CONTRACT DOCUMENTS
FOR CONSTRUCTION OF

SWWTP SLUICE GATE REPLACEMENT

Bid #B002-23

BROWNSVILLE
PUBLIC UTILITIES BOARD

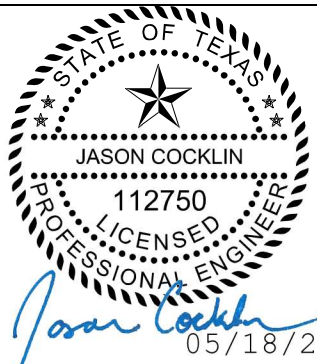
FREESE AND NICHOLS

Freese and Nichols, Inc.

800 N. Shoreline Blvd. Suite 1600N / Corpus Christi, TX / 361-561-6500

October 2022

00 01 07 DESIGN PROFESSIONAL SEALS

	Specification Sections Sealed
 FREESE AND NICHOLS, INC. TEXAS REGISTERED ENGINEERING FIRM F-2144	Division 02 40 05 50

	Specification Sections Sealed
 FREESE AND NICHOLS, INC. TEXAS REGISTERED ENGINEERING FIRM F-2144	Division 26 40 90 02

	Specification Sections Sealed
 FREESE AND NICHOLS, INC. TEXAS REGISTERED ENGINEERING FIRM F-2144	Division 03 Division 05

	Specification Sections Sealed
 9-30-2022 FREESE AND NICHOLS, INC. TEXAS REGISTERED ENGINEERING FIRM F-2144	Division 00 Division 01

END OF SECTION

00 01 10 TABLE OF CONTENTS

END OF SECTION

00 01 15 LIST OF DRAWINGS

Sheet No.	Sheet Title
Cover	Cover Sheet
G-1	Index of Drawings
G-2	General Notes and Standard Symbols
C-1	Partial Site Plan
M-1	Chlorine Contact Basins Plan, Section and Detail
S-1	Structural Notes
S-2	Chlorine Contact Basin Structural Plan, Section and Detail
S-3	Structural Details
E-1	Legend I
E-2	Legend II
E-3	Partial Site Plan
E-4	Effluent Electrical Building
E-5	Chlorine Contact Basin Plan
E-6	Diagrams and Duct Bank Details
E-7	Details I
E-8	Details II
PI-1	Legend I
PI-2	Loop Diagrams

END OF SECTION

00 45 02 NON-COLLUSION CERTIFICATION

STATE OF _____ §

COUNTY OF _____ §

Owner: Brownsville Public Utilities Board
1155 FM511
Olmito, TX 78575

Contract: SWWTP Chlorine Contact Basins Gate Replacement
BID #B002-23

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

Certified this _____ day of _____ 20 _____ .

Offeror: _____
(typed or printed name of organization)

Signature: _____
(individual's signature)

Name: _____
(typed or printed)

Title: _____
(typed or printed

Business Address:

_____

_____

_____

Phone: _____ Email: _____

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

END OF SECTION

TABLE OF CONTENTS

PART I - BROWNSVILLE PUBLIC UTILITIES BOARD CONTRACT SPECIFICATION

DIVISION 0 – BIDDING REQUIREMENTS, FORMS OF CONTRACT, BOND AND PROPOSAL

DESCRIPTION **PAGE No**

LEGAL NOTICE
AND
INVITATION TO BID
BID #B002-23

Sealed bids will be received by the PUBLIC UTILITIES BOARD of the City of Brownsville, Texas ("BPUB", "OWNER"), at the PUB Purchasing Department office; 1155 FM511, Olmito, TX 78575 **until 5:00 PM, local prevailing time, on October 26, 2022,** for the Project described in the Contract Documents and Specifications entitled:

SOUTH WASTEWATER TREATMENT PLANT (SWWTP) SLUICE GATE REPLACEMENT

Bids received after this time will not be considered.

Bids will be publicly opened and read aloud on October 27, 2022, at 10:00 AM. Bidders can request a copy of the bid tabulation by emailing dsolitaire@brownsville-pub.com. Vendors can call in at 10:00 AM, October 27, 2022, to (956) 214-6020 to listen to the bid opening.

The Work in general includes, but is not limited to:

1) The South WWTP has three chlorine contact basins (CCB) and each basin has an existing influent gate used for isolation. Specific improvements include the following for the CCB Influent Gates 1, 2 and 3:
    a. Removal of existing sluice gate F104 and installation of a new sluice gate F104 upstream in the influent channel.
    b. Removal of existing sluice gate F105 and installation of a new sluice gate F105 upstream in the influent channel.
    c. Removal of existing sluice gate F100, construction of a new concrete wall downstream of the existing gate and installing a new sluice gate F100 on the new wall.
    d. Replacing the manual crank of all three gates with an electric actuator with the ability to control the gates remotely.
    e. Associated structural, mechanical, electrical, instrumentation, and controls improvements.

Copies of the Contract Documents and Specifications may be obtained at the following website https://www.brownsville-pub.com/rfp_status/open/. A non-mandatory pre-bid conference shall be held at the BPUB Purchasing Department via conference call (956) 214-6020 at 10:00 AM, local prevailing time, on October 11, 2022.

Each bid, in duplicate, shall be enclosed in a sealed envelope and shall be plainly marked on the outside of the envelope: **"BID #B002-23 SOUTH WWTP SLUICE GATE REPLACEMENT, OCTOBER 26, 2022, 5:00 PM".** This envelope shall be addressed to Diane Solitaire; Brownsville Public Utilities Board; Purchasing Department; 1155 FM 511, Olmito, Texas 78575.

Each bid shall constitute an offer to the Board, as outlined therein, and shall be irrevocable for at least ninety (90) calendar days after the time announced for the opening thereof.

Each bid shall be accompanied by a Certified or Cashier's check payable to the order of the Brownsville Public Utilities Board, City of Brownsville, Texas for a sum not less than five (5%) percent of the total amount bid. In lieu of a check, a Bid Bond with a Corporate Surety licensed to do business in the State of Texas, may be submitted in an amount not less than five (5%) percent of the total amount bid conditioned that the BIDDER will pay the BPUB, as mutually agreed to liquidated damages, and not as a penalty, the amount specified in the Bond, unless he enters into a BPUB contract in accordance with his bid. BIDDER is required to execute a contract and furnish a Performance Bond, Payment Bond and a Certificate of Insurance. If the BIDDER fails to execute the contract and to furnish satisfactory Performance and Payment Bonds and Insurance Certificates within ten (10) calendar days from the date on which he is notified that his bid has been accepted, the amount of his check or bid bond shall be forfeited to the BPUB as mutually agreed to liquidated damages, and not as a penalty. **No bid will be considered if the Bid Security is not submitted.**

The BPUB will not be responsible in the event that the U.S. Postal Service or any other courier system fails to deliver the sealed bids to the Brownsville Public Utilities Board, Purchasing Office by the given deadline above. **No bids will be accepted via facsimile or electronic transmission.**

The BPUB specifically reserves the right to reject any or all bids, to waive irregularities or informalities in any or all bids and to accept any bid which is deemed to be in the best interest of the Board or to reject the bids. The award will be made to the responsive and responsible bidder submitting the lowest bid as determined by the BPUB.

Equal Opportunity in Employment - All qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin. Bidders will be required to comply with the President's Executive Order No. 11246, as amended by Executive Order 11375, and as supplemented in Department of Labor regulations 41 CFR, Part 60. The requirements for bidders and contractors under this Order are explained in the Specifications.

Diane Solitaire
Purchasing Department
(956) 983-6366

INSTRUCTIONS TO BIDDERS

Please submit this page upon receipt

Acknowledgment Form

SOUTH WWTP SLUICE GATE REPLACEMENT

BID #B002-23

For any clarifications, please contact Diane Solitaire at the Brownsville Public Utilities Board, Purchasing Department at (956) 983-6366 or e-mail: dsolitaire@brownsville-pub.com

Please e-mail this page upon receipt of the bid package or legal notice. If you only received the legal notice and you want the bid package mailed, please provide a method of shipment with account number in the space designated below.

Check one:

( ) Yes, I will be able to send a bid; obtained bid package from website.

( ) Yes, I will be able to send a bid; please email the bid package.
Email: _____

( ) Yes, I will be able to send a bid; please mail the bid package using the carrier & account number listed below:
Carrier: _____
Account: _____

( ) No, I will not be able to send a bid for the following reason:

_____

_____

If you are unable to send your bid, kindly indicate your reason for "No bid" above and return this form **via email to dsolitaire@brownsville-pub.com.** This will ensure you remain active on our vendor list.

Date _____

Company:_____

Name:_____

Address:_____

City: _____State:_____ Zip Code: _____

Phone: _____Fax: _____

Email:_____

Special Instructions

Contract Information

- **Interpretation**

Questions concerning terms, conditions, and Technical Specifications should be directed to:

Diane Solitaire, Materials/Warehouse Manager
email: dsolitaire@brownsville-pub.com

Tentative Time Line

1. October 3, 2022 through October 26, 2022 – Vendor bid preparation.
2. October 26, 2022 at 5:00 PM - **Vendor must submit bid, in duplicate, sealed in an envelope to:**

Diane Solitaire, Materials/Warehouse Manager
1155 FM 511
Olmito, TX 78575

Bid #B002-23 – South WWTP Sluice Gate Replacement
Due October 26, 2022 at 5:00 PM

The above noted information must be included on bid envelope and on any carrier's envelope/package. The Brownsville Public Utilities Board will not be held responsible for missing, lost or late mail. Brownsville Public Utilities Board will not accept electronic transmissions or facsimiles of sealed bids.

3. October 11, 2022 – Pre-Bid Conference at 10:00 AM
4. October 27, 2022 - Open bids at 10:00 AM
5. October 27, 2022 – November 18, 2022 - Evaluate bids
6. November 18, 2022 - Deadline to provide final recommendations for Board approval.
7. December 12, 2022 - Send to Utilities Board for formal and possible Contract award approval

- **"Or Equal"**

Brand name and/or manufacturer's references used in this Request are descriptive – not restrictive – they are intended to generally indicate type and quality desired. Brands of like nature and quality will generally be considered. If bidding on other than referenced Specifications, please provide complete descriptive information of said material/equipment article. BPUB also reserves the legal right to specify a "sole source" component if such component is critical for integration to a larger

BPUB assembly and alternative manufactured items will not meet the design and/or performance needs of the BPUB, in BPUB's sole discretion.

- **Pricing**

Bid unit prices on BPUB estimated quantities specified, extend and show total. In case of errors in extension, unit prices expressed in written words and not numerals, shall govern. Prices shall remain firm throughout the Contract.

All fields (UNIT PRICE & TOTAL PRICE) in the Bid Schedule must be filled in. The data must be complete to identify any bidding brand called for specifically.

Failure to submit any of the above information with the sealed bid may disqualify bid as non-responsive.

- **Contractor Representative**

The successful contractor agrees to send a personal representative with binding authority for the company to the Brownsville Public Utilities Board, upon request, to make any minor clarifications or adjustments and/or assist with coordination of all transactions as needed to allow Contract entry.

- **Quality of Products**

All material and equipment items specified must be new, in first class condition, including containers suitable for shipment and storage. No substitutions in standard grades or lesser quality will be accepted.

- **Determining Factors for Award**

1. Price
2. Responsibility of contractor to perform the intended work and responsiveness to the bid request.
3. Compliance with requirements of the Technical Specifications
4. Quality of performance on previous work on similar contracts
5. Recent successful completion of similar projects
6. BPUB financial and legal responsibility evaluations of any identified teaming arrangements involving significant joint ventures, sub-contractors and suppliers
7. Safety record will be considered when determining the responsibility of the bidder

- **Contract with Vendor/Entity Indebted to BPUB**

It is a policy of the BPUB to refuse to enter into a contract or other transaction with an individual, sole proprietorship, joint venture, Limited Liability Company or other entity indebted to BPUB.

- **Vendor ACH (Direct Deposit) Services**

The BPUB has implemented a payment service for vendors/contractors by depositing the contract payment directly to the contractor's/vendor's bank account. Successful vendor(s)/contractors will

be required to receive payments directly through Automated Clearing House (ACH) in lieu of a paper check. **The awarded vendor must agree to receive payments via ACH (Direct Deposit).**

- **Tax Identification Number (TIN)**

In accordance with IRS Publication 515, aW9 form, or a W8 form in cases of a foreign vendor, will be required of all vendors doing business with the Brownsville PUB. If a W9 or W8 form is not made available to Brownsville PUB, the first payment will be subject to income tax withholding at a rate of 28% or 30% depending on the U.S. status and the source of income as per IRS Publication 515. **The W9 or W8 form must be included with bid response.** Attached are sample forms.

- **Taxes**

The City of Brownsville and its Brownsville Public Utilities Board are exempt from Federal Excise Tax, State Tax and local sales Taxes. Do not include any taxes in the bid proposal. If it is later determined that tax was included in the bid it will not be included in the tabulation or any awards. Tax exemption certificates will be furnished by BPUB upon request.

- **Signing of Bid**

Failure to sign bid will disqualify it. Person signing bid should show title or legal authority to bind their firm to a Contract.

- **EEOC Guidelines**

During the performance of this Contract, the contractor agrees not to discriminate against any employee or applicant for employment because of race, national origin, age, religion, gender, sexual preference, marital or veteran status, or physically challenging condition.

- **Living Wage Statement**

On April 16, 2007, the BPUB Board of Directors approved a local "living wage" policy that requires all Contractors and Subcontractors performing 100% Non-Federally funded Work for the BPUB, to pay a minimum wage rate of $8.00/hour. The BPUB requires that all Contractors and Subcontractors comply with this policy. Otherwise, the BPUB adopts the Federal Department of Labor Wage scales for Cameron County on 100% Non-Federally funded projects as specified later herein in the Supplementary Conditions.

- **Contract and Purchase Order**

The services shall be completed in a timely manner as specified in Specifications. A Contract for the services will be placed into effect by means of a purchase order and/or Construction Agreement issued by the Brownsville Public Utilities Board after tabulation and final Contract approval by the Board.

- **Brownsville Public Utilities Board Rights**

    1. If only one or no bid is received by "submission date", the BPUB has the right to reject, re-bid, accept and/or extend the bid by up to an additional two (2) weeks from original submission date.
    2. The right to reject any/or all bids and to make award as it may appear to be advantageous to the Brownsville Public Utilities Board.
    3. The right to hold bid for 90 calendar days from submission date without action, and to waive all informalities in any bid.
    4. The right to extend the total bid beyond the original 90-calendar day period prior to an award, if agreed upon in writing by all parties (BPUB and vendor/contractor) and if bidder/vendor holds original bid prices firm.
    5. The right to terminate for cause or convenience all or any part of the unfinished portion of the Project resulting from this solicitation within seven (7) calendar days written notice; for cause: upon default by the vendor/contractor, for delay or non-performance by the vendor/contractor; or if it is deemed in the best interest of the BPUB for BPUB's convenience. (See, General Conditions Article 15)

- **Corrections**

Any interpretation, correction, or change of the Invitation to Bid will be made by written ADDENDUM. Changes or corrections will be issued by the Brownsville PUB Purchasing Department. **Addenda will be emailed to all who have returned the Bid Acknowledgment form.** Addenda will be issued as expeditiously as possible. It is the responsibility of the vendors/contractors to determine whether all Addenda have been received. It will be the responsibility of all respondents to contact the Brownsville PUB prior to submitting a response to the Invitation to Bid to ascertain if any/all Addenda have been issued, and to obtain any all Addenda, execute them, and return Addenda with the response to the Invitation to Bid. Addenda may also be posted on BPUB's website.

1. RECEIPT AND OPENING OF BIDS:

The Brownsville Public Utilities Board, City of Brownsville, Texas (hereinafter called OWNER), invites bids on the form attached hereto, all blanks of which must be appropriately filled in, in ink, for Project entitled **"Bid #B002-23, SOUTH WWTP SLUICE GATE REPLACEMENT".**

The OWNER may consider informal and non-responsive, any bid not prepared and submitted in accordance with the provisions hereof and may waive any informalities or reject any and all bids. Any bid may be withdrawn by vendor/contractor prior to the above scheduled time for the opening of bids or OWNER authorized postponement thereof. Any bid received after the time and date specified shall not be considered. No BIDDER may withdraw a bid within at least ninety (90) calendar days after the actual date of the opening thereof.

2. INSPECTION OF SITE:

Each BIDDER shall visit the Project site of the proposed Work and fully acquaint himself with the

existing conditions there relating to construction and labor, and shall fully inform himself as to the facility involved, the difficulties and restrictions attending the performance of the Contract. The BIDDER shall thoroughly examine and familiarize himself with the Drawings, Technical Specifications, and all other Contract Documents. The Contractor, by the execution of the Contract, shall in no way be relieved of any obligation under it due to his failure to receive or examine any form or legal instrument, or to visit the Project site and acquaint himself with the conditions there existing and the OWNER will be justified in rejecting any claim for extra time, or compensation, or both, based on facts regarding which Contractor should have been on notice as a result of such a diligent Project site visitation. Visits to the Project site shall be arranged by calling Ricardo Pineda, Senior Graduate Engineer, at telephone no. 956-983-6227.

3. PREPARATION OF BID AND USE OF SEPARATE BID FORMS:

These Contract Documents include a complete set of bidding documents. The BIDDER shall copy all Documents listed in the table of contents under the heading BIDDING DOCUMENTS and shall submit two sets (original signed and one signed photocopy) of his bid on these forms. A bid shall be comprised of the BIDDING DOCUMENTS completed by the BIDDER plus supplemental information required by the Specifications and Contract Documents.

If any of the information submitted as part of the bid is considered to be proprietary by the BIDDER, he shall conspicuously identify such intended confidential information in his bid. BPUB is subject to the provisions of the Texas Public Information Act and cannot legally guarantee confidentiality of submittals and may need to consult with its legal counsel and the Texas Attorney General in rendering decisions on any requested disclosures.

a) Preparation. Each bid shall be carefully prepared using the bid and bid data forms included as a part of the bidding documents. Entries on the bid and bid data forms shall be typed, using dark black ink, or legibly written in black ink. All prices shall be stated in written words and numeric figures, except where the forms provide for figures only. In case of discrepancy, especially in any sum total extensions, the amount shown in written words will generally prevail over numeric unit prices.

   The BIDDER shall acknowledge, in the space provided in the bid form, receipt of each Addendum issued for the Specifications and Documents during the bidding period.

   The BIDDER shall assemble all drawings, catalog data, and other supplementary information necessary to thoroughly describe Work, materials and equipment covered by the bid, and shall attach such supplemental information to the copies of the Specifications and documents submitted.

b) Signatures. Each BIDDER shall sign the bid with his usual signature and shall give his full business title and address. The BIDDER's corporate name stated on the bid shall be the exact legal name of the firm. The names of all persons signing should also be typed or printed below the signature.

Bids by partnerships shall be signed with the partnership name followed by the signature and designation title/officer of one of the partners or other authorized representative. A complete list of the partners shall be included with the bid.

Bids by a corporation shall be signed in the official corporate name of the corporation, followed by the signature and designation of the "president," "secretary," or other legally appropriate person authorized to bind the corporation.

A bid by a person who affixes to his signature the word "president," "secretary," "agent," or other designation, without disclosing his principal corporation, will be rejected. Satisfactory evidence of the legal authority of the officer signing on behalf of the corporation shall be furnished. Bidding corporations shall designate the state in which they are incorporated and the address of their principal office.

c) Submittal. The original signed bid (and its accompanying photocopy) shall be transmitted to arrive at the designated BPUB address not later than the date and time stipulated in the Legal Notice and Invitation to Bid.

Submit the original signed bid (and its accompanying photocopy) to:

Brownsville Public Utilities Board
1155 FM 511
Olmito, Texas 78575
Attention: Ms. Diane Solitaire
Purchasing Department

Each bid must be submitted in duplicate as stated above (original signature and photocopy), in a sealed envelope bearing on the outside the name of the BIDDER, his address, and the name of the Project for which the bid is submitted. If forwarded by mail, the sealed envelope containing the bid itself must be enclosed in another mailing envelope addressed as specified in the bid form.

4. METHOD OF BIDDING: UNIT PRICE AND LUMP SUM.

Prices shall be firm, not subject to qualification, condition or adjustment. Prices shall be in United States dollars. Prices shall be lump sum, except where unit prices are requested by the bid forms. When unit price items are required by the bid, the unit prices for each of the several items in the bid of each BIDDER shall include its pro-rata share of overhead, so that the sum of the products obtained by multiplying the quantity shown for each item, by the unit price bid, represents the total bid. Any bid not conforming to that requirement may be rejected as informal and non-responsive. The special attention of all BIDDERS is called to this provision, (See: General Conditions paragraph 11.9) for should conditions make it necessary to revise any unit price quantities, generally, a fifteen (15%) percent plus or minus tolerance quantity limit will be fixed for such increased or decreased quantities for which no extra compensation will be allowed, provided the net monetary value of all such additive and subtractive changes in quantities of such items of work pursuant to public competitive bidding statutes (i.e., difference in cost) shall not cumulatively increase or decrease the original Contract Price by more than twenty-five (25%) percent. A

proposed decrease only, that exceeds twenty-five (25%) percent of the original Contract Price must be agreed to in writing in advance by the Contractor.

5. DISCLOSURE BY BIDDER:

Each BIDDER shall submit with the bid documents, on the form furnished for that purpose, his Pre-Bid Disclosure Statement showing his experience record in performing the type of work embraced in the contract, his organization and equipment available for the work contemplated, and, when specifically requested by the OWNER, a detailed financial statement. The OWNER shall have the right to take such steps as it deems necessary, including telephonic contact to other owner references, to determine the ability and responsibility of the BIDDER to perform his obligations under the Contract and the BIDDER shall be responsive in furnishing the OWNER all such information and data for this purpose as it may request. OWNER reserves the right to reject any bid where an investigation of the available evidence or information does not satisfy the OWNER that the BIDDER is responsible to properly carry out the terms of the Contract. This shall also apply to any proposed subcontractor(s).

6. SUBCONTRACTS:

The BIDDER is specifically advised that any person, firm, or other party to whom it is proposed to award a subcontract under this Contract must be acceptable to the OWNER, and that a Pre-Bid Disclosure Statement for each proposed subcontractor must also be submitted with the bid documents.

7. BID SECURITY:

Each bid must be accompanied by a certified or cashier's check, or a bid bond prepared on the form of the bid bond attached hereto, duly executed by the BIDDER as principal, and having as surety therein a surety company approved by the OWNER, and authorized to do business in the State of Texas, in the amount of not less than five (5%) percent of the total bid amount, but not less than $2,500.00. Such checks, or bid bonds will be returned to all except the three lowest BIDDERS within fifteen (15) calendar days after the opening of bids, and the remaining checks, or bid bonds will be returned promptly after the OWNER and the accepted successful BIDDER have executed the Contract or if no award has been made, within Ninety (90) calendar days after the date of the opening of bids. The bid security will be returned upon demand of the BIDDER at any time thereafter, so long as he has not been notified of the acceptance of his bid.

8. ADDENDA AND INTERPRETATIONS:

No oral interpretations by OWNER and its representatives shall be binding upon OWNER as to the meaning of the Plans, Specifications, Contract Documents, or other pre-bid documents.

Every request for such interpretation should be made in writing, addressed to Diane Solitaire, BPUB Purchasing Department. Any interpretation, correction, or change to the Invitation to Bid will be made by ADDENDUM. Changes or corrections will be issued by the Brownsville PUB Purchasing Department only and will be on file at the BPUB Department mentioned above.

Addenda will be emailed or faxed to all who have returned the acknowledgement form. Addenda will be issued as expeditiously as possible. It is the BIDDER's responsibility to inquire as to any Addenda issued and failure of any BIDDER to receive any such Addenda or interpretation shall not relieve such BIDDER from any obligation under his bid as submitted. All Addenda so issued shall become part of the Contract Documents. Addenda may also be posted on BPUB's webpage.

Exceptions or conditional qualifications by the BIDDER to the Plans, Technical Specifications, Contract Documents, or other pre-bid documents will not be permitted at the time of submitting the Bid Documents to the OWNER, and any exceptions or conditional qualifications taken by BIDDER, will automatically deem the bid conditional and non-responsive and subject to OWNER rejection.

9. FACSIMILE MODIFICATION:

Any BIDDER may modify (not originally submit) his bid by facsimile communication at any time prior to the scheduled bid closing time for receipt of bids, provided such communication is received by the OWNER, in the BPUB Purchasing Department, prior to the bid closing time, and provided further, the OWNER is satisfied that a written confirmation of the facsimile modification, over the original signature of the BIDDER, was also mailed prior to the bid closing time. The facsimile communication should not reveal the total bid price, but only should provide the clarification, addition or subtraction, or other modification, so that the final bid prices or terms intended will not be known by the OWNER, until the original sealed bid is opened and the Bidder's intended modification computed by OWNER.

Revised bids submitted before the opening of bids, whether forwarded by mail or facsimile, if representing an increase in excess of two percent (2%) of the original bid submittal, must have the bid security (bid bond or check) adjusted accordingly; otherwise the bid will not be considered responsive.

If the written and originally signed confirmation of a bid revision is not received within three (3) calendar days after the bid closing time, no consideration will be given to any proposed adjustment contained in the facsimile modification.

10. TIME FOR RECEIVING BIDS:

Bids received prior to the advertised hour of opening will be securely kept sealed by BPUB. The officer whose duty it is to open them will decide when the specified time has arrived, and no bid received thereafter will be considered; except that when a bid arrives by mail after the time fixed for opening, but before the public reading of all other bids is completed, and it is shown to the satisfaction of the OWNER that the non-arrival on time was due solely to delay in the mails for which the BIDDER was not responsible, such bid will be received and considered.

BIDDERS are cautioned that, while facsimile modifications of bids may be received as provided above, such modifications, if not explicit and if in any sense subject to misinterpretation, shall make the bid so modified or amended, subject to rejection for non-responsiveness.

11. OPENING OF BIDS:

At the time and place fixed for the public opening of bids, the OWNER will cause to be opened and publicly read aloud every bid received within the time set for receiving bids, irrespective of any irregularities therein. BIDDERS and other persons properly interested in a bid (subcontractors, suppliers, etc.) may be present, in person or by representative, but shall carry identification and present same to BPUB as requested.

12. WITHDRAWAL OF BIDS:

Bids may be withdrawn on written, facsimile or electronic transmission request dispatched by the BIDDER in time for delivery in the normal course of business prior to the time fixed for bid opening; provided, that written confirmation of any facsimile withdrawal over the signature of the BIDDER is placed in the mail and postmarked prior to the time set for bid opening. The bid security of any BIDDER withdrawing the bid in accordance with the foregoing conditions will be returned promptly.

13. AWARD OF CONTRACT: REJECTION OF BIDS:

The Contract will be awarded to the responsive and responsible BIDDER submitting the lowest bid complying with the conditions of the Legal Notice and Invitation for Bids. The BIDDER to whom the award is made will be notified at the earliest possible date. The OWNER, however, reserves the right to reject any and all bids and to waive any informality in bids received, whenever such rejection or waiver is in BPUB's interest.

The OWNER reserves the right to consider as not responsible, any BIDDER who does not habitually perform with his own forces the major portions of the Work involved in construction of the improvements embraced in this proposed Contract. This provision is meant to prevent wholesale assignment and "brokering" of awarded contracts.

14. EXECUTION OF AGREEMENT: PERFORMANCE AND PAYMENT BOND:

Subsequent to the Notice of Award and within ten (10) calendar days after the prescribed forms are presented for signature, the successful BIDDER shall execute and deliver to the OWNER an Agreement in the form included in the Contract Documents in such number of copies as the OWNER may require.

Having satisfied all conditions of award as set forth elsewhere in these Documents, the successful BIDDER shall, within the period specified in the preceding paragraph, furnish a Performance Bond and Payment Bond, in accordance with the following parameters:

a.) For a Contract in excess of $100,000.00, a Performance Bond shall be executed in the full amount of the Contract, conditioned upon the faithful and timely performance of the Work in accordance with the Plans, Specifications, and Contract Documents. Said Bond shall be solely for the protection of the OWNER.

b.) For a Contract in excess of $50,000.00, a Payment Bond shall be executed in the full amount of the Contract, solely for the protection of all proper claimants supplying labor and material in the prosecution of the Work provided for in the Contract, for the use of each such claimant perfecting a proper and timely claim. Payment Bonds are required under Texas law, since no mechanics' liens are allowed against BPUB's public property assets.

When bonds are required, they shall serve as security for the faithful performance of the Contract, and for the payment of all persons, firms or corporations to whom the Contractor may become legally indebted to for labor, materials, tools, equipment, or services of any nature, including utility and transportation services employed or used by him in performing the Work. Such bonds shall be in the same form as that included in the Contract Documents and shall bear the same date as, or a date subsequent to that of the Agreement. The current power of attorney for the person who signs for any surety company shall be attached to such bonds. These bonds shall be signed by a guaranty or surety company legally authorized to do business in the State of Texas and appearing on the most recently issued (as of the date of bid opening) federally qualified U. S. Treasury Circular 570 List of Approved Sureties.

The failure of the successful BIDDER to execute such Agreement and to supply the required bonds and insurance certificates within ten (10) calendar days after the prescribed forms are presented for signature, or within such extended period as the OWNER may grant in writing, based upon reasons determined sufficient by the OWNER, shall constitute a default, and the OWNER may either award the Contract to the next lowest responsive and responsible BIDDER, or re-advertise for bids, and may charge against the defaulting BIDDER the difference between the amount of the defaulted bid and the amount for which a final Contract for the Work is subsequently executed, irrespective of whether the amount thus due exceeds the amount of the bid bond. If a more favorable bid is received by re-advertising, the defaulting BIDDER shall have no claim against the OWNER for a bid bond refund.

15. LIQUIDATED DAMAGES FOR FAILURE TO ENTER INTO CONTRACT:

The successful BIDDER, upon his failure or refusal to execute and deliver the Contract, Bonds and insurance certificates required within ten (10) calendar days after he has received BPUB notice of the acceptance of his bid, shall forfeit to the OWNER, as mutually agreed to liquidated damages (and not as a penalty) for such failure or refusal, the security provided in the bid bond or otherwise deposited with his bid.

16. TIME OF COMPLETION AND LIQUIDATED DAMAGES:

BIDDER agrees by submission of his bid that PERFORMANCE TIME IS OF THE ESSENCE OF THIS CONTRACT and further agrees to commence Work on the date to be specified in a BPUB written "Notice to Proceed" issued by the OWNER and to Substantially Complete the Project as provided in Article 3 of the Construction Agreement.

BIDDER agrees by submission of his bid to pay as mutually agreed to liquidated damages, and not as a penalty, the sum as provided in said Construction Agreement, Article 3.

17. NOTICE OF SPECIAL CONDITIONS:

Attention is particularly called to those parts of the Contract Documents and Specifications which address the following:

A. Access to Work - Inspection and testing of materials.
B. Insurance requirements.
C. Indemnification by Contractor
D. Wage and Hour Provisions.
E. State Sales and Use Tax Exemption Provisions.
F. Subsurface Geologic Conditions.
G. Certification Regarding Debarment, Suspension and other Responsibility Requirements (EPA 5700-49).

18. LAWS AND REGULATIONS:

The BIDDER's attention is directed to the fact that all applicable federal, State and local laws, statutes, ordinances, codes and the rules and regulations of all authorities having jurisdiction over construction of the Project, as may be periodically amended, shall apply to the Contract throughout, and they will be mutually deemed to be included in the Contract, the same as though herein written out in full.

19. EQUAL EMPLOYMENT OPPORTUNITY:

Attention of BIDDERS is particularly called to the requirement for ensuring that employees and applicants for employment are not discriminated against because of their race, religion, gender, age, sexual preference, physically challenging condition or national origin.

Equal Opportunity in Employment - All qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin. Bidders will be required to comply with the President's Executive Order No. 11246, as amended by Executive Order 11375, and as supplemented in Department of Labor regulations 41 CFR, Part 60. The requirements for bidders and contractors under this order are explained in the General Conditions.

20. PRE-BID CONFERENCE:

A virtual pre-bid meeting between the OWNER, prospective bidders, suppliers, etc., will be held to answer any questions concerning the Work. No Addenda will be issued at this meeting. Subsequent thereto, if necessary to clear up any written questions, a written Addendum will be issued by the OWNER to all pre-bid conference attendees. The pre-bid meeting will be held at the place, time and date indicated in the Legal Notice. Attendance at the Pre-Bid Conference is NOT mandatory for prospective bidders.

21. SUBMITTAL OF TRENCH SAFETY DESIGN: (RESERVED)

For Work involving excavations generally deeper than five (5) feet within narrow trenches, the apparent low BIDDER shall provide the OWNER with a Trench Safety System Plan and a

certificate signed and sealed by a Registered Professional Engineer licensed by the State of Texas, within twenty-one (21) calendar days after the date of the opening of Bids prior to award of the Contract. Failure to timely comply may disqualify BIDDER. This Section may be "Reserved" by BPUB if not applicable to the Work.

22. INFORMATION TO BE SUBMITTED WITH BID:

Each BIDDER shall submit with his bid, the following:

a) Equipment and Materials. In addition to the information submitted on the bid and bid data forms, each BIDDER shall submit all specifications, preliminary drawings, and similar descriptive information necessary to describe completely the equipment and materials he proposes to furnish.

The bid shall be based on using new equipment and materials, which comply with the Specifications and Contract Documents in every respect, unless existing equipment is specifically noted by OWNER for reuse. If alternate or "equal" equipment and materials are indicated in the bid, it shall be understood that the OWNER will have the option of selecting any one of the alternates so indicated and such selection shall not be a cause for extra contractor compensation or extension of time. OWNER specifically reserves the legal right to specify "sole source" equipment or materials in the Specifications when unique circumstances warrant.

b) Contractor's Field Organization and Safety Record.

(i) An organization chart showing the names of field management, supervisory, technical personnel, and number of employees/workforce available and the details of the management, supervisory, and technical organization which he proposes to use for this Project. The successful BIDDER's organizational concept will be subject to the review and acceptance of the OWNER.

(ii) The experience record of the Contractor's field superintendent(s) shall be submitted with the bid.

(iii) The Contractor's job-safety record summary for the previous five (5) years

(iv) The two most recent year's independently audited Financial Statements

(v) List of three (3) projects completed by CONTRACTOR of both similar size and scope over the past five (5) years

23. PREFERENCE LAW:

Bid evaluations will take into consideration any Preference Laws of the State of Texas, and any reciprocity laws of other states as they may be addressed by current Texas law.

24. SUBSURFACE GEOLOGIC CONDITIONS: (RESERVED)

Each BIDDER shall be responsible for determining prior to bidding, the types of subsurface materials which will be found. If test borings have been made on the Project site by the BPUB or its consultants, the locations and logs of the test borings are bound as an appendix to these Specifications and Documents.

It is to be expressly understood and acknowledged by the BIDDER, that any information on subsurface geology made available by OWNER for BIDDER'S convenience shall **not be a part of the Contract Documents and there is no expressed or implied guarantee of the data given, nor of the interpretation thereof.**

All excavation for this Project will be unclassified and the BIDDER shall be responsible for investigating and satisfying himself of subsurface geologic conditions (including the presence or likelihood of encountering soils requiring dewatering, rock or rock-like materials) prior to submitting his bid, which shall include any and all costs BIDDER associates with avoiding, managing or removing said subsurface geologic conditions without claim for extra compensation against OWNER.

Should BIDDER desire to perform on-site investigations prior to submitting his bid, he is required to notify the OWNER of such intentions and obtain OWNER's written permission not less than 48 hours prior to performing the investigation. BIDDER is responsible for obtaining all related insurance and necessary permits from all sources.

25. DISPOSAL OF EXCESS MATERIALS:

After completion of this Project there may be in some instances an excess of spoil material or waste material left over. In such cases where there is an excess of material, BIDDER shall load and haul it away from the job site and dispose of it in a legal manner so as not to: trespass; adversely impact any protected wetlands; adversely impact the 100 year flood plain; adversely impact any endangered species; or otherwise create drainage diversions or impoundments. No extra remuneration for this Work will be allowed.

26. EROSION AND SEDIMENT CONTROL MEASURES:

The BIDDER is expected to conduct his Work in such a manner as to minimize any soil erosion or sediment runoff from the construction site. Earth cuts and fills shall have smooth, flat side slopes, as generally indicated on the PLANS, to preclude erosion of the soil. Such operations should be timed consistent with the actual need for doing the Work and only to leave raw, unprotected surfaces for a minimum of time.

Existing lawns are to remain intact as far as practical. Such areas as are disturbed shall be duly restored by the BIDDER to as good as or better than original condition using the same type of grass, shrubs, or cover as the original. The BIDDER shall be responsible for correcting any erosion that occurs at his sole cost without claim for extra compensation.

As construction progresses, and in accordance with State and federal laws regulating stormwater runoff and management from construction sites greater than five acres in size, if applicable, (See: Section 405 of the Water Quality Act of 1987, Section 402(P) as amended), and at locations where erosion with sediment runoff occurs or is likely to occur, the BIDDER shall construct temporary ditches, perimeter siltation screens, retainage levees, drains, inlets, or other works to manage, prevent, or correct the possible conditions. Upon completion of the Work, such facilities shall be

removed by contractor.

During construction, the BIDDER shall take the necessary precautions to see that erosion is controlled and sediment runoff is prevented so as to protect the quality of any neighboring water bodies.

27. SAFETY PROVISIONS:

BIDDER shall provide barricades, flares, warning signs, and/or flagmen so that danger and inconvenience to the OWNER, public, and any job site working personnel, will be mitigated. In addition to any other requirements of the Contract Documents, the BIDDER shall be responsible for familiarity and compliance with all Federal (OSHA), State, railroad and local safety rules, laws and requirements.

28. PROTECTION OF PROPERTY AND EXISTING UTILITIES:

Within developed areas, all public and private property along and adjacent to the BIDDER'S operations, including roads, driveways, lawns, yards, shrubs, drainage gradients, and trees, shall be adequately protected, and when damages occur, they shall be repaired, replaced, or renewed or otherwise put in a condition equal to, or better than, that which existed before the BIDDER caused the damage or removal.

An attempt has been made by BPUB and the ENGINEER to locate and show all known existing utilities on the PLANS, but the possibility remains strong that some underground utilities may exist that have not been shown. The BIDDER, through mandatory contact with local utility owners, shall keep himself informed and take such precautions as necessary to avoid utility damage and unsafe working conditions for employees.

29. WAGES AND HOURS:

The most recent wage rate determination from the U.S. Department of Labor for Cameron County, Texas as amended within the previous three (3) years and as locally adopted by the BPUB, is a part of the Supplementary Conditions and controls minimum wage, hour and any fringe benefits, with the exception that no wage shall be paid below $8.00 as established locally by the BPUB.

A copy of the appropriate (building and/or heavy/highway) wage rate schedule(s) must be posted at the job site in both English and Spanish and kept posted in a conspicuous place on the site of the Project at all times during construction. The BIDDER shall familiarize himself with the included General and Supplementary Conditions Section entitled "Wage and Labor Standard Provisions - 100% Non-Federally Funded Construction." Copies of the current pre-bid wage rate schedule(s) are included in the Contract Documents, but the responsibility for initial posting and keeping same posted, rests upon the BIDDER.

30. WARRANTY/GUARANTEE:

The BIDDER shall warranty and guarantee the Work, equipment and materials for a period of at

least one (1) year after date of final acceptance in writing by the OWNER. During this period, the BIDDER shall make any repairs and/or replacements of defective equipment and materials and corrections of Work due to poor workmanship or manufacturing, all as may be required for full compliance with the General Conditions, Plans and Specifications. This combined workmanship quality guarantee, and minimal equipment and materials warranty, shall apply to all matters reported by the OWNER in writing within said one (1) year period and this post-construction guarantee/warranty period shall be included in the coverage period set forth in the Performance Bond.

31. STATE SALES AND USE TAX EXEMPTION:

Pursuant to 34 Texas Administrative Code 3.291, in order for the Brownsville PUB to continue to benefit from its status as a State Sales and Use Tax Exempt Organization. Construction contracts must be awarded on a "separated contract" basis. A "separated contract" is one that distinguishes the value of the tangible personal property (materials such as pipe, bricks, lumber, concrete, paint, etc.) to be physically incorporated into the Project realty, from the total Contract Price. Under the "separated contract" format, the Contractor in effect becomes a "seller" to the Brownsville PUB of materials that are to be physically incorporated into the Project realty. As a "seller", the Contractor will issue a "Texas Certificate of Resale" to the supplier in lieu of paying the sales tax on materials at the time of purchase. The Contractor will also issue a "Certificate of Exemption" to the supplier demonstrating that the personal property is being purchased for resale and that the resale is to the Brownsville PUB, which is a sales tax exempt entity under UTCA Tax Code Section 151.309(5). Contractors should be careful to consult the most recent guidelines of the State Comptroller of Public Accounts regarding the sales tax status of supplies and equipment that are used and/or consumed during Project Work (gas, oil, rental equipment), but that are not physically incorporated into the Project realty. Such items are generally not tax exempt. Contractors that have questions about the implementation of this statute are asked to inquire directly with the State Comptroller of Public Accounts, Tax Administration Division, State of Texas, Austin, Texas 78774. Bidders will not include any federal taxes in bid prices since the City of Brownsville and Brownsville PUB are exempt from payment of such federal taxes. "Texas Certificates of Exemption", "Texas Certificates of Resale" and "Texas Sales Tax Permits" are forms available to the Contractor through the regional offices of the State Comptroller of Public Accounts.

BID
B002-23
BPUB Purchasing Department
1155 FM 511
Olmito, Texas 78575
Due: OCTOBER 26, 2022 at 5:00 PM

Bid of _____ hereinafter called BIDDER, a corporation organized and existing under the laws of the State of _____, or, a partnership, or an individual doing business as _____.

To the Brownsville Public Utilities Board of the City of Brownsville, Texas, hereinafter called OWNER.

Gentlemen:

The undersigned BIDDER, in compliance with your Invitation to Bid for the **SOUTH WWTP SLUICE GATE REPLACEMENT**, having read and examined the Plans and Specifications with related Contract Documents and visited the site of the proposed Work, and being familiar with all of the federal, state and local conditions surrounding the construction of the proposed Project, including the availability of materials and labor, hereby proposes to furnish all labor, materials, equipment and supplies, and to construct the Project in accordance with the Contract Documents, within the time set forth herein, and at the Total Base Bid Amount prior to OWNER options on additive/deductive alternates of: (in words and numeric figures)

_____

_____. These price(s) are to cover all expenses incurred in performing the Work required under the Contract Documents, of which this bid is a part. These price(s) are firm and shall not be subject to adjustment, provided this Bid is accepted by OWNER within ninety (90) calendar days after the time set for BPUB receipt of bids.

BIDDER hereby agrees to commence Work under this Contract on or before a date to be specified in a written "Notice to Proceed" to be issued by the OWNER, and to then fully complete the Project within the times established in Article 3 of the Construction Agreement. BIDDER further agrees to pay as liquidated damages, not as a penalty, for failure to do so, the sum(s) established in Article 3 of the Construction Agreement.

BIDDER agrees to perform all Work for which he contracts as described in the Technical Specifications and as shown on the Plans, for the prices indicated on the following Bid Form.

BID SCHEDULE
BASE BID – B002-23
BROWNSVILLE PUBLIC UTILITIES BOARD

The Bidder, in compliance with the Invitation for Bids for the **SOUTH WWTP SLUICE GATE REPLACEMENT,** having examined the scope of work and written Specifications, hereby proposes to furnish construction services for the following Unit prices and lump sums.

Base Bid					
Item No.	**Item Description**	**Unit**	**Estimated Quantity**	**Unit Price**	**Extended Amount**
Items in Base Bid per Section 01 29 01 "Measurement and Basis for Payment"					
A-01	Mobilization	LS	1	$	$
A-02	Demobilization	LS	1	$	$
A-03	Demolition and Removal of Existing Gates	LS	1	$	$
A-04	Installation of Sluice Gates and Actuators	LS	1	$	$

TOTAL AMOUNT OF BID (ITEMS A-01 - A-04): $_____

_____

(written in words)

NOTE: Quantities are estimated. The Brownsville PUB reserves the right to increase or decrease quantities as allowed by Texas law (plus or minus fifteen (15%) percent and as deemed necessary by OWNER, without impacting the quoted unit prices. Prospective bidders are encouraged to visit and assess the existing Project site and structures prior to submitting a bid.

BIDDER Acknowledges receipt of the following Addenda:

_____

_____

_____

SUBCONTRACTORS. The undersigned BIDDER proposes that he will be responsible to perform major portions of the Work at the Project site with his own forces and that specific portions of the Work not performed by the undersigned will be subcontracted and performed by the following subcontractors.

Work Subcontracted	Name of Subcontractor
_____	_____
_____	_____
_____	_____

Bid amounts are to be legibly shown in both words and figures. In case of discrepancy, the unit price amount written in words will govern.

The above lump sum and unit prices shall include all labor, materials, excavation, bailing, shallow groundwater dewatering, shoring, removal, backfill, overhead, profit, insurance, etc., to cover the finished Work of the several kinds called for.

BIDDER understands that the OWNER reserves the right to reject any or all bids and to waive any informalities in the bidding and to elect to opt for any additive or deductive alternates in arriving at a final Contract price.

BIDDER agrees that this bid shall be good and may not be withdrawn for a period of ninety (90) calendar days after the scheduled bid opening.

The undersigned hereby declares that only the persons or firms interested in the bid as principal or principals are named herein, and that no other persons or firms than are herein mentioned have any interest in this Bid or in the Contract to be entered into; that this Bid is made without connection with any other person, company, or entities likewise submitting a bid or bid; and that it is in all respects for and in good faith, without collusion or fraud.

Upon receipt of written notice of the acceptance of this bid, BIDDER will execute the formal Contract attached within ten (10) calendar days and deliver the Bonds and Insurance Certificates as required under the GENERAL CONDITIONS. The Bid security attached in the sum of _____ ($_____) is to become the property of the OWNER in the event the Contract, Bonds, and insurance certificates are not executed or delivered within the time above set forth, as mutually agreed to liquidated damages and not as a penalty for the delay and additional administrative expense to the OWNER caused thereby; otherwise the Bid security will be returned upon the signing of the Contract and delivering the approved Bonds and Insurance Certificates.

Seal affixed here if BID is by a Corporation:
Respectfully submitted,

By:_____
Signature **(Failure to sign disqualifies bid)**

_____
Title

_____
Address

_____

Attest:_____

BID BOND

STATE OF_____§
§ KNOW ALL MEN BY THESE PRESENTS:
COUNTY OF_____§

THAT WE, the undersigned,_____ _____ as Principal, and _____ as Surety, are hereby held and firmly bound unto the BROWNSVILLE PUBLIC UTILITIES BOARD OF THE CITY OF BROWNSVILLE, TEXAS, Obligee, as OWNER in the penal sum of _____ _____ for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, successors and assigns.

Signed, this _____ day of _____, 20__.

The Condition of the above obligation is such that whereas the Principal has submitted to the OWNER a certain BID attached hereto and hereby made a part hereof to enter into a Contract in writing, for construction of the **SOUTH WWTP SLUICE GATE REPLACEMENT.**

NOW, THEREFORE,

(a) If said BID shall be rejected, or

(b) If said BID shall be accepted and the Principal shall execute and deliver a Contract in the form of Construction Agreement attached hereto (properly completed in accordance with said BID) and shall timely furnish any Payment and Performance Bonds required for his faithful performance of said Contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall timely furnish proper Insurance Certificates, and shall in all other respects perform the Agreement created by the BPUB acceptance of said BID,

then this obligation shall be void. Otherwise the same shall remain in full force and effect, it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its BID BOND shall be in no way impaired or affected by an extension of the time within which the OWNER may accept such BID; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto legally set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed, and these presents to be signed by their legally authorized officers, the day and year first set forth above.

Signed, this _____ day of _____, 20__.

_____
Principal

_____
Surety

By:_____

IMPORTANT - Surety companies executing BONDS must be legally authorized by the State Board of Insurance to transact business in the State of Texas, and be currently listed as approved federal sureties in the most recently issued (as of the date of bid opening) edition of the U. S. Treasury Circular 570.

CONTRACTOR'S
PRE-BID DISCLOSURE STATEMENT

All questions must be answered or your bid may be deemed non-responsive and subject to rejection. The data given must be clear and comprehensive. **This statement must be notarized**. If necessary, questions may be answered on separate attached sheets. The Bidder may submit any additional relevant information he desires.

1. This Pre-Bid Disclosure Statement is submitted to the Brownsville Public Utilities Board by:_____

a Corporation, __ a Partnership, ___ a Texas Joint Venture, or __ an Individual.
Address: _____ Contractor's Telephone #: _____
City _____ State _____ Zip Code_____

2. Years in business under present business name:_____

3. Years of experience in construction work of the type called for in this Contract as: A General Contractor _____, A Subcontractor _____.

4. What projects has your organization completed? List most recent FIRST.

Contract	Type of Work	Date Completed	Owners Name and Address	Amount

5. What projects does your organization have under way as of this date?

Contract	Type of Work	Date Completed	Owners Name and Address	Amount

6. Have you ever failed to complete any work awarded to you?
___Yes ____ No. If "Yes", state where and why. _____
_____
_____
_____

7. Are you at present in any binding arbitrations and/or lawsuits involving construction work of any type?
___ Yes ___ No. If "Yes", explain: _____
_____
_____
_____
_____

8. Explain in detail the manner in which you have inspected the work and jobsite proposed in this contract:_____
_____
_____
_____

9. Explain in detail your plan or layout for performing the work proposed in this contract:
_____
_____
_____
_____

10. If this contract is awarded to you, your company's office administrative manager for the work will be Mr. (Ms.) _____, and your resident construction superintendent will be Mr. (Ms.) _____.

11. What experience in this type of work does the individual designated as resident superintendent above have? _____
_____
_____

12. What portions of the work do you intend to subcontract?_____
_____
_____
_____
_____
_____

13. What equipment do you own or lease that is available for the proposed work?

Quantity	Description, Size Capacity, Etc.	Condition	Years in Service	Present Location

14. Have you received firm offers from all suppliers or manufacturers for all major items of material and/or equipment within the Base Bid Amount used in preparing your bid? __ Yes __ No

15. Attach resumes for the principal members of your organization, including the officers as well as the proposed superintendent for the project.

Credit available: $_____ Bank Reference: _____

Bonding Capacity available: $_____

The undersigned hereby authorizes and requests any person, firm or corporation to furnish any information requested by either the Owner's Engineer or Owner in verification of the recitals comprising this Pre-Bid Disclosure Statement.

The signatory of this questionnaire guarantees the truth and accuracy of all statements herein made and all answers herein expressed.

Dated this ____ day of _____, 20__.

By: _____

Title:_____

STATE OF _____

COUNTY OF _____

Subscribed and sworn to before me this ____ day of _____, 20__.

_____
Notary Public
My commission expires: _____

SUBCONTRACTOR'S
PRE-BID DISCLOSURE STATEMENT

All Subcontractor questions must be answered or the General Contractor's Bid may be deemed non-responsive and subject to rejection. The data given must be clear and comprehensive. **This statement must be notarized**. If necessary, questions may be answered on separate attached sheets. The prospective Subcontractor may submit any additional relevant information he desires.

1. This Pre-Bid Disclosure Statement is submitted to the Brownsville Public Utilities Board by: _____

__ a Corporation, __ a Partnership, __ a Texas Joint Venture, or __ an Individual.

Address: _____ Contractor's #: _____
City _____ State _____ Zip Code_____

2. Years in business under present business name: _____

3. Years of experience in construction work of the type called for in this Contract as: A General Contractor _____, A Sub-contractor _____.

4. Have you ever previously worked as a subcontractor for this General Contractor? _____ Yes; _____ No; If yes, list three most recent projects in which your company has served as a subcontractor to this General Contractor.

_____
_____
_____

5. What projects has your organization completed? List most recent FIRST.

Contract	Type of Work	Date Completed	Owners Name and Address	Amount

6. What projects does your organization have under way as of this date?

Contract	Type of Work	Date Completed	Owners Name and Address	Amount

7. Have you ever failed to complete any work awarded to you?
___ Yes ____ No. If "Yes", state where and why. _____
_____
_____
_____

8. Are you at present in any binding arbitrations and/or lawsuits involving construction work of any type?
___ Yes ___ No. If "Yes", explain: _____
_____
_____
_____
_____

9. Explain in detail the manner in which you have inspected the work and jobsite proposed in this contract:_____
_____
_____
_____

10. Explain in detail your plan or layout for performing the work proposed in this contract:
_____
_____
_____
_____

11. If this subcontract is awarded to you by the general contractor, your company's office administrative manager for the work will be Mr. (Ms.) _____, and your resident construction superintendent will be Mr. (Ms.) _____.

12. What experience in this type of work does the individual designated as resident superintendent above have? _____
_____
_____

13. What portions of the work do you intend to subtier subcontract? _____
_____
_____
_____
_____
_____

14. What equipment do you own that is available for the proposed work?

Quantity	Description, Size Capacity, Etc.	Condition	Years in Service	Present Location

15. Have you received firm offers from suppliers or manufacturers for all major items of material and/or equipment within the price totals used in preparing your subcontractor bid?
__ Yes __ No

16. Attach resumes for the principal members of your organization, including the officers as well as the proposed superintendent for the project.

Credit available: $_____ Bank Reference: _____

Bonding Capacity available: $_____

The undersigned hereby authorizes and requests any person, firm or corporation to furnish any information requested by either the Owner's Engineer or Owner in verification of the recitals comprising this Subcontractor Pre-Bid Disclosure Statement.

The signatory of this questionnaire guarantees the truth and accuracy of all statements herein made and all answers herein expressed.

Dated this ____ day of _____, 20__.

By: _____

Title:_____

STATE OF _____

COUNTY OF _____

Subscribed and sworn to before me this ____ day of _____, 20__.

_____
Notary Public
My commission expires: _____

REQUIRED FORMS CHECKLIST

The following documents are to be submitted as a part of the Bid/RFP/RFQ document

NAME	FORM DESCRIPTION	SUBMITTED WITH BID	
		YES ☐	NO ☐
Required Forms (if applicable)	Acknowledgement Form	☐	☐
	Debarment Certificate	☐	☐
	Ethic Statement	☐	☐
	Conflict of Interest Questionnaire	☐	☐
	W9 or W8 Form	☐	☐
	Direct Deposit Form	☐	☐
	Residence Certification Form	☐	☐
Special Instructions (if applicable)	Bid Schedule/Cost sheet completed and signed	☐	☐
	Cashier Check or Bid Bond of 5% of Total Amount of Bid	☐	☐
	OSHA 300 Log	☐	☐
	Contractor Pre-Bid Disclosure completed, signed and notarized	☐	☐
	Sub-Contractor Pre-Bid Disclosure completed, signed, and notarized	☐	☐
		☐	☐
References	Complete the Previous Customer Reference Worksheet for each reference provided	☐	☐
Addenda		☐	☐
		☐	☐

Prospective Bidders are respectfully reminded to completely read and thoroughly respond to the BPUB Instructions for Bidders and Pre-Bid Disclosure Statement. When BPUB evaluates the Bids, it reviews indices regarding the prospective contractors' responsibility to perform the project based upon prior job performances for BPUB and other public owners. Additionally, BPUB carefully reviews the prospective contractors' responsiveness to the BPUB Bid Advertisement. Bidders should thoroughly check their submittal for completeness prior to responding to BPUB. Do not imbalance your Bid line items to overload portions of the work. Remember to answer all written questions in the Pre-Bid Disclosure Statement and then notarize it when signing. Bidders are often required to submit OSHA 300 Logs from prior job performance records as well. BPUB can, has, and will reject Bids that fail the responsibility and/or responsiveness standards so as to protect the integrity of the bidding process for all participants. The Bidding community's compliance with these guideline standards will be appreciated by the BPUB.

ETHICS STATEMENT
(Complete and return with bid)

The undersigned bidder, by signing and executing this bid, certifies and represents to the Brownsville Public Utilities Board that bidder has not offered, conferred or agreed to confer any pecuniary benefit, as defined by (1.07 (a) (6) of the Texas Penal Code, or any other thing of value as consideration for the receipt of information or any special treatment of advantage relating to this bid; the bidder also certifies and represents that the bidder has not offered, conferred or agreed to confer any pecuniary benefit or other thing of value as consideration for the recipient's decision, opinion, recommendation, vote or other exercise of discretion concerning this bid, the bidder certifies and represents that bidder has neither coerced nor attempted to influence the exercise of discretion by any officer, trustee, agent or employee of the Brownsville Public Utilities Board concerning this bid on the basis of any consideration not authorized by law; the bidder also certifies and represents that bidder has not received any information not available to other bidders so as to give the undersigned a preferential advantage with respect to this bid; the bidder further certifies and represents that bidder has not violated any state, federal, or local law, regulation or ordinance relating to bribery, improper influence, collusion or the like and that bidder will not in the future offer, confer, or agree to confer any pecuniary benefit or other thing of value of any officer, trustee, agent or employee of the Brownsville Public Utilities Board in return for the person having exercised their person's official discretion, power or duty with respect to this bid; the bidder certifies and represents that it has not now and will not in the future offer, confer, or agree to confer a pecuniary benefit or other thing of value to any officer, trustee, agent, or employee of the Brownsville Public Utilities Board in connection with information regarding this bid, the submission of this bid, the award of this bid or the performance, delivery or sale pursuant to this bid.

THE VENDOR/CONTRACTOR SHALL DEFEND, INDEMNIFY, AND HOLD HARMLESS THE CITY OF BROWNSVILLE AND THE BROWNSVILLE PUBLIC UTILITIES BOARD, ALL OF THEIR OFFICERS, AGENTS AND EMPLOYEES FROM AND AGAINST ALL CLAIMS, ACTIONS, SUITS, DEMANDS, PROCEEDINGS, COSTS, DAMAGES, AND LIABILITIES, ARISING OUT OF, CONNECTED WITH, OR RESULTING FROM ANY NEGLIGENT ACTS OR OMISSIONS OF CONTRACTOR OR ANY AGENT, EMPLOYEE, SUBCONTRACTOR, OR SUPPLIER OF CONTRACTOR IN THE EXECUTION OR PERFORMANCE OF THIS BID.

I have read all of the specifications and general bid requirements and do hereby certify that all items submitted meet specifications.

COMPANY: _____

AGENT NAME: _____

AGENT SIGNATURE:_____

ADDRESS:_____

CITY: _____

STATE: _____ ZIP CODE: _____

TELEPHONE: _____ TELEFAX: _____

FEDERAL ID#: _____AND/OR SOCIAL SECURITY #: _____

DEVIATIONS FROM SPECIFICATIONS IF ANY:

NOTE: QUESTIONS AND CONCERNS FROM PROSPECTIVE CONTRACTORS SHOULD BE RAISED WITH OWNER AND ITS CONSULTANT (IF APPLICABLE) AND RESOLVED IF POSSIBLE, PRIOR TO THE BID SUBMITTAL DATE. ANY LISTED DEVIATIONS IN A FINALLY SUBMITTED BID MAY ALLOW THE OWNER TO REJECT A BID AS NON-RESPONSIVE.

CERTIFICATION REGARDING DEBARMENT, SUSPENSION,
AND OTHER RESPONSIBILITY MATTERS
(Complete and Return with Bid)

Name of Entity: _____

The prospective participant certifies to the best of their knowledge and belief that they and their principals:

a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency:
b) Have not within a three (3) year period preceding this bid been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
c) Are not presently indicted for or otherwise criminally or civilly charged by a government entity (Federal, State, Local) with commission of any of the offenses enumerated in paragraph (b) of this certification; and
d) Have not within a three (3) year period preceding this bid had one or more public transactions (Federal, State, Local) terminated for cause or default.

I understand that a false statement on this certification may be grounds for rejection of this bid or termination of the award. In addition, under 18 USC Section 1001, a false statement may result in a fine up to a $10,000.00 or imprisonment for up to five (5) years, or both.

_____
Name and Title of Authorized Representative (Typed)

_____ _____
Signature of Authorized Representative Date

☐ I am unable to certify to the above statements. My explanation is attached.

EPA FORM 5700-49 (11-88)

THIS FORM MUST BE COMPLETED IN ITS ENTIRETY & SUBMITTED WITH BID RESPONSE

CONFLICT OF INTEREST QUESTIONNAIRE

FORM CIQ

For vendor doing business with local governmental entity

This questionnaire reflects changes made to the law by H.B. 23, 84th Leg., Regular Session.

This questionnaire is being filed in accordance with Chapter 176, Local Government Code, by a vendor who has a business relationship as defined by Section 176.001(1-a) with a local governmental entity and the vendor meets requirements under Section 176.006(a).

By law this questionnaire must be filed with the records administrator of the local governmental entity not later than the 7th business day after the date the vendor becomes aware of facts that require the statement to be filed. *See* Section 176.006(a-1), Local Government Code.

A vendor commits an offense if the vendor knowingly violates Section 176.006, Local Government Code. An offense under this section is a misdemeanor.

OFFICE USE ONLY

Date Received

1 **Name of vendor who has a business relationship with local governmental entity.**

2 ☐ **Check this box if you are filing an update to a previously filed questionnaire.** (The law requires that you file an updated completed questionnaire with the appropriate filing authority not later than the 7th business day after the date on which you became aware that the originally filed questionnaire was incomplete or inaccurate.)

3 **Name of local government officer about whom the information is being disclosed.**

_____
Name of Officer

4 **Describe each employment or other business relationship with the local government officer, or a family member of the officer, as described by Section 176.003(a)(2)(A). Also describe any family relationship with the local government officer. Complete subparts A and B for each employment or business relationship described. Attach additional pages to this Form CIQ as necessary.**

A. Is the local government officer or a family member of the officer receiving or likely to receive taxable income, other than investment income, from the vendor?

☐ Yes ☐ No

B. Is the vendor receiving or likely to receive taxable income, other than investment income, from or at the direction of the local government officer or a family member of the officer AND the taxable income is not received from the local governmental entity?

☐ Yes ☐ No

5 **Describe each employment or business relationship that the vendor named in Section 1 maintains with a corporation or other business entity with respect to which the local government officer serves as an officer or director, or holds an ownership interest of one percent or more.**

6 ☐ Check this box if the vendor has given the local government officer or a family member of the officer one or more gifts as described in Section 176.003(a)(2)(B), excluding gifts described in Section 176.003(a-1).

7

_____ _____
Signature of vendor doing business with the governmental entity Date

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

CONFLICT OF INTEREST QUESTIONNAIRE
For vendor doing business with local governmental entity

A complete copy of Chapter 176 of the Local Government Code may be found at http://www.statutes.legis.state.tx.us/Docs/LG/htm/LG.176.htm. For easy reference, below are some of the sections cited on this form.

Local Government Code § 176.001(1-a): "Business relationship" means a connection between two or more parties based on commercial activity of one of the parties. The term does not include a connection based on:

(A) a transaction that is subject to rate or fee regulation by a federal, state, or local governmental entity or an agency of a federal, state, or local governmental entity;

(B) a transaction conducted at a price and subject to terms available to the public; or

(C) a purchase or lease of goods or services from a person that is chartered by a state or federal agency and that is subject to regular examination by, and reporting to, that agency.

Local Government Code § 176.003(a)(2)(A) and (B):

(a) A local government officer shall file a conflicts disclosure statement with respect to a vendor if:

***

(2) the vendor:

(A) has an employment or other business relationship with the local government officer or a family member of the officer that results in the officer or family member receiving taxable income, other than investment income, that exceeds $2,500 during the 12-month period preceding the date that the officer becomes aware that

(i) a contract between the local governmental entity and vendor has been executed; or

(ii) the local governmental entity is considering entering into a contract with the vendor;

(B) has given to the local government officer or a family member of the officer one or more gifts that have an aggregate value of more than $100 in the 12-month period preceding the date the officer becomes aware that:

(i) a contract between the local governmental entity and vendor has been executed; or

(ii) the local governmental entity is considering entering into a contract with the vendor.

Local Government Code § 176.006(a) and (a-1)

(a) A vendor shall file a completed conflict of interest questionnaire if the vendor has a business relationship with a local governmental entity and:

(1) has an employment or other business relationship with a local government officer of that local governmental entity, or a family member of the officer, described by Section 176.003(a)(2)(A);

(2) has given a local government officer of that local governmental entity, or a family member of the officer, one or more gifts with the aggregate value specified by Section 176.003(a)(2)(B), excluding any gift described by Section 176.003(a-1); or

(3) has a family relationship with a local government officer of that local governmental entity.

(a-1) The completed conflict of interest questionnaire must be filed with the appropriate records administrator not later than the seventh business day after the later of:

(1) the date that the vendor:

(A) begins discussions or negotiations to enter into a contract with the local governmental entity; or

(B) submits to the local governmental entity an application, response to a request for proposals or bids, correspondence, or another writing related to a potential contract with the local governmental entity; or

(2) the date the vendor becomes aware:

(A) of an employment or other business relationship with a local government officer, or a family member of the officer, described by Subsection (a);

(B) that the vendor has given one or more gifts described by Subsection (a); or

(C) of a family relationship with a local government officer.

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

BROWNSVILLE PUBLIC UTILITIES BOARD

RESIDENCE CERTIFICATION

In accordance with Chapter 2252 of the Texas Government Code, the following will apply. The pertinent portion of the Code has been extracted and is as follows:

Section 2252.001

(3) "Nonresident bidder" refers to a person who is not a resident of Texas.

(4) " Resident bidder " refers to a person whose principal place of business is in this State, including a contractor whose ultimate parent company or majority owner has its place of business in this State.

Section 2252.002

A governmental entity may not award a governmental contract to a nonresident bidder unless the nonresident bidder underbids the lowest bid submitted by a responsible resident bidder by an amount that is not less than the amount by which a resident bidder would be required to underbid the nonresident bidder to obtain a comparable contract in:
(1) The state in which the nonresident's principal place of business is located; or
(2) A state in which the nonresident is a resident manufacturer.

I certify that_____(Company Name) is **a resident Texas bidder** as defined in Section 2252.001(4) of the Texas Government Code.

Signature: _____

Print Name: _____

I certify that_____(Company Name) is a **nonresident bidder** as defined in Section 2252.001(3) of the Texas Government Code and our principal place of

business is:_____
(City and State)

Signature: _____

Print Name: _____

Previous Customer Reference Worksheet

Name of Customer:		Customer Contact:
Customer Address:		Customer Phone Number:
		Customer Email:

Name of Company Performing Referenced Work:

What was the Period of Performance?		What was the Final Acceptance Date?
From: To:		
Dollar Value of Contract? $_____		What Type of Contract? ☐ Firm Fixed Price ☐ Time and Material ☐ Not to Exceed ☐ Cost Plus Fixed Fee ☐ Other, Specify:_____

Provide a brief description of the work performed for this customer (add additional page if required)

Form **W-9**
(Rev. October 2018)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

▶ Go to *www.irs.gov/FormW9* for instructions and the latest information.

Give Form to the requester. Do not send to the IRS.

Print or type. See Specific Instructions on page 3.

1 Name (as shown on your income tax return). Name is required on this line; do not leave this line blank.

2 Business name/disregarded entity name, if different from above

3 Check appropriate box for federal tax classification of the person whose name is entered on line 1. Check only **one** of the following seven boxes.

☐ Individual/sole proprietor or single-member LLC ☐ C Corporation ☐ S Corporation ☐ Partnership ☐ Trust/estate

☐ Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=Partnership) ▶ _____

Note: Check the appropriate box in the line above for the tax classification of the single-member owner. Do not check LLC if the LLC is classified as a single-member LLC that is disregarded from the owner unless the owner of the LLC is another LLC that is **not** disregarded from the owner for U.S. federal tax purposes. Otherwise, a single-member LLC that is disregarded from the owner should check the appropriate box for the tax classification of its owner.

☐ Other (see instructions) ▶

4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3):

Exempt payee code (if any) _____

Exemption from FATCA reporting code (if any) _____

(Applies to accounts maintained outside the U.S.)

5 Address (number, street, and apt. or suite no.) See instructions.

Requester's name and address (optional)

6 City, state, and ZIP code

7 List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the instructions for Part I, later. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN*, later.

Note: If the account is in more than one name, see the instructions for line 1. Also see *What Name and Number To Give the Requester* for guidelines on whose number to enter.

Social security number

___ – ___ – ____

or

Employer identification number

__ – _____

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
3. I am a U.S. citizen or other U.S. person (defined below); and
4. The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions for Part II, later.

Sign Here | **Signature of U.S. person** ▶ | **Date** ▶

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. For the latest information about developments related to Form W-9 and its instructions, such as legislation enacted after they were published, go to *www.irs.gov/FormW9*.

Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return. Examples of information returns include, but are not limited to, the following.

- Form 1099-INT (interest earned or paid)
- Form 1099-DIV (dividends, including those from stocks or mutual funds)
- Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
- Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
- Form 1099-S (proceeds from real estate transactions)
- Form 1099-K (merchant card and third party network transactions)
- Form 1098 (home mortgage interest), 1098-E (student loan interest), 1098-T (tuition)
- Form 1099-C (canceled debt)
- Form 1099-A (acquisition or abandonment of secured property)

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See What is backup withholding, *later.*

Form **W-8BEN-E**

(Rev. October 2021)

Department of the Treasury
Internal Revenue Service

Certificate of Status of Beneficial Owner for United States Tax Withholding and Reporting (Entities)

▶ For use by entities. Individuals must use Form W-8BEN. ▶ Section references are to the Internal Revenue Code.
▶ Go to *www.irs.gov/FormW8BENE* for instructions and the latest information.
▶ Give this form to the withholding agent or payer. Do not send to the IRS.

OMB No. 1545-1621

Do NOT use this form for:	Instead use Form:
• U.S. entity or U.S. citizen or resident	W-9
• A foreign individual	W-8BEN (Individual) or Form 8233
• A foreign individual or entity claiming that income is effectively connected with the conduct of trade or business within the United States (unless claiming treaty benefits)	W-8ECI
• A foreign partnership, a foreign simple trust, or a foreign grantor trust (unless claiming treaty benefits) (see instructions for exceptions)	W-8IMY
• A foreign government, international organization, foreign central bank of issue, foreign tax-exempt organization, foreign private foundation, or government of a U.S. possession claiming that income is effectively connected U.S. income or that is claiming the applicability of section(s) 115(2), 501(c), 892, 895, or 1443(b) (unless claiming treaty benefits) (see instructions for other exceptions)	W-8ECI or W-8EXP
• Any person acting as an intermediary (including a qualified intermediary acting as a qualified derivatives dealer)	W-8IMY

Part I Identification of Beneficial Owner

1 Name of organization that is the beneficial owner

2 Country of incorporation or organization

3 Name of disregarded entity receiving the payment (if applicable, see instructions)

4 Chapter 3 Status (entity type) (Must check one box only):

- ☐ Corporation
- ☐ Partnership
- ☐ Simple trust
- ☐ Tax-exempt organization
- ☐ Complex trust
- ☐ Foreign Government - Controlled Entity
- ☐ Central Bank of Issue
- ☐ Private foundation
- ☐ Estate
- ☐ Foreign Government - Integral Part
- ☐ Grantor trust
- ☐ Disregarded entity
- ☐ International organization

If you entered disregarded entity, partnership, simple trust, or grantor trust above, is the entity a hybrid making a treaty claim? If "Yes," complete Part III. ☐ Yes ☐ No

5 Chapter 4 Status (FATCA status) (See instructions for details and complete the certification below for the entity's applicable status.)

- ☐ Nonparticipating FFI (including an FFI related to a Reporting IGA FFI other than a deemed-compliant FFI, participating FFI, or exempt beneficial owner).
- ☐ Participating FFI.
- ☐ Reporting Model 1 FFI.
- ☐ Reporting Model 2 FFI.
- ☐ Registered deemed-compliant FFI (other than a reporting Model 1 FFI, sponsored FFI, or nonreporting IGA FFI covered in Part XII). See instructions.
- ☐ Sponsored FFI. Complete Part IV.
- ☐ Certified deemed-compliant nonregistering local bank. Complete Part V.
- ☐ Certified deemed-compliant FFI with only low-value accounts. Complete Part VI.
- ☐ Certified deemed-compliant sponsored, closely held investment vehicle. Complete Part VII.
- ☐ Certified deemed-compliant limited life debt investment entity. Complete Part VIII.
- ☐ Certain investment entities that do not maintain financial accounts. Complete Part IX.
- ☐ Owner-documented FFI. Complete Part X.
- ☐ Restricted distributor. Complete Part XI.
- ☐ Nonreporting IGA FFI. Complete Part XII.
- ☐ Foreign government, government of a U.S. possession, or foreign central bank of issue. Complete Part XIII.
- ☐ International organization. Complete Part XIV.
- ☐ Exempt retirement plans. Complete Part XV.
- ☐ Entity wholly owned by exempt beneficial owners. Complete Part XVI.
- ☐ Territory financial institution. Complete Part XVII.
- ☐ Excepted nonfinancial group entity. Complete Part XVIII.
- ☐ Excepted nonfinancial start-up company. Complete Part XIX.
- ☐ Excepted nonfinancial entity in liquidation or bankruptcy. Complete Part XX.
- ☐ 501(c) organization. Complete Part XXI.
- ☐ Nonprofit organization. Complete Part XXII.
- ☐ Publicly traded NFFE or NFFE affiliate of a publicly traded corporation. Complete Part XXIII.
- ☐ Excepted territory NFFE. Complete Part XXIV.
- ☐ Active NFFE. Complete Part XXV.
- ☐ Passive NFFE. Complete Part XXVI.
- ☐ Excepted inter-affiliate FFI. Complete Part XXVII.
- ☐ Direct reporting NFFE.
- ☐ Sponsored direct reporting NFFE. Complete Part XXVIII.
- ☐ Account that is not a financial account.

6 Permanent residence address (street, apt. or suite no., or rural route). **Do not use a P.O. box or in-care-of address** (other than a registered address).

City or town, state or province. Include postal code where appropriate. | Country

7 Mailing address (if different from above)

City or town, state or province. Include postal code where appropriate. | Country

For Paperwork Reduction Act Notice, see separate instructions. Cat. No. 59689N Form **W-8BEN-E** (Rev. 10-2021)

NOTICE OF AWARD

TO: _____
_____
_____

Project Description: SOUTH WWTP SLUICE GATE REPLACEMENT

Dear Sir/Madam:

The Owner, BPUB has considered the BID submitted by you for the above-described Work in response to its Legal Notice and Invitation to Bid dated October 26, 2022 and Instruction to Bidders.

You are hereby notified that after any Owner adjustments to the Base Bid Amount to account for Owner options regarding additive and deductive alternates, your BID has been accepted in the final Contract Price amount of $_____.

You are required by the Instructions to Bidders to execute the Construction Agreement and furnish any required Contractor's Performance Bond, Payment Bond and Certificates of Insurance within ten (10) calendar days from the date you receive this Notice.

In addition with the Bonds and Insurance Certificates, you must complete, execute, and submit a Contractor Job Safety Analysis (JSA) form. The JSA form is required prior to entering into a contractual agreement with the OWNER, and will be valid for a period of thirty (30) calendar days after which you must complete, execute and submit an updated JSA form. The completed JSA form is included as a part of the Contract Documents.

If you fail to execute this Agreement and furnish any required Bonds, Insurance Certificates, or other certifications within ten (10) calendar days from the date of this Notice, Owner will be entitled to consider all your rights arising out of the Owner's acceptance of your BID as abandoned, and as a forfeiture of your BID BOND.

The Owner will be entitled to such other rights as may be granted by law and equity.

You are required to promptly sign and return an acknowledged copy of this NOTICE OF AWARD to the Owner.

Dated this ____ day of _____, 20__.

BROWNSVILLE PUBLIC UTILITIES BOARD OF THE CITY OF BROWNSVILLE, TEXAS

By:_____
Name: John S. Bruciak
Title: General Manager / CEO

ACCEPTANCE OF NOTICE OF AWARD

Receipt of the above NOTICE OF AWARD is hereby acknowledged by:

_____this____day of _____, 20___.

By:_____

Name:_____

Title:_____

NOTICE TO PROCEED

TO:_____

ADDRESS:_____

Contract for: SOUTH WWTP SLUICE GATE REPLACEMENT

You are notified that the Contract Time under the above Contract will commence to run on _____, 20__. By that date, you are to start performing your obligations under the Contract Documents. In accordance with the Agreement, the date of Substantial Completion prior to final payment is _____, 20__.

Before you may start any Work at the site, Bonds and Insurance Certificates along with certain material submittals must be submitted and approved by the BPUB before a BPUB Purchase Order is issued and prior to the purchase and shipment of Work materials.

Brownsville Public Utilities Board:
(Owner)

BY: _____
(Authorized Signature)
NAME: ___John S. Bruciak, P.E.__
TITLE: __General Manager/CEO__
DATE: _____

CONSTRUCTION AGREEMENT

THIS AGREEMENT is by and between the BROWNSVILLE PUBLIC UTILITIES BOARD of the City of Brownsville, Texas (hereinafter called OWNER or BPUB) and <CONTRACTOR NAME> of <CITY & STATE> (hereinafter called CONTRACTOR), performing as an independent contractor.

OWNER and CONTRACTOR, as the Parties hereto, in consideration of the mutual covenants hereinafter set forth, agree as follows:

Article 1. WORK.

CONTRACTOR shall furnish all of the material, supplies, tools, equipment, labor and other services necessary for the construction and completion of the Work described herein and complete all the Work as specified or indicated in the Contract Documents. The Work is generally described as: South Wastewater Treatment Plant Improvements (hereinafter referred to as "Work" and/or "Project").

Article 2. ENGINEER.

The Project has been designed by OWNER'S independent professional engineering consultant(s): FREESE AND NICHOLS (hereinafter called ENGINEER).

Article 3. CONTRACT TIME.

3.1 The Work shall be Substantially Completed in accordance with paragraph 14.8 of the General Conditions within **three-hundred (300)** consecutive Calendar Days after the date when the Contract Time commences to run as provided in paragraph 2.3 of the General Conditions, and finally completed and ready for final payment in accordance with paragraph 14.13 of the General Conditions within thirty (30) consecutive Calendar Days after the date of Substantial Completion as established in accordance with paragraph 14.8 of the General Conditions.

CONTRACTOR hereby acknowledges and agrees that the ENGINEER has already included in the calculation of the performance Calendar Days, normal, monthly, non-compensable rain days for Cameron County, Texas, based upon historical monthly National Oceanic and Atmospheric Administration (NOAA) record averages.

3.2 **Liquidated Damages**. OWNER and CONTRACTOR recognize that the **TIME OF PERFORMANCE IS OF THE ESSENCE** in this Agreement and that OWNER will suffer financial loss if the Work is not Substantially Complete within the time specified in Article 3.1 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. Both Parties hereto also recognize the delays, expense and difficulties involved in proving in a legal proceeding the actual loss suffered by OWNER if the Work is not Substantially Complete on time. Accordingly, instead of requiring such proof, OWNER and CONTRACTOR agree that as liquidated damages for the delay (but not as a penalty) CONTRACTOR shall pay OWNER **FIVE HUNDRED DOLLARS AND NO CENTS** ($500.00) for each Calendar Day

that expires after the time specified in Article 3.1 for Substantial Completion, until the Work is Substantially Complete.

Article 4. CONTRACT PRICE.

4.1 CONTRACTOR shall perform the Work described in the Contract Documents for the amounts shown in the CONTRACTOR'S Bid Schedule, and OWNER shall pay CONTRACTOR in current funds based on the Bid Schedule.

Article 5. PAYMENT PROCEDURES.

CONTRACTOR shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by OWNER as provided for in the General Conditions.

5.1 **Progress Payments**. OWNER shall make progress payments on account of the Contract Price on the basis of CONTRACTOR's mathematically correct Applications for Payment on or about the twentieth-fifth (25^{th}) Calendar Day after submittal of the Application for Payment each month as provided below. All progress payments shall be on the basis of the progress of the Work measured by the Schedule of Values provided for in paragraph 14.1 of the General Conditions.

5.1.2. Prior to Substantial Completion, progress payments shall be in an amount equal to ninety-five percent (95%) of the amount requested in the Application for Payment, with five percent (5%) remaining as OWNER's retainage for the Project, to be released by OWNER in accordance with Article 5.2 below.

5.1.3. Upon Substantial Completion, OWNER shall pay an amount sufficient to increase total payments to CONTRACTOR to ninety-five percent (95%) of the Contract Price, less such amounts OWNER shall determine in accordance with paragraphs 14.7 and 14.8 of the General Conditions.

5.2 **Final Payment**. Upon final completion and acceptance of the Work after resolution of any punch list items in accordance with paragraph 14.8 and 14.13 of the General Conditions, OWNER shall pay the remainder of the Contract Price as recommended by Engineer as provided in said paragraphs 14.13.

Article 6. CONTRACTOR'S REPRESENTATIONS.

In order to induce OWNER to enter into this Agreement, CONTRACTOR makes the following representations to OWNER:

6.1 CONTRACTOR has familiarized himself with the Project, nature and extent of the Contract Documents, Work, and with all local conditions and federal, state and local laws, ordinances, rules and regulations that in any manner may affect cost, progress or performance of the Work.

6.2 CONTRACTOR has made, or caused to be made, examinations and investigations of information as he deems necessary for the performance of the Work at the Contract Price, as determined by the Bid Schedule and finalized Schedule of Values as determined by Article 2 of the General Conditions, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents; and no additional examinations, investigations or similar data are, or will be required by CONTRACTOR for such purposes.

6.3 CONTRACTOR has given OWNER advanced written notice of all obvious conflicts, errors or discrepancies that he has discovered in the Contract Documents prior to bidding, and the written resolution thereof by OWNER was acceptable to CONTRACTOR.

6.4 CONTRACTOR is skilled and experienced to responsibly perform the type of Work described in the Contract Documents in a workmanlike and timely manner.

Article 7. CONTRACT DOCUMENTS.

The Contract Documents which comprise the entire Agreement between OWNER and CONTRACTOR are attached to this Construction Agreement, made a part hereof, and consist of the following:

7.1 Legal Notice and Invitation to Bid
7.2 Instructions to Bidders
7.3 Bid Forms and Bid Schedule
7.4 Bid Bond
7.5 Contractor's and Subcontractor's Pre-Bid Disclosure Statements
7.6 Notice of Award and Acceptance of Notice
7.7 Notice to Proceed
7.8 This Construction Agreement
7.9 Performance Bond
7.10 Payment Bond
7.11 General Conditions
7.12 Supplementary General Conditions
7.13 Technical Specifications
7.14 Addendum number(s)__ (page __).
7.15 CONTRACTOR's Certificate(s) of Insurance.
7.16 Construction Drawings bearing the following general title: B002-23 **SOUTH WWTP SLUICE GATE REPLACEMENT** (Sheets G-1 through PI-2)
7.17 Any Written Amendment, including Change Orders, duly delivered after execution of this Agreement.

There are no Contract Documents other than those listed above in this Article 7. The Contract Documents may only be altered, amended or repealed by a Written Amendment (as defined in Article 1 of the General Conditions).

Article 8. MISCELLANEOUS.

8.1 Terms used in this Agreement which are defined in Article 1 of the General Conditions shall have the meanings indicated in the General Conditions.

8.2 No assignment by a Party hereto of any rights under, or interest in, the Contract Documents will be binding on another Party hereto without the written consent of the Party sought to be bound; and specifically, but without limitation, moneys that may become due, and moneys that are due, may not be assigned without such prior written consent (except to the extent that 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 Documents.

8.3 OWNER and CONTRACTOR each binds himself, his partners, successors, assigns and legal representatives to the other Party hereto, his partners, successors, assigns and legal representatives in respect to all covenants, agreements and obligations contained in the Contract Documents.

8.4 The invalidity or unenforceability of any provision of the Contract Documents shall not affect the validity or enforceability of any other provision of the Contract Documents.

8.5 This Construction Agreement and the Contract Documents are subject to all applicable local, Texas, federal laws, statutes, codes, ordinances, rules and regulations.

8.6 In the event of default by CONTRACTOR under the Contract Documents, OWNER shall have all rights and remedies afforded to it at law or in equity to enforce the terms of the Contract Documents. The exercise of any one right or remedy shall be without prejudice to the enforcement of any other right or remedy allowed at law or in equity.

8.7 If any action at law or in equity is necessary by OWNER to enforce or interpret the terms of the Contract Documents, OWNER shall be entitled to reasonable attorneys' fees, court costs, expert witness fees, and any necessary and reasonable supporting disbursements, in addition to any other relief to which the OWNER is entitled.

8.8 The Contract Documents constitute the **ENTIRE AGREEMENT BETWEEN THE PARTIES** hereto and supersede any prior written or oral agreements and understandings between the Parties. The Contract can only be modified or amended by written agreement of the Parties.

8.9 These Contract Documents are governed by the laws of the State of Texas and the Parties agree that venue for any litigation/arbitration/mediation arising from these Contract Documents shall lie in Cameron County, Texas.

Article 9. OTHER REQUIREMENTS

9.1 Workers' Compensation Insurance (For additional detail see: General Conditions paragraphs 5.3.1 and 5.5.1-2

A. By signing this Agreement, CONTRACTOR certifies that it provides workers' compensation insurance coverage for all employees employed on this Project pursuant to Tex. Lab. Code Sections 401 and 406.096(a).

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

9.2 Prohibition of Contracts with Companies Engaged in Business with Iran, Sudan, or Foreign Terrorist Organizations

A. See: Tex. Gov't Code Section 2252.152, Subchapter F, which prohibits the award of governmental contracts to companies engaged in business with Iran, Sudan, or foreign terrorist organizations.

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

9.3 Prohibition of Contracts with Certain Companies that Boycott Israel

A. See: Tex. Gov't Code Chapter 2271 which prohibits the award of governmental contracts to companies boycotting Israel.

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

9.4 Certificate of Interested Parties: CONTRACTOR must complete and submit a Certificate of Interested Parties (Form 1295) to the OWNER with the signed Agreement as required by Tex. Gov't Code Section 2252.908(e).

(THE REMAINDER OF THIS PAGE INTENTIONALLY LEFT BLANK)

IN WITNESS WHEREOF, the Parties hereto have signed this Construction Agreement in triplicate originals. One counterpart each has been delivered to OWNER and CONTRACTOR, and the third will be filed with the ENGINEER.

This Construction Agreement will be Effective on _____, 20__, the date when OWNER signs below.

[NOTE: THE DATE OF THE PAYMENT AND PERFORMANCE BONDS CANNOT PRECEDE THIS EFFECTIVE CONTRACT DATE.]

BROWNSVILLE PUBLIC UTILITIES BOARD	<CONTRACTOR>
By: _____	By: _____
Name: John S. Bruciak	Name: _____
Title: General Manager/CEO	Title: _____
Signature Date: _____	Signature Date: _____
Attest: _____	Attest: _____
Address for giving notices:	Address for giving notices:
Attn: Ricardo Pineda, E.I.T.	Attn: _____
1425 Robinhood Drive	_____
Brownsville, TX 78521	_____
(956) 983-6227	_____
rpineda@brownsville-pub.com	_____

CONTRACTOR hereby acknowledges and understands that this is a "separated contract" pursuant to 34 Texas Administrative Code 3.291. The following amount of money represents that part of the total Contract Price representative of the value of tangible personal property to be physically incorporated into the Project realty: $_____._____.

[NOTE: SEE GENERAL CONDITIONS PARAGRAPH 6.16, "Taxes", and "STATE SALES AND USE TAX EXEMPTION."]

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS:

THAT _____
(Name of Contractor as Principal)

_____
(Address of Contractor)

a _____
(corporation, partnership, or individual)

hereinafter called Principal, and

_____
(Name of Surety)

_____
(Address of Surety)

hereinafter called Surety, are held and firmly bound unto the PUBLIC UTILITIES BOARD of the City of Brownsville, Texas, hereinafter called OWNER as Obligee, in the penal sum of _____ Dollars ($_____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain Contract with the OWNER, dated the ____ day of _____, 20___, a copy of which is hereto attached and made a part hereof, for the construction of the Project: **SOUTH WWTP SLUICE GATE REPLACEMENT.**

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said Contract during the original term thereof, and any extensions thereof which may be granted by the OWNER, with or without notice to the Surety and during the one (1) year post-construction workmanship guaranty and minimum materials/equipment warranty period, and if he shall satisfy all claims and demands incurred under such Contract, and **SHALL FULLY INDEMNIFY AND SAVE HARMLESS THE OWNER FROM ALL COSTS AND DAMAGES WHICH IT MAY SUFFER BY REASON OF FAILURE TO DO SO**, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety, for value received, hereby stipulates and agrees: that no written change, extension of time, alteration or addition to the terms of the Contract or to Project Work to be performed thereunder, or the Specifications accompanying the same, shall in any ways affect its obligation on this PERFORMANCE BOND, and it does hereby waive notice

of any such written change, extension of time, alteration or addition to the terms of the Contract, or to the Project Work, or to the Specifications.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose timely filed and legally perfected claim may be unsatisfied.

This PERFORMANCE BOND is subject to and governed by Sections 2253.01-079 of the Texas Government Code (Vernon's Texas Codes Annotated) and Chapter 3503 of the Texas Insurance Code (VTCA), and all amendments thereto.

IN WITNESS WHEREOF, this instrument is executed in triplicate originals, each counterpart of which shall be deemed an original, this the ____ day of _____, 20___.

A. ATTEST: _____
(Principal)

_____ By:_____(s)
(Principal) Secretary (Signature of legally authorized representative of Principal)
Print Name _____
Print Title _____

(SEAL)

_____ _____
(Witness as to Principal) (Address)

_____ _____
(Address)

_____

B. ATTEST: _____
(Surety)

_____ By:_____
(Surety) Secretary (Signature of Attorney-in-Fact for Surety)
Print Name _____

(SEAL)

_____ _____
(Witness as to Surety) (Address)

_____ _____
(Address)

_____

NOTE: Date of PERFORMANCE BOND must not be prior to Effective Date (execution date by OWNER) of Contract. If CONTRACTOR is a Partnership, all partners should execute PERFORMANCE BOND.

IMPORTANT: Surety companies executing PERFORMANCE BONDS must be legally authorized by the Texas State Board of Insurance to transact business in the State of Texas, and be currently listed as an approved federal surety in the most recently issued edition (prior to Contract's Effective Date) of the U. S. Treasury Circular 570.

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS:

THAT _____
(Name of Contractor as Principal)

_____
(Address of Contractor)

a _____
(corporation, partnership, or individual)

hereinafter called Principal, and

_____
(Name of Surety)

_____
(Address of Surety)

hereinafter called Surety, are held and firmly bound unto the PUBLIC UTILITIES BOARD of the City of Brownsville, Texas, hereinafter called OWNER as Obligee, the penal sum of _____ Dollars ($_____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain Contract with the OWNER, dated the ____ day of _____, 20___, a copy of which is hereto attached and made a part hereof, for the construction of the: **SOUTH WWTP SLUICE GATE REPLACEMENT.**

NOW, THEREFORE, if the Principal shall promptly make payment to all persons, firms, SUBCONTRACTORS, and corporations furnishing materials for, or performing labor in the prosecution of the WORK provided for in such Contract, and any authorized extension or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such WORK, and all insurance premiums on said WORK, and for all labor, performed in such WORK, whether by SUBCONTRACTORS or otherwise, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to WORK to be performed thereunder, or the SPECIFICATIONS accompanying the same, shall in any wise affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract, or to the WORK, or to the Specifications.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge any remaining, timely and legally perfected right of any lawful beneficiary hereunder, whose timely filed and legally perfected claim may be unsatisfied.

This Bond is subject to and governed Sections 2253.01 of the Texas Government Code (Vernon's Texas Codes Annotated) and Chapter 3503 of the Texas Insurance Code (VTCA), and all amendments thereto.

IN WITNESS WHEREOF, this instrument is executed in triplicate, each counterpart of which shall be deemed an original, this the ____ day of _____, 20__.

ATTEST:_____
(Principal)

_____ By:_____(s)
(Principal) Secretary (Signature)

(SEAL)

_____ _____
(Witness as to Principal) (Address)

_____ _____
(Address)

_____

ATTEST: _____
(Surety)

_____ By:_____
(Surety) Secretary (Attorney-in-Fact)

(SEAL)

_____ _____
(Witness as to Surety) (Address)

_____ _____
(Address)

_____

NOTE: Date of PAYMENT BOND must not be prior to Effective Date (execution date by OWNER) of Contract. If Contractor is a Partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing PAYMENT BONDS must be legally authorized by the Texas Board of Insurance to transact business in the State of Texas, and be currently listed as an approved federal surety in the most recently issued edition (prior to Contract's Effective Date) of the U. S. Treasury Circular 570.

ATTACH POWER OF ATTORNEY

INSERT CERTIFICATE OF INSURANCE

GENERAL CONDITIONS

OF THE

CONSTRUCTION CONTRACT

Prepared by
The Public Utilities Board of the City of Brownsville, Texas,
as a periodically reviewed and revised
Adaptation From the 1983 Base Document Prepared by

Engineers' Joint Contract Documents Committee

and originally

Issued and Published Jointly By:

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE
A practice division of the
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AMERICAN CONSULTING ENGINEERS COUNCIL

AMERICAN SOCIETY OF CIVIL ENGINEERS

CONSTRUCTION SPECIFICATION INSTITUTE

The base document from which this adaptation (Spring 2020 BPUB) was prepared (1983 edition) was approved and endorsed by:

The Associated General Contractors of America

TABLE OF CONTENTS OF STANDARD GENERAL CONDITIONS

GENERAL CONDITIONS

SCOPE. The Standard General Conditions of the Construction Contract prepared by the National Society of Professional Engineers (NSPE-1910-8, 1983 Edition) as periodically amended and adapted by the OWNER to meet local requirements, shall form a part of this Contract, together with the following Supplementary General Conditions. A copy of the locally amended Standard General Conditions (based upon NSPE-1910-8) is bound herewith. The following supplements modify, change, delete, or add to the General Conditions. Where any part of the General Conditions is modified or voided by any Supplementary General Conditions, the unaltered provisions of that part shall remain in effect.

ARTICLE 1. DEFINITIONS

Wherever used in these General Conditions or in the other Contract Documents, the following terms have the meanings indicated which are applicable to both the singular and plural, male and female thereof:

Addenda - Written or graphic instruments issued prior to the opening of Bids which clarify, correct or change the bidding documents or the Contract Documents. These Addenda are a part of the Contract Documents and modify the Drawings, Specifications or other bid documents as indicated. No verbal changes in the Work not depicted or described in writing shall be binding.

Supplements to, changes in, or corrections to the Drawings and/or Specifications issued in writing by OWNER during the period of bidding. These Addenda are a part of the Contract and modify the Drawings and/or Specifications as indicated. No verbal changes in the Work as shown or described shall become binding.

Agreement - The written and signed short-form Construction Agreement (Contract or Agreement) between OWNER and CONTRACTOR covering the Work to be performed; other Contract Documents including these General Conditions are attached to the Construction Agreement and made a part thereof as provided therein.

Alternates. Additions to; deletions from; or changes to requirements for the Project, each of which shall be bid separately and shall be included in or deleted/deducted from the Contract at the discretion of OWNER.

Application for Payment - The form developed by OWNER which is to be used by CONTRACTOR in requesting interim progress or final Contract payments and which is to include such supporting documentation as is required by the Contract Documents.

Bid - The written offer or proposal of the bidder submitted on the OWNER prescribed form setting forth in figures and in script, the prices for the Work to be performed.

Bonds - Bid, Performance and Payment Bonds procured by the CONTRACTOR from a surety authorized by the Texas Department of Insurance to conduct business in the State of Texas, and any other instruments of security as may be specified by the OWNER.

Calendar Day –A calendar day consists of twenty-four hours and is measured from midnight, to the next midnight, and shall constitute a single calendar day. Calendar days include Saturdays and Sundays. THIS IS A CALENDAR DAY CONTRACT.

Change Order - A document developed by ENGINEER, which is signed by CONTRACTOR and OWNER and authorizes an addition, deletion or revision to the Work, or an adjustment in the Contract Price and/or the Contract Time, issued after the Effective Date of the Construction Agreement. Executed Change Orders are part of the amended Contract Documents.

Contract Documents – The Legal Notice and Invitation to Bid; Instructions to Bidder(s); Pre-Bid Disclosure Statements; Notice of Award; Notice to Proceed; The Construction Agreement; Addenda (which pertain to the Contract Documents); CONTRACTOR's Bid (including documentation accompanying the Bid and any post-Bid documentation submitted prior to the Notice of Award); the Bid, Performance and Payment Bonds; these General Conditions; the Supplementary Conditions; the Specifications and the Drawings; and those documents enumerated in Article 7 of the Construction Agreement; and those outlined in paragraphs 3.4 and 3.5 of the General Conditions..

Contract Price - The moneys payable by OWNER to CONTRACTOR under the Contract Documents as stated in the Agreement (subject to the General Conditions provisions of paragraphs 9.1 and 11.9.1 in the case of Unit Price Work).

Contract Time - The number of days ("calendar" days computed as provided in General Conditions paragraph 17.2) or the date specifically stated in the Agreement for the Substantial Completion of the Work.

CONTRACTOR - The person, firm or corporation with whom OWNER has entered into the Agreement to construct the Work.

Defective - An adjective which when modifying the word "Work" refers to "Work" that is unsatisfactory, faulty or deficient, or does not conform to, or comply with the Contract Documents, or does not meet the requirements of any inspection, referenced standard, test or approval referred to in the Contract Documents, or has been damaged prior to the time OWNER makes the final payment (unless responsibility for the protection thereof has been assumed by OWNER at Substantial Completion in accordance with General Conditions paragraph 14.8 or 14.10).

Drawings - The drawings (plans) which depict the character, design, and scope of the Work to be performed and which have been prepared and/or approved by ENGINEER and are referred to in the Contract Documents.

Effective Date of the Agreement - The date indicated in the short-form Construction Agreement document upon which it becomes legally binding and effective, but if no such date is indicated, it means the date on which the Construction Agreement is signed by OWNER.

Engineer- The private, outside, independent professional engineering consulting firm(s) named as such in the Agreement.

Field Order - A written order issued by ENGINEER which orders minor changes or contains interpretations in the Work in accordance with General Conditions paragraph 9.5, but which does not involve a change in the Contract Price or the Contract Time.

Furnish. To supply at the Work jobsite the materials, supplies, equipment, etc., referred to in the Specifications and/or Drawings. Installation is not always required of the Supplier by the Specifications, but shall be performed or arranged for by the General CONTRACTOR.

General Requirements – Sections 01.11.00 – 01.79.00 of Division 1 of the Specifications.

Laws and/or Regulations - Federal and/or State Laws, rules, administrative agency regulations, local ordinances, local codes and/or court orders applicable to the Work performance.

Notice of Award - The written notice by OWNER to the apparent successful bidder stating that upon compliance by the apparent successful bidder with the conditions precedent enumerated therein, within the time specified, OWNER will sign and deliver the Construction Agreement.

Notice to Proceed - A written notice given by OWNER to CONTRACTOR (with copy to ENGINEER) fixing the date on which the Contract Time will commence to run and on which CONTRACTOR shall start to perform CONTRACTOR's obligations under the Contract Documents.

OWNER'S Project Team (OPT) - The OWNER, OWNER'S Field Representative, ENGINEER, ENGINEER's Resident Project Representative, and the other entities identified in the Supplementary Conditions and the consultants, subconsultants, individuals or entities directly or indirectly employed or retained by them to provide services to the Owner.

OWNER - The City of Brownsville, acting through its Public Utilities Board (BPUB) of the City of Brownsville, Texas and its directly employed authorized representatives.

Partial Utilization - Placing a portion of the Work in service for the benefit of the OWNER and for the purpose for which it is intended (or a related purpose) before reaching Substantial Completion for all the Work.

Project – The construction of the Work to be provided to OWNER under the Contract Documents which may be the whole, or a part, as indicated elsewhere in the Contract Documents.

Provide – To furnish and install the materials, supplies, equipment, etc. referred to in the Specifications and/or Drawings, at the location shown or otherwise approved at the Project Work job-site.

Site Observers - Resident Project Representative - The authorized representative of ENGINEER who is assigned to periodically observe the Work at the site of the Project, or any part

thereof, on behalf of OWNER. OWNER'S Field Representative – the authorized representative of OWNER who observes the daily Work progress on behalf of OWNER. These two Representatives will coordinate with each other.

Shop Drawings - All drawings, diagrams, illustrations, schedules and other data which are specifically prepared by, or for CONTRACTOR, to illustrate some portion of the Work, and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams and other information prepared by a Supplier and submitted by CONTRACTOR to ENGINEER, to illustrate material or equipment for some portion of the Work.

Special Conditions – Those portions of the Contract Documents unique to this Project and often mandated by third-party regulatory and funding authorities.

Specifications - Those portions of the Contract Documents consisting of written technical descriptions for the design configuration and/or performance standard for materials, equipment, any specified construction systems, standards and workmanship, as applied to the Work and certain administrative details applicable thereto.

Standard Abbreviations. Wherever reference is made to standard specifications, standards of quality or performance, as established by a recognized national authority, the reference may be by initials and acronyms as generally recognized throughout the engineering and construction industries.

Subcontractor – An individual, firm or corporation having a direct contract with CONTRACTOR, or with any other Subcontractor (subtier), for the performance of a part of the Work at the Project site.

Substantial Completion - The Work (or a specified part thereof) has progressed to the point where, in the opinion of ENGINEER as evidenced by its ENGINEER's definitive written and signed certificate of Substantial Completion, and that it is apparently sufficiently complete, in accordance with the Contract Documents, so that the Work (or specified part) can be utilized for the OWNER's purposes for which it is intended; or if there is no such certificate issued by ENGINEER, when final payment is due in accordance with General Conditions paragraph 14.13. The terms "Substantially Complete" and "Substantially Completed" as applied to any Work refer to the Substantial Completion thereof.

Supplementary Conditions - The part of the Contract Documents which amends or supplements these General Conditions.

Supplier - A manufacturer, fabricator, supplier, distributor, materialman or third-party vendor.

Underground Facilities - All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such manmade facilities or attachments, and any outer encasements containing such facilities (vaults, conduits) which have been installed underground to furnish/transport any of the following services or materials: electricity, gases, steam, liquid

petroleum products, telephone or other related data communications, cable television, sewage, storm drainage, traffic or other electronic control systems or potable water.

Unit Price Work - Work to be paid for on the basis of unit prices for ENGINEER/OWNER estimated quantities.

Work - The entire completed construction or the various separately identifiable parts thereof, required to be furnished by the CONTRACTOR under the Contract Documents. Work is the result of performing services, furnishing labor and furnishing and incorporating materials and equipment into the construction Project, all as required by the Contract Documents.

Work Directive Change - A written directive to CONTRACTOR, issued on or after the Effective Date of the Agreement and signed by OWNER, ordering an addition, deletion or revision in the Work, or responding to differing or unforeseen physical conditions under which the Work is to be performed as provided in General Conditions paragraph 4.2 or 4.3 or to emergencies under General Conditions paragraph 6.24. A Work Directive Change may not change the Contract Price or the Contract Time, but is evidence that the parties expect that the change directed or documented by a Work Directive Change will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Time as provided in General Conditions paragraph 10.2.

Working Day. When and if applicable, a week day (Monday through Friday only, inclusive) in which weather conditions are such that Work can be performed in a normal manner. Weekends (Saturday, Sunday) and OWNER holidays shall not be considered working days.

Written Amendment - A written amendment of the Contract Documents, signed by OWNER and CONTRACTOR on or after the Effective Date of the Agreement and normally dealing with the non-engineering or non-technical (rather the commercial terms, legal provisions, etc.), rather than Work-related, aspects of the Contract Documents. Written Amendments are normally embodied in a Change Order once construction commences.

ARTICLE 2. PRELIMINARY MATTERS

Delivery of Bonds:

2.1 When CONTRACTOR delivers the triplicate original executed Agreements to OWNER, CONTRACTOR shall also deliver to OWNER such Bonds as CONTRACTOR may be required to furnish in accordance with paragraph 5.1.

Copies of Documents:

2.2 OWNER shall furnish to CONTRACTOR up to ten (10) copies (unless otherwise specified in the Supplementary Conditions) of the Contract Documents as are reasonably necessary for the execution of the Work. Additional copies will be furnished to CONTRACTOR, upon request, at the cost of reproduction reimbursable to OWNER.

Commencement of Contract Time; Notice to Proceed:

2.3 The Contract Time will commence to run and be accounted for on the date indicated in the Notice to Proceed. A Notice to Proceed may be given by OWNER at any time after the Effective Date of the Agreement. The CONTRACTOR should be prepared to perform Work as soon as Contract Time commences.

Starting the Project:

2.4 CONTRACTOR is obligated to perform the Work on the date when the Contract Time commences to run, but no Work shall be done at the Project site prior to the date on which the Contract Time commences to run per the Notice to Proceed.

Before Starting Construction:

2.5 Before undertaking each part of the Work, CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon and all applicable field measurements. CONTRACTOR shall promptly report in writing to ENGINEER any conflict, error or discrepancy which CONTRACTOR may discover and shall obtain a written interpretation or clarification from ENGINEER before proceeding with any Work affected thereby. CONTRACTOR shall be in **DEFAULT** to OWNER for failure to report to ENGINEER any obvious conflict, error, or discrepancy in the Contract Documents, if CONTRACTOR had actual knowledge thereof, or should reasonably have known thereof pursuant to customary construction industry standards.

2.6 Within ten (10) calendar days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), CONTRACTOR shall submit to ENGINEER for review:

2.6.1 an estimated Work Progress Schedule indicating the starting and completion dates of the various critical stages of the Work; and

2.6.2 a preliminary Schedule of Shop Drawing submissions; and

2.6.3 a preliminary Schedule of Values for all of the Work, which will include quantities and prices of items aggregating the total Contract Price and will subdivide the Work into logical component parts in sufficient detail to later serve as the basis for measuring actual Project progress and substantiating monthly payments during construction. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work which will be automatically confirmed in writing by CONTRACTOR at the time of submission to ENGINEER.

2.7 By the tenth (10th) calendar day after award of the Contract by OWNER, CONTRACTOR shall deliver to OWNER (with copy to ENGINEER) original certificates (and any other evidence of insurance requested by OWNER) which CONTRACTOR is required to purchase and maintain in accordance with Article 5.

Preconstruction Conference:

2.8 After the Effective Date of the Agreement, but before CONTRACTOR starts the Work at the Project site, a mandatory conference attended by CONTRACTOR, ENGINEER, OWNER and others as appropriate, will be held to discuss the Schedules referred to in paragraph 2.6, to discuss procedures for managing exchanges of Shop Drawings and other submittals and for processing Applications for Payment; and to establish a working and pragmatic understanding among the Project participants as to the general progress and administration of the Work.

Finalizing Schedules:

2.9 At least ten (10) calendar days before submission of the first monthly Application for Payment, a conference attended by CONTRACTOR, ENGINEER, and others as appropriate will be held to finalize the various Schedules submitted in accordance with Article 2.6. The finalized Progress Schedule will be acceptable to ENGINEER as providing an orderly progression of the Work to completion within the Contract Time, but such acceptance will neither impose on ENGINEER responsibility for the progress or scheduling of the Work, nor relieve CONTRACTOR from full responsibility therefore. CONTRACTOR acknowledges the ENGINEER has already included in the calculation of the performance calendar days agreed to by CONTRACTOR by its Bid submission in this calendar day Contract, normal non-compensable monthly rain days for Cameron County, Texas. The CONTRACTOR shall update this Progress Schedule no less than monthly at each payment submittal. The CONTRACTOR shall only include in the submittal any abnormal and unusual rain days that exceed those typically experienced in Cameron County, Texas, based upon historical monthly National Oceanic and Atmospheric Administration (NOAA) record averages (rain days will be verified by the ENGINEER and the Site Observers weekly), and any OWNER approved time extensions in the modified Progress Schedule. The amended monthly Work Progress Schedule shall be reviewed and accepted by the ENGINEER and the OWNER monthly as a pre-condition to payment to CONTRACTOR. The finalized Schedule of Shop Drawing submissions will be acceptable to ENGINEER as providing a workable arrangement for processing the exchange of submissions. The finalized Schedule of Values will be acceptable to ENGINEER as to form and substance.

ARTICLE 3. CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

Intent:

3.1 The Contract Documents comprise the entire agreement between OWNER and CONTRACTOR concerning the Work. The Contract Documents are complementary; what is called for by one is as binding as if called for by all. The Contract Documents will be construed in accordance with the law of Cameron County, Texas.

3.2 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. Any Work, materials or equipment that may reasonably be inferred from the Contract Documents as being required of CONTRACTOR to produce the OWNER'S intended result will be supplied by CONTRACTOR, whether or not specifically called for. When words which have a well-known

technical or trade meaning are used to describe Work, materials or equipment, such words shall be interpreted in accordance with that meaning. Reference to standard specifications, manuals or codes of any technical society, organization or association, whether such reference is specific or by implication, shall mean the latest amended standard specification, manual, code or Laws or Regulations in effect at the time of opening of Bids (or, on the Effective Date of the Construction Agreement, if there were no Bids for a specialty project), except as may be otherwise specifically stated. However, no provision of any referenced standard specification, manual or code (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties and responsibilities of OWNER, CONTRACTOR, ENGINEER or any of their consultants, agents or employees from those set forth in the Contract Documents , nor shall it be effective to assign to ENGINEER, or any of ENGINEER's subconsultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of paragraphs 9.15 or 9.16. Clarifications and interpretations of the Contract Documents shall be issued by ENGINEER in writing as provided in paragraph 9.4.

3.3 If, during the performance of the Work, CONTRACTOR finds a conflict, error or discrepancy in the Contract Documents, CONTRACTOR shall immediately report same to ENGINEER in writing, and before proceeding with the Work affected thereby, shall obtain a written interpretation or clarification from ENGINEER. CONTRACTOR shall be in **DEFAULT** to OWNER for failure to report any obvious conflict, error or discrepancy in the Contract Documents if CONTRACTOR had actual knowledge thereof, or should reasonably have known thereof, pursuant to customary construction industry standards.

Amending and Supplementing Contract Documents:

3.4 The Contract Documents may be amended to provide for additions, deletions and revisions in the Work or to modify the terms and conditions thereof in one or more of the following written ways:

3.4.1 a formal Written Amendment,

3.4.2 a Change Order (pursuant to definition and paragraph 10.4), or

3.4.3 a Work Directive Change (pursuant to definition and paragraph 10.1).

As indicated in paragraphs 11.2 and 12.1, Contract Price and Contract Time may only be changed by a Change Order or a Written Amendment.

3.5 In addition, the requirements of the Contract Documents may be supplemented and minor variations and deviations in the Work may be authorized in one or more of the following ways:

3.5.1 a Field Order (pursuant to definition and paragraph 9.5),

3.5.2 OWNER Engineer's approval of a Shop Drawing or sample (pursuant to

definition and paragraphs 6.25 through 6.30), or

3.5.3 OWNER Engineer's written interpretation or clarification (pursuant to paragraph 9.4).

Reuse of Documents:

3.6 Neither CONTRACTOR, nor any Subcontractor (including sub-tier subcontractors) or Supplier, or other related person or organization performing or furnishing any of the Project Work to OWNER, shall have or acquire any title to, or ownership rights in, any of the Drawings, Specifications or other Contract Documents (or copies of any thereof) prepared by or bearing the seal of ENGINEER, and they shall not reuse any of them on extensions of the Project or any other project without written consent of OWNER and ENGINEER, and specific written verification or adaptation by ENGINEER for a fee. All Drawings, Specifications or other Documents (or copies of any thereof) are upon completion of the Project to become the property of OWNER. Further use thereof without written consent of OWNER and ENGINEER is prohibited and solely at the risk of the user.

ARTICLE 4. AVAILABILITY OF LANDS: PHYSICAL CONDITIONS: REFERENCE POINTS

Availability of Lands:

4.1 OWNER shall furnish, as indicated in the Contract Documents, the lands upon which the Work is to be performed, rights-of-way, licenses and easements for access thereto and such other lands which are specifically designated by OWNER for the use of CONTRACTOR. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by OWNER, unless otherwise provided in the Contract Documents. If CONTRACTOR believes that any delay in OWNER's furnishing of these lands, rights-of-way, licenses or easements entitles CONTRACTOR to an extension of the Contract Time, CONTRACTOR may make a claim therefore as provided in Article 12. CONTRACTOR may privately and separately provide at his own option and non-reimbursable cost, for any and all additional lands, and access thereto, that may be required for CONTRACTOR'S temporary construction facilities or storage of materials and equipment.

4.2 **Physical Condition:**

4.2.1 Explorations and Reports: Reference is made to the Supplementary Conditions for any identification of any reports of geotechnical explorations and tests of subsurface conditions at the Project site that may have been utilized by ENGINEER in preparation of the Contract Documents. Any of these geotechnical explorations and reports are expressly not part of these Contract Documents. CONTRACTOR may not rely upon the accuracy of the technical data contained in any such reports, nor upon non-technical data, interpretations or opinions contained therein or for the completeness thereof, for CONTRACTOR's purposes. Except as indicated in the immediately preceding sentence and in paragraph 4.2.6, CONTRACTOR shall have full responsibility with respect to CONTRACTOR'S advanced, pre-bid exploration, testing and

determining any CONTRACTOR risk and cost associated with encountering any subsurface conditions at the Project site.

4.2.2 **Existing Structures:** Reference is made to the Supplementary Conditions for any identification of those Drawings of physical conditions in or relating to existing surface or subsurface structures (except Underground Facilities referred to in paragraph 4.3) which are at or contiguous to the Project site that have been utilized by ENGINEER in preparation of the Contract Documents. CONTRACTOR may rely upon the accuracy of the technical data actually contained in such drawings, but not for the current physical conditions or description completeness thereof for CONTRACTOR's purposes. Except as indicated in the immediately preceding sentence and in paragraph 4.2.6, CONTRACTOR shall have full responsibility with respect to current locating, verification, investigation of, and encountering physical conditions in or relating to such structures.

4.2.3. **Report of Differing Conditions:** If CONTRACTOR believes that:

4.2.3.1 any technical data on which CONTRACTOR is entitled to rely as provided in paragraphs 4.2.1 and 4.2.2 is inaccurate, or

4.2.3.2 any physical condition uncovered or revealed at the Project site differs materially from that indicated, reflected or referred to in the Contract Documents,

CONTRACTOR shall, promptly after becoming aware thereof and before performing any Work in connection therewith (except in an emergency as permitted by paragraph 6.22), notify OWNER's Field Representative and ENGINEER's Resident Project Representative in writing about the inaccuracy or difference.

4.2.4 **ENGINEER's Review:** ENGINEER will promptly review the pertinent conditions, determine the necessity of obtaining any additional explorations or tests with respect thereto, and advise OWNER in writing (with a copy to CONTRACTOR) of ENGINEER's findings and conclusions.

4.2.5 **Possible Document Change:** If ENGINEER concludes that there is a material error in the Contract Documents, or that because of newly discovered, latent physical conditions, a change in the Contract Documents is required, a Work Directive Change or a Change Order may be issued as provided in Article 10 to reflect and document the consequences of the inaccuracy or difference.

4.2.6 **Possible Price and Time Adjustments:** In each such case, an increase or decrease in the Contract Price or an extension or shortening of the Contract Time, or any combination thereof, may be allowable to the extent that they are attributable to any such inaccuracy or difference. If OWNER and CONTRACTOR are unable to agree as to the financial impact or length thereof, a CONTRACTOR or OWNER claim may be made therefore as provided in Articles 11 and 12. All increases or decreases in the Contract Price shall be governed by all State and local statutes, codes, laws, ordinances, rules and regulations governing public competitive bidding and Change Orders.

Physical Conditions

4.3 **Underground Facilities:**

4.3.1 **Shown or Indicated:** The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Project site is only based on existing available information and data furnished to OWNER or ENGINEER by the owners of such Underground Facilities, (Non-OWNER utilities, pipeline companies, railroads, etc.) or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

4.3.1.1 OWNER and ENGINEER shall not be responsible for the actual current conditions, accuracy or completeness of any such third-party information or data; and,

4.3.1.2 CONTRACTOR shall have full responsibility before commencement of related Work for reviewing and checking all such current information and data; for locating all actual current Underground Facilities shown or indicated in the Contract Documents, for coordination of the Work with the owners of such Underground Facilities during construction; for the safety and protection thereof as provided in paragraph 6.20 and; paying for the repair of any damage thereto resulting from the Work; the cost of all of which is mutually considered between OWNER and CONTRACTOR as having been included in the CONTRACTOR'S original Contract Price.

4.3.2 Not Shown or Indicated: If an Underground Facility is uncovered or revealed at or contiguous to the Project site which was not shown or indicated in the Contract Documents, and which CONTRACTOR could not reasonably have been expected to be aware of under customary construction industry standards, CONTRACTOR shall, promptly after becoming aware thereof and before performing any Work affected thereby (except in an emergency as permitted by paragraph 6.22), identify the owner of such Underground Facility and give written notice thereof to that owner and to OWNER and ENGINEER. ENGINEER will promptly review the Underground Facility to determine the extent to which the Contract Documents should be modified to reflect and document any consequences of the existence of the Underground Facility, and the Contract Documents may be amended or supplemented to the extent necessary. During such time, CONTRACTOR shall be responsible for the safety and protection of such Underground Facility as provided in paragraph 6.20. CONTRACTOR may be allowed an increase in the Contract Price or an extension of the Contract Time, or both, to the extent that they are attributable to the existence of any Underground Facility that was not shown or indicated in the Contract Documents, and which CONTRACTOR could not reasonably have been expected to be aware of pursuant to customary construction industry standards. If the parties are unable to agree as to the financial impact or length thereof, CONTRACTOR may make a claim therefore as provided in Articles 11 and 12. All increases or decreases in the Contract Price shall be governed by all State and local statutes, codes, laws, ordinances, rules and regulations governing public competitive bidding and Change Orders.

Reference Points:

4.4. CONTRACTOR shall be responsible for laying out the Work (unless otherwise specified by OWNER in the General Requirements), and shall protect and preserve the established reference points and shall make no changes or relocations without the prior written approval of ENGINEER. CONTRACTOR shall report to ENGINEER whenever any reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations, and CONTRACTOR shall be responsible for the accurate replacement or relocation of such reference points by CONTRACTOR-retained professionally qualified personnel (not including OWNER or ENGINEER representatives).

ARTICLE 5. BONDS AND INSURANCE

Performance and Payment Bonds:

For a Contract in excess of $100,000.00, a Performance Bond shall be procured and executed by CONTRACTOR in the full amount of the Contract Price conditioned upon the faithful performance of the Work for OWNER in accordance with the Plans, Specifications and Contract Documents. Said Bond shall be solely for the protection of the OWNER.

For a Contract in excess of $50,000.00, a Payment Bond shall be executed in the full amount of the Contract Price, for the primary protection of all claimants against the surety for non-payment in supplying labor, materials and equipment in the prosecution of the Work provided for in the Contract, for the use of each such claimant timely perfecting a proper claim against surety.

5.1 CONTRACTOR shall furnish Performance and Payment Bonds, each in an amount at least equal to the Contract Price as security for the faithful performance of the Work for OWNER and payment of all CONTRACTOR's labor, materials, equipment and supply obligations under the Contract Documents. **These Bonds shall remain in effect by CONTRACTOR at least until one year after the date when final payment becomes due,** except as otherwise provided by Law or Regulation or by the Contract Documents. CONTRACTOR shall also furnish any such other bonds as may be required by the Supplementary Conditions (e.g. any maintenance, extended warranty, special indemnity, etc.). All Bonds shall be in the forms prescribed by Law or Regulation or by the Contract Documents and be executed by such sureties as are authorized to do business in the State of Texas. All Bonds signed by an agent ("attorney in fact") must be accompanied by a certified copy of the authority to act on behalf of the surety.

5.2 If the surety on any Bond furnished by CONTRACTOR is declared a bankrupt or becomes insolvent, or its right to do business in Texas is terminated or it ceases to meet the requirements of paragraph 5.1, CONTRACTOR shall within five (5) calendar days thereafter substitute another Bond and surety, both of which must be acceptable to OWNER.

Contractor's Liability Insurance:

5.3 CONTRACTOR shall purchase and maintain such commercial general liability and other insurance coverages as are appropriate for the Work being performed and furnished, and as

will provide protection from claims set forth below which may arise out of, or result from, CONTRACTOR's performance and furnishing of the Work and CONTRACTOR's other obligations under the Contract Documents; whether it is to be performed or furnished by CONTRACTOR, by any Subcontractor, by anyone directly or indirectly employed by any of them to perform or furnish any of the Work; or by anyone for whose acts and/or omissions any of them may be liable:

5.3.1 Claims under workers' compensation, disability benefits and other similar employee benefit acts. This is a Texas public works Contract and any CONTRACTOR'S or Subcontractor's attempted rejection of the worker's compensation act, and thereby substituting a CONTRACTOR'S or Subcontractor's self-insurance reserve, is specifically prohibited by Texas law.

5.3.2 Claims for damages because of bodily injury, occupational sickness or disease, or death of CONTRACTOR's employees traditionally covered by employer's liability insurance;

5.3.3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than CONTRACTOR's employees;

5.3.4 Claims for damages insured by personal injury liability coverage which are sustained: (a) by any person as a result of an offense directly or indirectly related to the employment of such person by CONTRACTOR; or (b) by any other person for any other reason;

5.3.5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom;

5.3.6 Claims arising out of operation of Laws or Regulations for damages because of bodily injury or death of any person or for damage to property; and

5.3.7 Claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any owned or hired motor vehicle.

The various insurance coverages required by this Article 5 shall include the specific type coverage and be underwritten for not less than the limits of liability and coverage amounts provided herein below or in the Supplementary Conditions, or required by law, whichever is greater. The commercial general liability insurance shall include completed operations insurance. All of the policies of insurance so required to be purchased and maintained (or the certificates or other evidence thereof) shall be of an "occurrence"-type, when applicable, and shall contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least (30) thirty days prior written notice has been given to OWNER by certified mail. All such insurance shall remain in effect until final payment and at all times thereafter when CONTRACTOR may be correcting, removing or replacing defective Work in accordance with paragraph 13.12. In addition, CONTRACTOR shall maintain such completed operations insurance for at least two (2) years after final payment and furnish OWNER with evidence of

continuation of such insurance at final payment and one year thereafter. Insurance coverage furnished under the Contract Documents (except for Workmen's Compensation and any professional engineering errors and omissions liability insurance that CONTRACTOR or his agent might carry applicable to this Project) shall include the City of Brownsville and BPUB as OWNER, and their respective City Commissioners, public officials, officers, Board Members, and employees, as named additional insureds and hereinafter known as "additional insureds."

The following entities are to also be specifically named as additional insureds:

1. City of Brownsville, Texas
   Attn: City Secretary Griselda Rosas
   City Plaza, First Floor
   1034 E. Levee St.
   Brownsville, Texas 78520

2. Brownsville Public Utilities Board
   1425 Robinhood Drive
   Brownsville, TX 78521

Contractual Liability Insurance:

5.4 The commercial general liability insurance required by paragraph 5.3 will include contractual liability insurance applicable to CONTRACTOR's INDEMNITY obligations under paragraphs 6.32 and 6.33.

5.5 Specific Coverages of Insurance Required by Owner:

5.5.1 Workmen's Compensation and Employer's Liability. This insurance shall protect the laborer, and insure the CONTRACTOR, and insulate the additional insureds, against all claims under applicable Texas workmen's compensation laws, pursuant to subparagraph 5.3.1. The additional insureds shall also be protected under an Employer's Liability policy against claims for injury, disease, or death of employees which, for any reason, may not fall within the provisions of a workmen's compensation law. This Employer's Liability policy shall include an "all states" endorsement.

5.5.2. **Mandatory TWCC Rule 28 TAC Sect. 110.110 Adapted Language**

(A) **Definitions:**

Certificate of coverage ("certificate") - A copy of a certificate of insurance, or a coverage agreement, showing statutory workers' compensation insurance coverage for the person's or entity's (CONTRACTOR's) employees providing services on this public works Project, for the duration of this Project.

"Duration of the Project" - includes the time from the beginning of the Work on this Project until the CONTRACTOR's/person's Work on this Project has been completed and accepted by the OWNER.

“Persons providing services on the Project” ("subcontractor" in § 406.096) - includes all persons or entities performing all or part of the services the CONTRACTOR has undertaken to perform on this Project, regardless of whether that person contracted directly with the CONTRACTOR and regardless of whether that person has employees. This includes, without limitation, independent contractors, subcontractors, leasing companies, motor carriers, owner-operators, employees of any such entity, or employees of any entity which furnishes persons to provide services on this Project.

"Services" - include, without limitation, providing, hauling, or delivering equipment or materials, or providing labor, transportation, or other service related to this Project.

(B) The CONTRACTOR shall provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, § 401.011(44) for all employees of the CONTRACTOR providing services on this Project, for the duration of this Project.

(C) The CONTRACTOR must provide a certificate of coverage to the OWNER prior to being awarded the Contract.

(D) If the coverage period shown on the CONTRACTOR'S current certificate of coverage ends during the duration of this Project, the CONTRACTOR must, prior to the end of the coverage period, file a new certificate of coverage with the OWNER showing that coverage has been extended.

(E) The CONTRACTOR shall obtain from each person providing services on this Project, and provide to the OWNER:

(1) a certificate of coverage, prior to that person beginning Work on this Project, so the OWNER will have on file certificates of coverage showing coverage for all persons providing services on this Project; and

(2) no later than seven (7) calendar days after receipt by the CONTRACTOR, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of this Project.

(F) The CONTRACTOR shall retain all required certificates of coverage for the duration of this Project and for three (3) years thereafter.

(G) The CONTRACTOR shall notify the OWNER in writing by certified mail or personal delivery, within ten (10) calendar days after the CONTRACTOR knew or should have known, of any change that materially affects the provision of coverage

of any person providing services on this Project.

(H) The CONTRACTOR shall post on this Project site a notice, in the text, form and manner prescribed by the Texas Workers' Compensation Commission, informing all persons providing services on this Project that they are required to be covered, and stating how a person may verify coverage and report lack of coverage.

(I) The CONTRACTOR shall contractually require each person with whom it contracts to provide services on this Project, to:

(1) provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, § 401.011(44) for all of its employees providing services on this Project, for the duration of this Project;

(2) provide to the CONTRACTOR, prior to that person beginning Work on this Project, a certificate of coverage showing that coverage is being provided for all employees of the person providing services on this Project, for the duration of this Project;

(3) provide the CONTRACTOR, prior to the end of the coverage period, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of this Project;

(4) obtain from each other person with whom it contracts, and provide to the CONTRACTOR:

(a) a certificate of coverage, prior to the other person beginning Work on this Project; and

(b) a new certificate of coverage showing extension of coverage, prior to the end of the coverage period, if the coverage period shown on the current certificate of coverage ends during the duration of this Project;

(5) retain all required certificates of coverage on file for the duration of this Project and for three (3) years thereafter;

(6) notify the OWNER in writing by certified mail or personal delivery, within ten (10) calendar days after the person knew or should have known, of any change that materially affects the provision of coverage of any person providing services on this Project; and

(7) contractually require each person with whom it contracts, to perform as

required by clauses (I)-(1-7) of this subparagraph, with the certificates of coverage to be provided to the person for whom they are providing services.

(J) By signing this Contract or providing or causing to be provided a certificate of coverage, the CONTRACTOR is representing to the OWNER that all employees of the CONTRACTOR who will provide services on this Project will be covered by workers' compensation coverage for the duration of this Project, that the coverage will be based on proper reporting of classification codes and payroll amounts, and that all coverage agreements will be filed with the appropriate insurance carrier. Providing false or misleading information may subject the CONTRACTOR to administrative penalties, criminal penalties, civil penalties, or other civil actions.

(K) The CONTRACTOR's failure to comply with any of these provisions is a breach of Contract by the CONTRACTOR which entitles the OWNER to declare the Contract void if the CONTRACTOR does not remedy the breach within ten (10) calendar days after receipt of notice of breach from the OWNER.

The liability limits shall not be less than:

Workmen's compensation	Texas Statutory Limits
Employer's liability	$100,000.00 each occurrence

5.5.3 Comprehensive Business Automobile Liability. This insurance shall be written in comprehensive business form and shall protect the CONTRACTOR and the additional insureds against all claims described under Section 5.3.7. of the General Conditions of the Contract Documents and arising from the use of motor vehicles, and shall cover, on or off the Project site, all motor vehicles licensed for highway use, whether they are owned, non-owned, or hired.

The liability limits shall not be less than:

Bodily Injury and property damage	$500,000.00 combined single limit each occurrence

5.5.4 Commercial General Liability. This insurance shall be an "occurrence" type policy written in commercial form and shall protect the CONTRACTOR and the additional insureds against all claims described in Sections 5.3, 5.3.3., 5.3.4., 5.3.5., 5.3.6, 5.4 of the General Conditions of the Contract Documents arising out of any intentional or negligent act and/or omission of the CONTRACTOR or his agents, employees, or subcontractors. This policy shall also include protection against claims insured by usual personal injury liability coverage.

The liability limits shall not be less than:

Personal Injury and property damage	$1,000,000.00 combined single limit each occurrence and

and $1,000,000.00 aggregate

If the CONTRACTOR'S Work, or Work under his direction, requires blasting, explosive conditions, or underground operations, the commercial general liability coverage shall contain no exclusion relative to blasting, exploding, collapse of structures, or damage to underground property.

5.5.5 Excess Umbrella Liability Policy. This insurance shall protect the CONTRACTOR and the additional insureds against all claims in excess of the limits provided under the employer's liability, comprehensive business automobile liability, and commercial general liability policies. The liability limits of the umbrella policy shall not be less than $2,000,000.00. The policy shall be an "occurrence" type policy.

5.5.6 Transportation Insurance. This insurance shall be of the "all risks" type and shall protect the CONTRACTOR and the OWNER from all insurable risks of physical loss or damage to equipment and materials in transit to the Project jobsite and until the OWNER receives the equipment and materials at the Project jobsite. The coverage amount shall be not less than one-half of the full amount of the total Contract Price.

Transportation insurance shall provide for losses to be payable to the CONTRACTOR and the OWNER as their respective legal interests may appear.

5.5.7 All policies required under paragraph 5.5 herein shall contain a "cross liability" or "severability of interest" clause or endorsement. Notwithstanding any other provision of these policies, the insurance afforded shall apply separately to each insured, named insured, or additional insured with respect to any claim, suit, or judgment made or brought by or for any other insured, named insured, or additional insured, as though a separate policy had been issued to each, except the insurer's liability shall not be increased beyond the amount or amounts for which the insurer would have been liable had only one insured been named.

5.5.8 CONTRACTOR shall require each of his Subcontractors to procure and maintain during the life of his subcontract, Subcontractor's Commercial General Liability and Property Damage Insurance of the type specified in subparagraphs 5.5.1, 5.5.2, 5.5.3, 5.5.4 and paragraph 5.6 hereof, in the same amounts as required by OWNER for CONTRACROR, unless alternative amounts are approved in writing by OWNER.

5.5.9 The insurance required under subparagraphs 5.5.1, 5.5.2, 5.5.3, 5.5.4 and paragraph 5.6 hereof shall provide adequate protection for CONTRACTOR and his Subcontractors respectively against damage claims which may arise from operations under this Contract, whether such operation is by the insured or by anyone directly or indirectly employed by him, and also, against any special hazards which may be encountered in the performance of this Contract.

5.5.10 CONTRACTOR shall not commence any Work under this Contract until he has obtained all the insurance coverage required under this Article 5. and such insurance has been approved by OWNER; nor shall CONTRACTOR allow any Subcontractor to commence Work on this Contract until the insurance required by the Subcontractor has been so obtained and

approved.

Property Insurance:

5.6 Unless otherwise provided in the Supplementary Conditions, CONTRACTOR shall purchase and maintain property insurance upon the Work at the Project site to the full insurable value thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions, established by current customary construction industry standards given the type of Work in Cameron County, Texas and value thereof, or as may be required by Laws and Regulations). This insurance shall include the interests of OWNER, CONTRACTOR, and Subcontractors, in the Work, all of whom shall be listed as insured or additional insured parties, which shall insure against the perils of fire and extended coverage and shall include "all risk" insurance for physical loss and damage including theft, vandalism and malicious mischief, collapse and water damage, and such other perils as may be provided in the Supplementary Conditions (e.g. flood, wind, etc.); and shall include damages, losses and expenses arising out of or resulting from any insured loss or cost incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers, architects, attorneys and other professionals). If not covered under the "all risk" insurance or otherwise provided in the Supplementary Conditions, CONTRACTOR shall purchase and maintain similar property insurance on portions of the Work stored on and off the site or in transit when such portions of the Work are to be included in an Application for Payment. The policies of insurance required to be purchased and maintained by CONTRACTOR in accordance with this paragraph shall be of an "occurrence"-type, when applicable, and contain a provision that the coverage afforded will not be canceled or materially changed until at least (30) thirty calendar days prior written notice has been given to OWNER by certified mail.

5.6.1 Property Insurance Coverage. This insurance shall protect CONTRACTOR and the additional insureds against all claims described in Section 5.6 and shall provide the following minimum amounts:

Property Insurance Coverage: Provide Full Contract Price Amount or $100,000.00 Minimum, whichever is greater.

Waiver of Rights:

5.7 Waiver

5.7.1 CONTRACTOR waives all rights against OWNER, (unless OWNER or other named entities as additional insureds were solely negligent), for all losses and damages caused by any of the perils covered by the policies of insurance provided in response to paragraph 5.6 and any other property insurance applicable to the Work, and also waives all such rights against all other entities named as additional insureds in such policies for losses and damages so caused. As required by paragraph 6.12, each subcontract between CONTRACTOR and a Subcontractor will contain similar “flow down” waiver provisions by the Subcontractor in favor of CONTRACTOR, OWNER, ENGINEER and their respective sub-consultants, and all other entities named as additional insureds.

5.7.2 CONTRACTOR intends that any policies provided in response to paragraph 5.6 shall protect all of the entities insured and provide primary coverage for all losses and damages caused by the perils covered thereby. Accordingly, all such policies shall 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 of the entities named as insured or additional insured, and if the insurers require separate waiver forms to be signed by any Subcontractor, CONTRACTOR will obtain the same.

Acceptance of Insurance:

5.8 If OWNER has any objection to the coverage afforded by or other provisions of the insurance required to be purchased and maintained by CONTRACTOR in accordance with paragraphs 5.3, 5.4, 5.5 and 5.6 on the basis of the coverages not complying with the Contract Documents, OWNER will attempt to notify CONTRACTOR in writing thereof within ten (10) calendar days of the date of delivery of such certificates to OWNER in accordance with paragraph 2.7. CONTRACTOR shall provide to the OWNER such additional information regarding the insurance provided by CONTRACTOR as the OWNER may reasonably request. Failure on the part of the OWNER or its agents to detect an insurance deficiency as compared to the insurance requirements of the Contract shall not constitute a waiver by the OWNER of the insurance requirements which CONTRACTOR and/or Subcontractor must contractually meet to be in compliance herewith.

Partial Utilization - Property Insurance:

5.9 If OWNER finds it necessary to occupy, use, or operate a portion or portions of the Work prior to Substantial Completion of all the Work, such use, occupancy or operation may be accomplished in accordance with paragraph 14.10. CONTRACTOR shall have the obligation to inform the insurers of OWNER's intent to so occupy, use or operate a portion or portions of the Work. The insurers of CONTRACTOR providing the property insurance shall consent to such use, occupancy or operation by endorsement on the policy or policies, but the property insurance shall not be canceled or lapse on account of any such partial use, occupancy, or operation by OWNER.

ARTICLE 6. CONTRACTOR'S RESPONSIBILITIES

Supervision and Superintendence:

6.1 CONTRACTOR shall supervise 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 and customary construction industry standards. CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences, procedures, safety and quality control of construction, but CONTRACTOR shall not be responsible for any negligence of others in any design or selection of a specific means, method, technique, sequence or procedure of construction which is indicated in and required by the Contract Documents. CONTRACTOR shall be solely responsible to guarantee that the

finished Work complies accurately with the Contract Documents and CONTRACTOR shall not rely upon the OWNER's and/or ENGINEER'S construction observation to accomplish same.

6.2 CONTRACTOR shall keep on the Work at all times during its progress a competent resident superintendent, who shall not be replaced without written notice to OWNER and ENGINEER, except under extraordinary circumstances. The superintendent will be CONTRACTOR's representative at the site and shall have authority to act on behalf of CONTRACTOR. All communications given to the superintendent shall be as binding as if given directly to CONTRACTOR.

Labor, Materials and Equipment:

6.3 CONTRACTOR shall provide competent, suitably qualified personnel to survey and lay out the Work, oversee quality control, monitor safety, and perform construction of the Work as required by the Contract Documents. CONTRACTOR shall at all times maintain good discipline and order at the Project site. Except in connection with the safety or protection of persons or the Work or property at the Project site or adjacent thereto, and except as otherwise indicated in the Contract Documents, all Work at the Project site shall be performed during regular daily working hours (generally eight (8) hours between 7:00 A. M. and 6:00 P.M.) as may be specifically set forth by the OWNER, and CONTRACTOR will not permit overtime work or the performance of Work on Saturday, Sunday or any legal holiday without OWNER's advanced written consent. Preference employment shall be given to resident citizens of the Cameron County, Texas area where such persons are available and fully qualified to perform the Work to which the employment relates.

6.3.1 CONTRACTOR shall acquaint himself with all matters and conditions concerning the Project site and any existing construction. Any practical and constructive criticism or exception regarding any feature of the Work must be presented in writing to OWNER at least ten (10) calendar days prior to bidding. After the Contract Agreement to perform the Work has been signed by CONTRACTOR, it shall then be his responsibility to provide satisfactory Work that will meet the full intent of the Contract Documents. CONTRACTOR shall then pursue this Work with the other trades so that all phases of the Work may be properly coordinated without delays or damage to any parts of the Work.

6.4 Unless otherwise specified in the General Requirements, CONTRACTOR shall furnish and assume full responsibility for all 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 furnishing, performance, testing, start-up and completion of the Work.

6.4.1 CONTRACTOR shall provide and maintain suitable weather-tight, washable, sanitary toilet facilities for all workmen for the entire construction period. CONTRACTOR shall comply with all requirements of applicable health authorities. When toilet facilities are no longer required, promptly remove them from the Project site, disinfect and clean the surface area as required. CONTRACTOR shall keep each toilet facility swept and supplied with toilet tissue at all times.

6.5 All materials and equipment shall be of good quality and new, except as otherwise specifically provided in the Contract Documents. Sometimes a project specification may require salvage and reinstallation of OWNER's recently acquired machinery and equipment pre-existing at a project site. If required by ENGINEER, CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment procured for the Project. All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the instructions of the applicable Supplier, except as otherwise provided in the Contract Documents; but no provision of any such Supplier instructions will be effective to assign to ENGINEER any duty or authority to supervise or direct the furnishing or performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.15 or 9.16.

6.6 CONTRACTOR shall notify OWNER and ENGINEER in writing of any conflict between the manufacturer's directions and the Contract Documents and shall not perform any Work on any item until such conflict has been resolved. Upon award of the Contract, CONTRACTOR will secure a certificate of exemption from the Texas State Comptroller to preserve the OWNER's exemption from Limited Sales, Excise and Use Tax in an amount representing that part of the total Contract Price representative of the value of tangible personal property to be physically incorporated into the Project realty. The certificate of exemption must contain a statement to the effect that such materials or property have been, or will be, utilized in the performance of the Contract to the full extent of the amount for which a certificate of exemption is requested.

6.6.1 Except where otherwise specified, CONTRACTOR shall, at all times, provide protection against weather, so as to maintain all Work, materials and fixtures free from injury or damages. All new Work likely to be damaged by weather shall be covered or otherwise protected as required.

6.6.2 While it is appreciated that CONTRACTOR has to maintain continuous construction operations and sequences, it should be understood that the OWNER's electric, gas, water, wastewater production and distribution systems must function during the Contract period with a minimum of inconvenience to the OWNER's customers and the OWNER. Requirements of the: Texas Commission on Environmental Quality (TCEQ); Texas Railroad Commission (TRC); Electric Reliability Council of Texas (ERCOT); and the State and federal regulatory agencies having jurisdiction over the Project site, must be met by CONTRACTOR. It is therefore incumbent on CONTRACTOR to plan ahead on the basis of integrating his construction sequencing program as far as possible into the normal operating sequence of the various utility systems to avoid or minimalize disruption of services. No departure from the normal operating sequence of the utility systems will be allowed, except with the specific advanced written agreement of OWNER.

6.6.3 CONTRACTOR shall notify OWNER and ENGINEER in writing a minimum of forty-eight (48) hours in advance of any Work which will be tied into the existing utility systems. Method of tie-in shall be submitted to ENGINEER for his approval prior to any Work being performed. At no time shall contaminated water that has not been disinfected be

allowed to seep into any existing waterlines, and at no time shall sewage be allowed to flow into surrounding Project areas. Connections will be made during times of daily minimum sewage flows, if required by Project.

6.6.4 CONTRACTOR shall coordinate his Work with that of other contractors whose work may occur at a conflicting time and location. The coordination shall be such that CONTRACTOR's Work will be maintained at a normal rate. Any priority of contractors' performance disputes will be decided by OWNER, after consultation with ENGINEER.

6.6.5 All Work that is performed on, across or along International Boundary and Water Control Commission levees must conform to all I.B. & W.C.C. requirements. All Work performed on, across or along Brownsville Irrigation and Drainage District or the Cameron County Water Control and Improvement District No.16 canals or ditches must conform to all District requirements.

6.6.6 Satisfactory access or detour roads shall be provided by CONTRACTOR where necessary due to his construction.

6.6.7 If required by the Bid or Project Specifications, or by law for the type of excavation construction being performed, CONTRACTOR and his Registered Professional Engineer shall develop the Trench Safety System Plan and shall provide any necessary shoring, bracing and/or sheeting pursuant to Section 756.023 of the Texas Health and Safety Code and OSHA 29 C.F.R. 1926, Subpart P, Vol. 54 No. 209 of the Federal Register, October 31, 1989, pp. 45959-45991, and, as provided in Section 11 - "Trench Excavation and Shoring Safety Plan" of the OWNER's Standard Specifications.

6.6.8 CONTRACTOR shall routinely provide adequate barricades and warning devices in conformance with the guidelines for Traffic Control as established by the Texas Department of Transportation (TDOT) in the Texas Manual on Uniform Traffic Control Devices (TMUTCD). This provision shall be incidental and subsidiary to the rest of the Work in this Contract, and shall not constitute a separate CONTRACTOR pay item.

6.6.9 CONTRACTOR shall provide to OWNER the services of technical representative(s) from Supplier(s) for CONTRACTOR furnished equipment, for a sufficient period of time to assist in start-up and initial adjustment of all installed or delivered equipment, and to train, advise and consult with OWNER's operating personnel, if appropriate for the Project.

6.6.9.1 For each mechanical system, CONTRACTOR shall provide to OWNER a written certification from the manufacturer's representative that the products of the manufacturer have been installed by CONTRACTOR in conformance with the manufacturer's requirements and recommendations.

6.6.10 All items of equipment required for this Contract shall be Bid to provide as part of the Contract Price, any literature explaining "Operation and Maintenance" (O&M) of that item of equipment. If a manufacturer does not print such a standard O&M manual, CONTRACTOR shall develop and provide OWNER with a customized manual approved in

writing by the manufacturer.

Adjusting Progress Schedule:

6.7 CONTRACTOR shall submit to ENGINEER for the Project record and acceptance only, and not approval or concurrence to the extent indicated in paragraph 2.9, periodic adjustments in the Progress Schedule to reflect the impact thereon of new Project developments; these revised Schedules will conform generally to the Progress Schedule then in effect and additionally will comply with any provisions of the General Requirements applicable thereto.

Substitutes or "Or-Equal" Items:

6.8

6.8.1 As a general rule, the OWNER and ENGINEER prefer all determinations regarding proposed Substitutions of materials or equipment as potential "or-equal-items" be resolved during the pre-Bid phase. Whenever materials or equipment are specified or described in the Contract Documents by using the name of a proprietary item, or the name of a particular Supplier, the naming of the item is intended to establish the type, function, performance standard and quality required. In some instances, the OWNER, after consultation with ENGINEER, is legally allowed to "sole source" a specific material or component of equipment when its design and/or performance is required to integrate with a larger OWNER system that will remain in place, or that OWNER has an inventory of spare parts for, or that OWNER has a long favorable, performance reliability history with. Unless the material or equipment name is followed by words indicating that no substitution is permitted, materials or equipment of other Suppliers generally may be accepted by ENGINEER, if sufficient information is submitted by CONTRACTOR to allow ENGINEER to determine that the material or equipment proposed is equivalent, or equal to, that named by ENGINEER. The procedure for review by ENGINEER will include the following as supplemented in the General Requirements. Requests for review of substitute items of material and equipment will not be accepted by ENGINEER from anyone other than CONTRACTOR. If CONTRACTOR wishes to furnish or use a substitute item of material or equipment, CONTRACTOR shall make written application to ENGINEER for acceptance thereof, certifying in writing that the proposed substitute will adequately perform the functions and achieve the results called for by the general design, be similar and of equal substance to that specified and be suited to the same use as that specified. The CONTRACTOR'S written application will state that the evaluation and acceptance of the proposed substitute will not prejudice CONTRACTOR's achievement of Substantial Completion on time, whether or not acceptance of the substitute for use 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 any other work on the Project by other contractors) to adapt the design to the proposed substitute and whether or not incorporation or use of the substitute in connection with the Work is subject to payment of any vendor license fee or royalty. All variations of the proposed substitute from that specified will be identified in the CONTRACTOR'S written application and available maintenance, repair and replacement parts and service will be indicated. The CONTRACTOR'S written application will also contain an itemized estimate of all costs or savings that will result directly or indirectly from acceptance of such substitute, including costs of redesign, operation, performance, and potential claims or protests of other contractors

affected by any resulting change, all of which shall be considered by ENGINEER in evaluating the proposed substitute. ENGINEER may require CONTRACTOR to furnish at CONTRACTOR's non-compensable expense additional data about the proposed substitute.

6.8.2 If a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents, CONTRACTOR may generally furnish or utilize a substitute means, method, sequence, technique or procedure of construction acceptable to ENGINEER, if CONTRACTOR submits sufficient written information to allow ENGINEER to determine that the substitute proposed can be legally utilized by CONTRACTOR (e.g. patented or licensed processes) and is equivalent to that indicated or required by the Contract Documents. OWNER may have similar legal rights to "sole source" as generally indicated above in paragraph 6.8.1. The procedure for review by ENGINEER will be similar to that provided in paragraph 6.8.1 above, as applied by ENGINEER and as may be supplemented in the General Requirements.

6.8.3 ENGINEER will be allowed a reasonable time within which to evaluate each proposed substitute. ENGINEER will be the sole judge of acceptability, and no substitute will be ordered, installed or utilized without ENGINEER's prior written acceptance which will be evidenced by either a Change Order or an approved Shop Drawing. OWNER may require CONTRACTOR to furnish at CONTRACTOR's non-compensable expense, a special performance guaranty bond or other form of surety with respect to any accepted substitute. ENGINEER will record time required by ENGINEER and any ENGINEER's outside technical consultants in evaluating substitutions proposed by CONTRACTOR and in making any required changes in the Contract Documents occasioned thereby. Whether or not ENGINEER accepts a proposed substitute, CONTRACTOR shall reimburse OWNER for the charges of ENGINEER and any ENGINEER's consultants for evaluating each proposed substitute.

Concerning Subcontractors, Suppliers and Others:

6.9

6.9.1 CONTRACTOR shall not employ any Subcontractor, Supplier or other person or organization (including those acceptable to OWNER and ENGINEER as indicated in paragraph 6.8), whether initially or as a substitute, against whom OWNER or ENGINEER may have reasonable objection. CONTRACTOR shall not be required to employ any Subcontractor, Supplier or other person or organization to furnish or perform any of the Work against whom CONTRACTOR has reasonable objection.

6.9.2 The Pre-Bid documents require the CONTRACTOR to identify Subcontractors, Suppliers or other persons or organizations (including those who are to furnish the principal items of material and equipment), to be submitted to OWNER at the time of bidding. OWNER's or ENGINEER's acceptance (either in writing or by failing to make written objection thereto) of any such Subcontractor, Supplier or other person or organization so identified by CONTRACTOR may be revoked by OWNER or ENGINEER on the basis of reasonable objection after due investigation, in which case CONTRACTOR shall submit an acceptable substitute. The Contract Price may be increased by the difference in the cost occasioned by such substitution and an appropriate Change Order or written Amendment may be executed by the OWNER and

CONTRACTOR. All increases or decreases in the Contract Price shall be governed by all State and local statutes, codes, laws, ordinances, rules and regulations governing public competitive bidding and maximum Change Order limits. No acceptance by OWNER or ENGINEER of any such Subcontractor, Supplier or other person or organization shall constitute a waiver of any right of OWNER or ENGINEER to reject any defective or non-compliant Work.

6.10 CONTRACTOR shall be fully responsible to OWNER and ENGINEER for all acts and/or omissions of the Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct contract or indirect relationship with CONTRACTOR, just as CONTRACTOR is responsible to the OWNER for CONTRACTOR's own acts and/or omissions. Nothing in the Contract Documents shall create any contractual relationship between OWNER or ENGINEER and any such Subcontractor, subtier subcontractor, Supplier or other person or organization, nor shall it create any obligation on the part of OWNER to pay or to supervise the payment of any moneys due any such Subcontractor, subtier subcontractor, Supplier or other person or organization, except as may otherwise be required by Laws and Regulations.

6.11 The divisions and sections of the Specifications and the identifications of any Drawings shall not control CONTRACTOR in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

6.12 All Work performed for CONTRACTOR by a Subcontractor will be pursuant to an appropriate written agreement between CONTRACTOR and the Subcontractor, which specifically binds the Subcontractor through appropriate "flow down" provisions, to the applicable terms and conditions of the Contract Documents for the benefit of OWNER, and contains waiver provisions as required by paragraph 5.7.

Patent Fees and Royalties:

6.13 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 a particular 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 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 shall be disclosed by OWNER in the Contract Documents. **CONTRACTOR SHALL INDEMNIFY AND HOLD HARMLESS THE CITY OF BROWNSVILLE AND THE BROWNSVILLE PUBLIC UTILITIES BOARD, INCLUDING THEIR RESPECTIVE COMMISSIONERS, BOARD MEMBERS OFFICERS AND EMPLOYEES (INDEMNITEES) AGAINST ANY CLAIMS, DAMAGES, LOSSES AND EXPENSES (INCLUDING ATTORNEYS' FEES AND COURT COSTS) ARISING OUT OF 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, AND SHALL DEFEND ALL SUCH CLAIMS IN CONNECTION WITH ANY ALLEGED INFRINGEMENT OF SUCH RIGHTS. IT IS THE EXPRESSED**

INTENTION OF THE PARTIES HERETO THAT THE INDEMNITY PROVIDED FOR IN THIS PARAGRAPH IS INDEMNITY BY CONTRACTOR TO INDEMNIFY AND PROTECT INDEMNITEES FROM THE CONSEQUENCES OF OWNER'S OWN NEGLIGENCE WHERE THAT NEGLIGENCE ON THE PART OF THE OWNER IS A CONCURRING CAUSE OF THE CLAIMS, DAMAGES, LOSSES, AND EXPENSES REFERENCED ABOVE. FURTHERMORE, THE INDEMNITY PROVIDED FOR IN THIS PARAGRAPH SHALL HAVE NO APPLICATION TO ANY CLAIM, DAMAGE, LOSS AND EXPENSE REFERENCED ABOVE WHERE SUCH RESULTS FROM THE SOLE NEGLIGENCE OF THE OWNER INDEPENDENT OF THE FAULT OF ANY OTHER PERSON OR ENTITY.

Permits:

6.14 Unless otherwise provided in the Supplementary Conditions, CONTRACTOR shall obtain and pay for all construction permits and licenses. 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 opening of Bids. CONTRACTOR shall pay all charges of utility owners with the exception of those normally charged by OWNER, for connections to the Work, and OWNER shall pay all charges of such third-party utility owners for facility capital costs related thereto such as impact fees or plant investment fees, if any.

6.14.1 Fires shall not be built on the Project premises except by the express consent of OWNER and Brownsville City and/or County Fire Marshall.

Laws and Regulations:

6.15

6.15.1 CONTRACTOR shall give all notices and comply with all Laws and Regulations applicable to furnishing and performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, OWNER shall not be responsible for monitoring CONTRACTOR's compliance with any Laws or Regulations.

6.15.2 If CONTRACTOR has actual knowledge that the Specifications or Drawings are at variance with any Laws or Regulations, CONTRACTOR shall give ENGINEER prompt written notice thereof, and any necessary changes will be authorized by OWNER by one of the methods indicated in paragraph 3.4. If CONTRACTOR performs any Work knowing, or having reason to know, that it is contrary to such Laws or Regulations, and without such advanced written notice to ENGINEER, CONTRACTOR shall bear all costs arising therefrom; however, it shall not be CONTRACTOR's original and primary responsibility to make certain that the Specifications and Drawings are in accordance with such Laws and Regulations.

Taxes:

6.16 "Pursuant to 34 Texas Administrative Code 3.291, in order for the OWNER to

continue to benefit from its status as a State Sales and Use Tax Exempt Organization, after August 14, 1991 public works construction contracts must be awarded on a "separated contract" basis. A "separated contract" is one where the CONTRACTOR distinguishes in writing prior to starting Work, between the value of the tangible personal property (materials such as pipe, bricks, lumber, concrete, paint, etc.) to be physically incorporated into the Project real estate from the total Contract price. Under the "separated contract" format, the CONTRACTOR in effect becomes a "seller" to the OWNER of materials that are to be physically incorporated into the Project real estate. As a "seller", the CONTRACTOR will issue a "Texas Certificate of Resale" to the CONTRACTOR'S supplier in lieu of paying the sales tax on the Project materials at the time of purchase. The CONTRACTOR will also issue a "Certificate of Exemption" to the supplier, demonstrating that the personal property is being purchased for resale and that the resale is to a public owner, the City of Brownsville, Texas, and its BPUB, which are sales tax exempt entities under UTCA Tax Code Section 151.309(5). CONTRACTOR should be careful to consult the most recent guidelines of the Texas State Comptroller of Public Accounts regarding the sales tax status of supplies and equipment that are used and consumed during Project Work (e.g. gas, oil, fluids, rental equipment, etc.), but that are not physically incorporated into the Project real estate. Such items are generally not tax exempt. If the CONTRACTOR has questions about the implementation of this policy he is asked to inquire with the State Comptroller of Public Accounts, Tax Administration Division, State of Texas, Austin, Texas 78774. The CONTRACTOR will not include any federal taxes in Bid prices since the OWNER is exempt from payment of such taxes. "Texas Certificates of Exemption", "Texas Certificates of Resale" and "Texas Sales Tax Permits" are forms available to the CONTRACTOR through the regional offices of the Texas State Comptroller of Public Accounts."

6.16.1. On the last page of the Construction Agreement a blank is provided for the CONTRACTOR to fill in an amount in dollars and cents indicating the Bid price of all materials and other tangible personal property included in the total Bid that will be physically incorporated into the Project real estate. The amount to be filled in by CONTRACTOR has reference to all of such materials and other tangible personal property as will actually be physically incorporated into the final result of the Work covered by the Contract. "Tangible personal property" means personal property which may be seen, weighed, measured, felt or touched, or which is in any other manner perceptible to the senses.

6.16.2. Upon award of the Contract, OWNER will, on written request of CONTRACTOR, furnish CONTRACTOR with a certificate of exemption from the Texas Limited Sales, Excise and Use Tax in only an amount not exceeding the above mentioned bid price for materials and other tangible personal property that will be physically incorporated into the Project real estate. Such written request by CONTRACTOR must contain a statement to the effect that such materials or property will be utilized in the performance of the Contract, to the full extent of the amount for which a certificate of exemption is requested. The Texas Comptroller of Public Accounts often audits contractors regarding compliance with these paragraph 6.16 provisions.

Use of Premises:

6.17 CONTRACTOR shall confine construction equipment, the storage of materials and equipment and the operations of workers to the Project site and land and areas identified in and permitted by the Contract Documents, or otherwise privately acquired by the CONTRACTOR, and other land and areas permitted by Laws and Regulations, rights-of-way, permits and easements. CONTRACTOR shall assume full responsibility for any damage to any Project land or area, and to the owner or occupant of any land or areas contiguous thereto, resulting from the performance of the Work. Should any claim be made against OWNER by any such adjacent owner or occupant because of the performance of the Work, CONTRACTOR shall promptly attempt to settle with such other party by agreement, or otherwise resolve the claim by mediation, arbitration or at law. **CONTRACTOR SHALL INDEMNIFY, AND HOLD HARMLESS THE CITY OF BROWNSVILLE AND THE BPUB INCLUDING THEIR RESPECTIVE COMMISSIONERS, BOARD MEMBERS OFFICER'S AND EMPLOYEES (INDEMNITEES) FROM AND AGAINST ALL CLAIMS, DAMAGES, LOSSES AND EXPENSES (INCLUDING, BUT NOT LIMITED TO, FEES OF ENGINEERS, ARCHITECTS, ATTORNEYS AND OTHER PROFESSIONALS AND COURT COSTS) ARISING DIRECTLY, INDIRECTLY OR CONSEQUENTIALLY OUT OF ANY ACTION, LEGAL OR EQUITABLE, BROUGHT BY ANY SUCH OTHER THIRD PARTY ENTITY AGAINST OWNER, TO THE EXTENT BASED ON A CLAIM ARISING OUT OF CONTRACTOR'S NEGLIGENT PERFORMANCE OF THE WORK. IT IS THE EXPRESSED INTENT OF THE PARTIES HERETO THAT THE INDEMNITY PROVIDED FOR IN THIS PARAGRAPH IS INDEMNITY BY CONTRACTOR TO INDEMNIFY AND PROTECT THE INDEMNITEES FROM THE CONSEQUENCES OF THE INDEMNITEES' OWN NEGLIGENCE, WHEN THAT NEGLIGENCE ON THE PART OF THE INDEMNITEES IS A CONCURRING CAUSE OF THE INJURY, DEATH OR DAMAGE.**

FURTHERMORE, THE INDEMNITY PROVIDED FOR IN THIS PARAGRAPH SHALL HAVE NO APPLICATION TO ANY CLAIM, LOSS, DAMAGE, CAUSE OF ACTION, SUIT, AND LIABILITY WHERE THE INJURY, DEATH OR DAMAGE RESULTS FROM THE SOLE NEGLIGENCE OF THE INDEMNITEES, INDEPENDENT OF THE FAULT OF ANY OTHER PERSON OR ENTITY.

6.18 During the progress of the Work, CONTRACTOR shall keep the premises free from accumulations of waste materials, rubbish and other debris resulting from the Work. At the completion of the Work, CONTRACTOR shall remove and legally dispose of all waste materials, rubbish and debris from and about the premises, as well as all tools, appliances, construction equipment and machinery, and surplus materials, and shall leave the Project site clean and ready for occupancy by OWNER. CONTRACTOR shall restore to original condition all property not designated for alteration by the Contract Documents.

6.19 CONTRACTOR shall be confined to all working real estate and easements provided by OWNER, unless CONTRACTOR separately and privately secures at his own non-reimbursable cost, additional private temporary construction easements. Generally, storage of excavation material and all CONTRACTOR equipment and material shall remain within the limits of Project and working easements.

6.20 CONTRACTOR shall not weight load or permit any part of any structure or utility to be loaded in any manner that will endanger the structure or utility, nor shall CONTRACTOR subject any part of the Work or adjacent property to surcharge stresses or pressures, or loss of subjacent or lateral support, that will endanger it.

Record Documents:

6.21 CONTRACTOR shall as a precondition to interim monthly progress payments, show evidence of regularly maintaining and updating and storing in a safe place at the Project site, one record copy of all Drawings, Specifications, Addenda, Written Amendments, Change Orders, Work Directive Changes, Field Orders and any written interpretations and clarifications (issued pursuant to paragraph 9.4) in good order and periodically annotated to show all changes made by CONTRACTOR during construction. These periodically updated record documents, together with all approved samples and a counterpart of all approved Shop Drawings, will be at all times available to ENGINEER for on-site reference. Upon completion of the Work, these record documents, samples and Shop Drawings, will be delivered to ENGINEER for OWNER record retention.

Safety and Protection:

6.22 CONTRACTOR shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. CONTRACTOR shall take all necessary precautions for the safety of employees and the general public, and shall also provide the necessary protection to prevent damage, injury or loss to:

6.22.1 other persons and organizations who may be required to properly visit the Project site;

6.22.2 all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Project site; and

6.22.3 other property at the Project site or adjacent thereto, including drainage gradients, trees, shrubs, lawns, walks, pavements, roadways, structures, utilities and Underground Facilities not designated for removal, relocation or replacement in the course of construction.

6.22.4 Driveways, culverts, storm sewer inlets and laterals, and other public or private property that is destroyed or removed during the construction shall be replaced to its original or better condition by CONTRACTOR. Temporary drainage and any subgrade dewatering is to be provided by CONTRACTOR in the total Contract Price as necessary to protect and complete the Work.

6.22.5 CONTRACTOR is responsible for locating any underground obstacles. It is not represented by OWNER or ENGINEER that the Plans show all previous or current sewers, waterlines, electric lines, gas lines, telephone lines and other underground obstacles and utilities. CONTRACTOR shall exercise caution to prevent damage to existing utilities and other obstacles or facilities not meant for demolition or construction modifications during the progress of the

construction Work, taking care to locate same in advance of the actual Work. OWNER or ENGINEER will render reasonable assistance to CONTRACTOR in the matter of determining the location of existing utilities by making available such existing maps, records, and other available existing information as may be accessible to OWNER or ENGINEER, when requested to do so, but the accuracy of such information will not be guaranteed by OWNER or ENGINEER. CONTRACTOR shall make repairs and/or replacements to all damage to existing utilities resulting from his operations. Where a pipe, duct or other structure of a utility is exposed, which, in the opinion of ENGINEER requires strengthening, altering, shielding or moving, if that utility owner does not cure the situation itself, CONTRACTOR shall perform such Work on same as ENGINEER may order in writing after consultation by ENGINEER with the affected utility owner, that Work, if any, may be paid for by OWNER as extra Work. Should CONTRACTOR, in the layout of his Work, encounter any pipe, underground utility or structure, the location of which has not been furnished to him by ENGINEER, he shall bring such conditions to the attention of ENGINEER for ENGINEER, OWNER and CONTRACTOR discussion to determine the CONTRACTOR'S method to be used to pin in place, remove or bypass such obstructions.

6.22.6 It is essential that in the event of any CONTRACTOR damage being caused to existing utilities, that immediate attention be given to their repair. Any repair work carried out shall be at the non-reimbursable cost of CONTRACTOR and shall be performed to the complete satisfaction of ENGINEER and OWNER, who will acknowledge same in writing. It is therefore, the duty of CONTRACTOR, prior to Bid submittal if possible, and no later than the commencement of construction, to inspect and accurately record in writing to OWNER and ENGINEER, the pre-existing condition of any utility which he reasonably suspects or knows to be damaged, faulty, or defective. In addition, any such utilities so recorded, which in the opinion of CONTRACTOR may deteriorate further as a result of the proposed mode of construction operations should be protected. CONTRACTOR shall discuss with OWNER and ENGINEER what appropriate remedial measures should be employed by CONTRACTOR or utility owner to reach a resolution.

CONTRACTOR shall comply with all applicable Laws and Regulations of any public body having jurisdiction for the safety of persons or property, or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. CONTRACTOR shall notify owners of adjacent property and of Underground Facilities and utility owners, the scheduling and location(s), that prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, restoration and replacement of their property. All damage, injury or loss to any property referred to in paragraphs 6.22.3 and 6.22.4 caused, directly or indirectly, in whole or in part by CONTRACTOR, any Subcontractor, Supplier or any other person or organization directly or indirectly employed by any of them to perform or furnish any of the Work; or anyone for whose acts any of them may be liable; shall be remedied by CONTRACTOR. CONTRACTOR's duties and responsibilities for the safety and protection of the Work shall continue until such time as all the Work is completed and ENGINEER has issued a notice to OWNER and CONTRACTOR in accordance with paragraph 14.13 that the Work is acceptable to ENGINEER (except as otherwise expressly provided in connection with Substantial Completion).

6.23 CONTRACTOR shall designate in writing to OWNER a responsible representative

at the Project site whose duty shall be the management of risk and safety, and that person shall make a concerted effort to assist workers and visitors at the Project site to prevent accidents. This person shall be CONTRACTOR's superintendent, unless otherwise designated in writing by CONTRACTOR to OWNER.

Emergencies:

6.24 In emergencies affecting the safety or protection of persons, or the Work, or property at the Project site or adjacent thereto, CONTRACTOR, without special written or oral instruction or authorization from ENGINEER or OWNER, is obligated to act to prevent threatened 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 thereby. If ENGINEER determines that a change in the Work or Contract Documents is recommended because of the CONTRACTOR's prompt action taken in response to an emergency, a Work Directive Change or Change Order may be issued by OWNER to document the consequences of any changes or variations.

Shop Drawings and Samples:

6.25 After checking and verifying all field measurements and after complying with applicable procedures specified in the General Requirements, CONTRACTOR shall submit to ENGINEER for review and approval, in accordance with the accepted Schedule of Shop Drawing submissions (see process in paragraphs 2.6 and 2.9), or for other appropriate action if so indicated in the Supplementary Conditions, a copy of all Shop Drawings, to ENGINEER, which will bear a stamp or specific written indication by ENGINEER that CONTRACTOR has satisfied CONTRACTOR's submission review responsibilities under the Contract Documents. All submissions will be identified as the ENGINEER may require. The data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials and similar data to enable ENGINEER to efficiently and comprehensively review the CONTRACTOR's information as required.

6.25.1 Before ordering any material or doing any Work, CONTRACTOR will verify all measurements of any existing and new Work and shall be responsible for their correctness. Any differences which may be found shall be submitted to ENGINEER for consideration before proceeding with the Work. No extra compensation will be allowed to CONTRACTOR because of differences between actual dimensions and measurements indicated on the Drawings.

6.26 CONTRACTOR shall also submit to ENGINEER for review and approval with such promptness as to cause no delay in Work, all samples required by the Contract Documents. All samples will have been checked by and accompanied by a specific written indication that CONTRACTOR has internally satisfied CONTRACTOR's submission review responsibilities under the Contract Documents and will be identified clearly as to material, Supplier, pertinent data such as catalog numbers and the use for which the material is intended.

6.27

6.27.1 Before submission of each Shop Drawing or sample, CONTRACTOR shall have internally determined and verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar data with respect thereto and reviewed or coordinated each Shop Drawing or sample with other Shop Drawings and samples, and with the requirements of the Work and the Contract Documents.

6.27.2 At the time of each submission, CONTRACTOR shall give ENGINEER specific written notice of each variation that the Shop Drawings or samples may have from the requirements of the Contract Documents, and, in addition, shall cause a specific notation to be made on each Shop Drawing submitted to ENGINEER for review and approval, of each such CONTRACTOR variation.

6.28 ENGINEER will review and approve with reasonable promptness, Shop Drawings and samples, but ENGINEER's review and approval will be only for general conformance with the design concept of the Project and for compliance with the information given in the Contract Documents, and shall not extend to CONTRACTOR's means, methods, techniques, sequences or procedures of construction (except where a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents), or to CONTRACTOR's safety precautions or programs incident thereto. The review and approval of a separate or component item will not indicate approval of the assembly into which the item integrally functions. 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 ENGINEER's specific attention in writing to the most current revisions, other than the corrections called for by ENGINEER on previous CONTRACTOR submittals.

6.29 ENGINEER's review and approval of Shop Drawings or samples shall not relieve CONTRACTOR from responsibility for any variation from the requirements of the Contract Documents, unless CONTRACTOR has in writing called ENGINEER's specific attention to each such variation at the time of submission as required by paragraph 6.27.2, and ENGINEER has given written approval of each such variation by a specific written notation thereof incorporated in or accompanying the Shop Drawing or sample approval; nor will any approval by ENGINEER relieve CONTRACTOR from responsibility for CONTRACTOR's errors or omissions in the Shop Drawings, or from responsibility for having complied with the provisions of paragraph 6.27.1.

6.30 Where a Shop Drawing or sample is required by the Specifications, any related Work performed prior to ENGINEER'S review and approval of the pertinent submission will be at the sole risk, and non-reimbursable expense and responsibility of CONTRACTOR.

Continuing the Work:

6.31 CONTRACTOR shall carry on the Work and adhere to the Progress Schedule during any and all disputes or disagreements with OWNER. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as OWNER may otherwise agree to in writing.

INDEMNIFICATION:

6.32 CONTRACTOR AGREES TO AND SHALL INDEMNIFY AND HOLD HARMLESS THE CITY OF BROWNSVILLE AND THE BROWNSVILLE PUBLIC UTILITIES BOARD, INCLUDING THEIR RESCPECTIVE COMMISSIONERS, BOARD MEMBERS, OFFICERS, AND EMPLOYEES (INDEMNITEES) FROM AND AGAINST ANY AND ALL CLAIMS, LOSSES, DAMAGES, CAUSES OF ACTION, SUITS, AND LIABILITY OF EVERY KIND, INCLUDING ALL EXPENSES OF LITIGATION, COURT COSTS, AND ATTORNEY'S FEES, FOR INJURY TO OR DEATH OF ANY PERSON, OR FOR DAMAGE TO ANY PROPERTY, ARISING OUT OR IN CONNECTION WITH THE NEGLIGENT PERFORMANCE OF THE WORK, PROVIDED THAT SUCH CLAIM, DAMAGE, LOSS, LIABILITY OR EXPENSE: (A) IS ATTRIBUTABLE TO BODILY INJURY, SICKNESS, DISEASE OR DEATH OR TO INJURY OR DESTRUCTION OF TANGIBLE PROPERTY, INCLUDING THE LOSS OF USE RESULTING THEREFROM; AND (B) IS CAUSED IN WHOLE OR IN PART BY ANY CONDITION OF THE WORK OR MATERIALS, OR BY ANY NEGLIGENT ACT OR OMISSION OF CONTRACTOR, ANY SUBTIER SUBCONTRACTOR, ANYONE DIRECTLY OR INDIRECTLY EMPLOYED BY CONTRACTOR OR ANY SUBCONTRACTOR OR ANYONE FOR WHOSE ACTS CONTRACTOR OR ANY SUBCONTRACTOR MAY BE LIABLE UNDER THIS CONTRACT.

SUCH INDEMNITY SHALL APPLY WHERE THE CLAIMS, LOSSES, DAMAGES, CAUSES OF ACTION, SUITS, OR LIABILITY ARISE IN PART FROM THE CONCURRENT NEGLIGENCE OF INDEMNITEES.

IT IS THE EXPRESSED INTENTION OF THE PARTIES HERETO, BOTH CONTRACTOR AND INDEMNITEES THAT THE INDEMNITY PROVIDED FOR IN THIS PARAGRAPH IS INDEMNITY BY THE CONTRACTOR, TO INDEMNIFY AND PROTECT INDEMNITEES FROM THE CONSEQUENCES OF INDEMNITEE'S OWN NEGLIGENCE, WHERE THAT NEGLIGENCE IS A CONCURRING CAUSE OF THE INJURY, DEATH OR DAMAGE. FURTHERMORE, HOWEVER, THE INDEMNITY PROVIDED FOR IN THIS PARAGRAPH SHALL HAVE <u>NO APPLICATION</u> TO ANY CLAIM, LOSS, DAMAGE, CAUSE OF ACTION, SUIT, AND LIABILITY WHERE THE INJURY OR DEATH OR DAMAGE RESULTS FROM THE SOLE NEGLIGENCE OF THE INDEMNITEES, INDEPENDENT OF THE FAULT OF ANY OTHER PERSON OR ENTITY.

6.33 IN ANY AND ALL CLAIMS AGAINST INDEMNITEES OR ANY OF THEIR CONSULTANTS, AGENTS OR EMPLOYEES BY ANY EMPLOYEE OF CONTRACTOR, ANY SUBCONTRACTOR, ANY PERSON OR ORGANIZATION DIRECTLY OR INDIRECTLY EMPLOYED BY ANY OF THEM TO PERFORM OR FURNISH ANY OF THE WORK, OR ANYONE FOR WHOSE ACTS ANY OF THEM MAY BE LIABLE, THE INDEMNIFICATION OBLIGATION UNDER PARAGRAPH 6.32 SHALL 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, OR OTHER PERSON OR ORGANIZATION UNDER WORKERS' OR WORKMEN'S COMPENSATION ACTS, DISABILITY BENEFIT ACTS OR OTHER EMPLOYEE BENEFIT ACTS.

6.34 THE OBLIGATIONS OF CONTRACTOR UNDER PARAGRAPH 6.32 SHALL NOT EXTEND TO ANY LIABILITY OF ENGINEER ARISING OUT OF THE PREPARATION OR APPROVAL OF PROJECT MAPS, DRAWINGS, DESIGNS, PLANS, SPECIFICATIONS, OPINIONS, CALCULATIONS, REPORTS, AND SURVEYS.,

6.35 CONTRACTOR shall perform all phases of Work, other than general clean-up, through the duration of the Contract, as defined in these General and any Supplementary Conditions. If CONTRACTOR desires to perform Work, other than general clean-up, during weekends or holidays, prior proper arrangements must be made in writing with OWNER, or any other regulatory agency regarding such Work.

6.35.1 General. This Contract shall be based upon payment by CONTRACTOR and his Subcontractors of wage rates not less than the General Prevailing Wage Rate of per diem wages for work of a similar character in Cameron County, Texas, for each type of laborer, workman or mechanic needed to implement the Contract at the Project Site, and not less than the general prevailing rate of per diem wages for legal holiday and overtime Work. The Schedule of General Prevailing Wage Rates specifically adopted by the OWNER for this Project, and other important Wage and Labor Standard Provisions are included in these Contract Documents in the Supplementary Conditions. Pursuant to local OWNER labor policy, no Project worker shall be paid less than $8.00 per hour, regardless of the adopted wage listings in the attached U. S. Department of Labor General Wage Decision for Cameron County, Texas.

CONTRACTOR shall at minimum comply with all requirements of the prevailing wage law of the State of Texas, Texas Revised Civil Statutes, Texas Government Code (TGC) Section 2259.001 et seq., including the latest amendments thereto, and those special local wage provisions adopted by OWNER. When in conflict, the more stringent requirements apply to CONTRACTOR.

6.35.2 Records. CONTRACTOR and each Subcontractor shall keep an accurate record showing the names and occupations of all classifications of laborers, workmen, and mechanics employed, together with the actual wages paid to each worker. At all reasonable working hours, such CONTRACTOR records shall be open to inspection by the representatives of the OWNER. With each monthly application for payment, CONTRACTOR shall provide to ENGINEER a certified copy of such payroll records as necessary to substantiate compliance with this provision during the period of time for which the application for payment pertains. OWNER shall take cognizance of any and all employee complaints regarding any violations of the requirements of TGC Section 2259.001 et seq.

6.35.3 Penalty. In case CONTRACTOR and any Subcontractor fail to comply with the prevailing wage law, by statutory authority, CONTRACTOR shall forfeit to the OWNER $60.00 per calendar day, or portion thereof, for each laborer, workman, or mechanic who is paid

less than the specified local rate for any Work done under the Contract.

6.35.4 Hours of Labor. CONTRACTOR shall comply with all requirements of the hours of work on public works in accordance with the laws of the State of Texas, Texas Revised Civil Statutes, Articles 5165.1 to 5165.3, including the latest amendments thereto.

No CONTRACTOR or Subcontractor contracting for any part of the Contract Work which may require or involve the employment of laborers, workmen or mechanics at the Project Site, shall require or permit any laborer, workman or mechanic in any work week in which he is employed on such Work, to work in excess of forty (40) hours in such work week, unless such laborer, workman or mechanic receives compensation at a rate not less than one and one-half times his basic rate of pay, for all hours in excess of forty (40) hours in such work week.

6.35.5 Equal Employment Opportunities. The CONTRACTOR shall not discriminate against any employee or applicant for employment because of race, religion, gender, sexual preference, national origin, age, physically challenged condition, or a political belief or affiliation, and will comply with all State and federal statutes applicable to CONTRACTOR which relate to employment discrimination.

6.35.6 Veterans Preference. Pursuant to Texas Revised Civil Statutes, Article 4413(31), including the latest amendments thereto, CONTRACTOR shall give preference in employment to honorably discharged veterans who were engaged in the military services of the United States in time of war or conflict and who are, and have been, citizens of Texas for not less than five (5) years.

ARTICLE 7. OTHER WORK

Related Work at Site:

7.1 OWNER may perform other separate work related to the Project at the site by OWNER's own forces, have other work performed by utility owners, or award other direct construction contracts therefor, which shall contain General Conditions similar to these. If the fact that such other work is to be performed was not originally noted in these Contract Documents, advance written notice thereof will be given to CONTRACTOR prior to OWNER authorizing any such other work; and, if CONTRACTOR believes that such other work performance will involve additional expense to CONTRACTOR, or requires additional time, and the Parties hereto are unable to agree as to the extent thereof, CONTRACTOR may make a claim therefore as provided in Articles 11 and 12. All increases or decreases in the Contract Price shall be governed by all State and local laws, statutes, codes, ordinances, rules and regulations governing public competitive bidding and Change Orders.

7.2 CONTRACTOR shall afford each utility owner and other contractor who is a party to a separate direct contract with OWNER (or OWNER, if OWNER itself is performing the additional work with OWNER's employees) proper and safe access to the Project site and a reasonable opportunity for the introduction and storage of materials and equipment, and the execution of such separate work, and shall properly connect and coordinate the Work with their

separate work. CONTRACTOR shall do all cutting, fitting and patching of the Work that may be required to make its several parts come together properly and integrate with such other work. CONTRACTOR shall not endanger any separate work of others by cutting, excavating or otherwise altering their work, and will only cut or alter their work with the written consent of ENGINEER and the consent of other contractor(s), persons whose separate work will be affected. The duties and responsibilities of CONTRACTOR under this paragraph are for the benefit of such utility owners and other contractors, to the extent that there are comparable provisions for the benefit of CONTRACTOR in said separate direct contracts between OWNER and such other utility owners and other contractors.

7.3 If any part of CONTRACTOR's Work depends upon the separate work of any such other contractor or utility owner (or OWNER) for proper execution or results, CONTRACTOR shall inspect and promptly report to ENGINEER in writing any delays, defects or deficiencies in such other work that renders it unavailable or unsuitable for such integration, proper execution and results of CONTRACTOR'S Work. CONTRACTOR's failure to so report will constitute an acceptance of the other separate work as fit and proper for integration with CONTRACTOR's Work, except for latent or non-apparent defects and deficiencies in the other work.

Coordination:

7.4 If OWNER contracts with others for the performance of other separate work on the Project at the Project site, the person or organization who will have authority and responsibility for coordination of the activities among the various prime contractors will be identified by OWNER in the Supplementary Conditions, or OWNER'S WORK DIRECTIVE CHANGE, and the specific matters to be covered by such authority and responsibility will be itemized, and the extent of such authority and responsibilities will be provided, in the Supplementary Conditions or OWNER'S WORK DIRECTIVE CHANGE.

ARTICLE 8. OWNER'S RESPONSIBILITIES

8.1 OWNER shall issue all written and oral communications to CONTRACTOR through OWNER's Field Representative and/or ENGINEER.

8.2 In case of termination of the employment of ENGINEER, OWNER shall appoint a replacement Engineer whose status under the Contract Documents shall be that of the former ENGINEER.

8.3 OWNER shall furnish the data required of OWNER under the Contract Documents promptly, and shall make eligible payments to CONTRACTOR within the time periods allowed by the Contract Documents and State prompt pay statutes, after payments are due as provided in Article 14.

8.4 OWNER's duties in respect to providing lands and easements and providing any recent existing available engineering surveys to establish CONTRACTOR construction reference points are set forth in paragraphs 4.1 and 4.4. Paragraph 4.2 refers to OWNER's identifying and making available to CONTRACTOR copies of any existing and available reports of explorations

and tests of subsurface pre-existing conditions at the Project site which are not part of the Contract Documents, but which have been utilized by ENGINEER in generally preparing the Drawings and Specifications.

8.5 OWNER is obligated to consider and may execute Change Orders as indicated in paragraph 10.4.

8.6 OWNER's responsibility in respect to certain inspections, tests and approvals is set forth in paragraphs 13.3 through 13.5.

8.7 In connection with OWNER's right to stop Work or suspend Work, see paragraphs 13.10 and 15.1. Paragraph 15.2 outlines OWNER's right to terminate services of CONTRACTOR under certain circumstances.

ARTICLE 9. ENGINEER'S STATUS DURING CONSTRUCTION

Owner's Representative:

9.1 OWNER's private consulting ENGINEER (generally through its Resident Project Representative) will be OWNER's primary representative during the construction period. OWNER's Field Representative will be the secondary representative during the construction period.

Visits to Site:

9.2 ENGINEER, routinely through the Resident Project Representative will make periodic visits to the site at intervals appropriate to the various stages of construction to observe the progress and general quality of the executed Work and to determine, in general, for the benefit of OWNER only, if the Work is proceeding in accordance with the Contract Documents. ENGINEER will not be required to make exhaustive or continuous on-site observations to check the quality or quantity of the Work, because CONTRACTOR is solely responsible for same. ENGINEER's efforts will be directed toward providing for OWNER only, a greater degree of confidence that the CONTRACTOR's completed Work will conform to the Contract Documents. On the basis of such limited visits and on-site observations as an experienced and qualified design professional, ENGINEER will keep OWNER informed of the progress of the Work and will endeavor to advise OWNER of any obvious defects and deficiencies in the Work.

On-Site Project Representation:

9.3 OWNER will generally furnish a Project Field Representative to assist ENGINEER in observing the daily performance of the Work for the sole benefit of the OWNER. This is an option available to OWNER that need not be exercised, nor may it be relied upon by the CONTRACTOR in any way to satisfy CONTRACTOR's quality control responsibility. The secondary duties, responsibilities and limitations of authority of any such OWNER Field Representative and any assistants will be determined by the OWNER.

Clarifications and Interpretations:

9.4 ENGINEER will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents (in the form of Drawings or otherwise) as ENGINEER may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents. If CONTRACTOR believes that a written clarification or interpretation by ENGINEER justifies an increase in the Contract Price or an extension of the Contract Time, and the OWNER and CONTRACTOR are unable to agree to the basis, amount or extent thereof, CONTRACTOR may make a claim therefore as provided in Article 11 or Article 12. Any increases or decreases in the Contract Price shall be governed by all State and local laws, statutes, codes, ordinances, rules and regulations governing public competitive bidding and Change Orders.

Authorized Variations in Work:

9.5 ENGINEER may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Time, and are consistent with the overall intent of the Contract Documents. These may be accomplished by a Field Order and will be binding on OWNER, and also on CONTRACTOR who shall promptly perform the Work involved. If CONTRACTOR believes that a Field Order justifies an increase in the Contract Price or an extension of the Contract Time, CONTRACTOR may make a claim therefore as provided in Article 11 or 12. Any increases or decreases in the Contract Price shall be governed by all State and local laws, statutes, codes, ordinances, rules and regulations governing public competitive bidding and Change Orders.

Rejecting Defective Work:

9.6 ENGINEER will have the authority to disapprove or reject Work which ENGINEER believes to be defective, and will also have authority to require special inspection or testing of the Work as provided in paragraph 13.9, whether or not the Work is fabricated, installed or completed.

Shop Drawings, Change Orders and Payments:

9.7 In connection with ENGINEER’s responsibility for Shop Drawings and samples, see paragraphs 6.25 through 6.30 inclusive.

9.8 In connection with ENGINEER's responsibilities as to Change Orders, see Articles 10, 11 and 12.

9.9 In connection with ENGINEER's responsibilities in respect to Applications for Payment, etc., see Article 14.

Determinations for Unit Prices:

9.10 ENGINEER will determine the final actual quantities and classifications of any Unit Price Work performed by CONTRACTOR. ENGINEER will review with CONTRACTOR, 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 decisions thereon will be final and binding upon OWNER and CONTRACTOR.

Decisions on Disputes:

9.11 ENGINEER will be the interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. Claims, disputes and other matters relating to the acceptability of the Work or the interpretation of the requirements of the Contract Documents pertaining to the performance and furnishing of the Work, and claims under Articles 11 and 12 in respect of changes in the Contract Price or Contract Time, will be referred initially to ENGINEER in writing, with a request for a formal decision in accordance with this paragraph, which ENGINEER will render in writing within a reasonable time. Written notice of each such claim, dispute and other matter will be delivered by the claimant (OWNER or CONTRACTOR) to ENGINEER and opposing Party no later than thirty (30) calendar days after the occurrence of the event giving rise thereto, and written supporting data will be submitted to ENGINEER and the other Party within sixty (60) calendar days after such occurrence, unless ENGINEER allows claimant an additional period of time in writing to ascertain more accurate data in support of the claim.

9.12 When functioning as interpreter and judge under paragraphs 9.10 and 9.11, it is hereby mutually agreed between OWNER and CONTRACTOR that ENGINEER will not be personally liable in connection with any non-negligent interpretation or decision rendered in good faith in such official and professional engineering capacity. The rendering of a decision by ENGINEER pursuant to paragraphs 9.10 and 9.11 with respect to any such claim, dispute or other matter (except any which have been waived by the making or acceptance of final payment as provided in paragraph 14.13) will be a condition precedent to any exercise by CONTRACTOR and/or OWNER of such rights or remedies they may otherwise have under the Contract Documents or by Laws or Regulations in respect of any such claim, dispute or other matter.

Limitations on ENGINEER's Responsibilities:

9.13 Neither ENGINEER's authority to act under this Article 9, or elsewhere in the Contract Documents, nor any decision made by ENGINEER in good faith either to exercise or not exercise such authority, shall give rise to any personal or corporate duty or responsibility of ENGINEER to CONTRACTOR, any Subcontractor, any Supplier, or any other person or organization performing any of the Work, or to any surety for any of them.

9.14 Whenever in the Contract Documents the terms: "as ordered"; "as directed"; "as required"; "as allowed"; "as approved"; or terms of like effect or import are used, or the adjectives: "reasonable"; "suitable"; "acceptable"; "proper"; or "satisfactory"; or adjectives of like effect or import are used to describe a requirement, direction, review or judgment of ENGINEER as to the Work, it is intended that such requirement, direction, review or judgment will be solely to evaluate the Work for general compliance with the Contract Documents (unless there is a specific statement

indicating otherwise). The use of any such term or adjective shall not be effective to assign to ENGINEER any duty to supervise or direct the furnishing, performance, or quality control of the CONTRACTOR's Work or any duty or authority to undertake responsibility of the CONTRACTOR contrary to the provisions of paragraph 9.15 or 9.16.

9.15 ENGINEER will not be responsible for CONTRACTOR's means, methods, techniques, quality control, sequences or procedures of construction, or the safety precautions and programs incident thereto, for which CONTRACTOR shall be solely responsible. ENGINEER will not be responsible for CONTRACTOR's failure to perform or furnish the Work in accordance with the Contract Documents.

9.16 ENGINEER will not be responsible for the acts and/or omissions of CONTRACTOR or of any Subcontractor, any Supplier, or of any other person or organization performing or furnishing any of the Work.

ARTICLE 10. CHANGES IN THE WORK

10.1 Without invalidating the Agreement and without notice to any surety, OWNER may, at any time, or from time to time, order additions, deletions or revisions in the Work that are in compliance with State public competitive bidding statutes and laws governing Change Orders; these will be authorized by a Written Amendment, a Change Order, or a Work Directive Change. Upon receipt of any such document, CONTRACTOR shall promptly proceed with the Work involved, which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

10.2 If OWNER and CONTRACTOR are unable to agree as to the extent, if any, of an increase or decrease in the Contract Price, or an extension or shortening of the Contract Time that should be allowed as a result of a Work Directive Change, a claim may be made therefore as provided in Article 11 or Article 12. All increases or decreases in the Contract Price shall be governed by all State and local laws, statutes, codes, ordinances, rules and regulations governing public competitive bidding and Change Orders.

10.3 CONTRACTOR shall not be entitled to an increase in the Contract Price or an extension of the Contract Time with respect to any Work performed that is not required by the Contract Documents as amended, modified and supplemented as provided in paragraphs 3.4 and 3.5, except in the case of an emergency as provided in paragraph 6.24, and except in the case of uncovering Work as provided in paragraph 13.9.

10.4 OWNER and CONTRACTOR may execute appropriate Change Orders (or Written Amendments) covering:

10.4.1 changes in the Work which are ordered by OWNER pursuant to paragraph 10.1; are required because of willing and informed acceptance of defective Work by OWNER under paragraph 13.13; or OWNER correcting defective Work under paragraph 13.14; or are otherwise agreed to by the Parties;

10.4.2 changes in the Contract Price or Contract Time which are agreed to by the Parties; and

10.4.3 changes in the Contract Price or Contract Time which embody the substance of any written decision rendered by ENGINEER pursuant to paragraph 9.11; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, CONTRACTOR shall carry on the Work and adhere to the Progress Schedule as provided in paragraph 6.31.

10.5 If notice 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 Time) is required by the provisions of any Bond to be given to a surety by CONTRACTOR, the giving of any such notice will be CONTRACTOR'S sole responsibility, and the amount of each applicable Bond may be adjusted accordingly.

ARTICLE 11. CHANGE OF CONTRACT PRICE

11.1 The Contract Price constitutes the total compensation (subject to authorized adjustments) payable to CONTRACTOR for properly performing the Work. All original duties, responsibilities and obligations assigned to or undertaken by CONTRACTOR shall be at his expense without change in the original Contract Price.

11.2 The Contract Price may only be changed by a Change Order or by a Written Amendment. Any claim for an increase or decrease in the Contract Price shall be based on initial written notice delivered promptly by the CONTRACTOR or OWNER to the other Party, and to ENGINEER promptly (but in no event later than thirty (30) calendar days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the amount of the claim with supporting data shall follow and be delivered within sixty (60) calendar days after such occurrence (unless ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim), and shall be accompanied by claimant's written statement that the amount claimed covers all known amounts (direct, indirect and consequential) to which the claimant believes he is entitled as a result of the occurrence of said event. All claims for adjustment in the Contract Price shall be determined by ENGINEER in accordance with paragraph 9.11, if OWNER and CONTRACTOR cannot otherwise agree on the amount involved. No claim for an adjustment in the Contract Price will be valid, and will be deemed legally waived under this Contract, if not submitted in accordance with this paragraph 11.2.

11.3 The value of any Work covered by a Change Order or of any claim for an increase or decrease in the Contract Price shall be determined in one of the following ways:

11.3.1 Where the Work involved is covered by unit prices contained in the Contract Documents, by application of unit prices to the actual quantities of the Work items involved (subject to the provisions of paragraphs 11.9.1. through 11.9.3. inclusive).

11.3.2 By mutual acceptance of a lump sum (which may include an allowance for

overhead and profit not necessarily in accordance with paragraph 11.6.2.1).

11.3.3 On the basis of the Cost of the Work (determined as provided in paragraphs 11.4 and 11.5), plus a CONTRACTOR's Fee for overhead and profit (determined as provided in paragraphs 11.6 and 11.7).

Cost of the Work:

11.4 The term "Cost of the Work" means the sum of all costs necessarily incurred and paid by CONTRACTOR in the proper performance of the Work. Except as otherwise may be agreed to in writing by OWNER, such costs shall be in amounts no higher than those prevailing in the Cameron County, Texas area and shall include only the following items, and shall not include any of the costs itemized in paragraph 11.5:

11.4.1 Payroll costs for employees in the direct employ of CONTRACTOR in the performance of the Work under Schedules of Job Classifications as set forth by OWNER in the Supplementary Conditions of the Contract Documents. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of any fringe benefits, if any, which shall include social security contributions, unemployment, excise and payroll taxes, workers' or workmen's compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday, as may be applicable thereto. Such employees shall include superintendents and foremen at the Project site. The expenses of performing Work after regular daily working hours on Saturday, Sunday or on legal holidays shall be included in the above, to the extent authorized in an advanced written approval notice by OWNER.

11.4.2 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 shall accrue to CONTRACTOR, unless OWNER deposits funds with CONTRACTOR with which to make advanced payments, in which case the cash discounts shall accrue to OWNER. All trade discounts, rebates and refunds and all returns from sale of surplus materials and equipment, shall accrue to OWNER, and CONTRACTOR shall make provisions so that they may be obtained.

11.4.3 Payments made by CONTRACTOR to the Subcontractors for Work performed by Subcontractors. If required by OWNER, CONTRACTOR shall obtain competitive bids from Subcontractors acceptable to CONTRACTOR, and shall deliver such bids to OWNER who will then determine which bid will be accepted. If a 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 shall be determined in the same manner as CONTRACTOR's Cost of the Work. All subcontracts shall be subject to the other provisions of the Contract Documents insofar as applicable. CONTRACTOR shall accomplish the applicability of the Contract Documents to Subcontractor agreements by using either "flow down" provisions or appropriate recitations in the subcontract agreements of parts of these Contract Documents.

11.4.4 Costs of special consultants (including but not limited to engineers,

architects, testing laboratories, surveyors, attorneys and accountants) employed for services specifically related to the Work.

11.4.5 Supplemental costs actually incurred including the following:

11.4.5.1 The proportion of necessary transportation, travel and subsistence expenses of CONTRACTOR's employees incurred in discharge of duties connected with the Work.

11.4.5.2 Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office and temporary facilities at the Project site and hand tools not owned by the workers, 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.

11.4.5.3 Rentals of all construction equipment and machinery and the parts thereof, whether rented from CONTRACTOR or others, in accordance with written rental agreements produced to OWNER as requested, and the costs of transportation, loading, unloading, installation, dismantling and removal thereof (all in accordance with terms of said rental agreements). The rental of any such equipment, machinery or parts shall cease when the use thereof is no longer necessary for the Work.

11.4.5.4 Any sales, consumer, use or similar taxes actually paid as related to the Work that OWNER is not exempt from paying, and for which CONTRACTOR is liable, as imposed by Laws and Regulations.

11.4.5.5 Deposits forfeited 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 any royalty payments and fees for permits and licenses.

11.4.5.6 Losses and damages (and related expenses), not compensated to CONTRACTOR by insurance or otherwise, to the Work, or otherwise sustained by CONTRACTOR in connection with the proper performance and furnishing of the Work, provided they have resulted from causes other than the intentional and/or negligent acts and/or omissions of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them, or for whose acts and/or omissions any of them may be liable. Such losses shall include settlements made with the advanced written consent and approval of OWNER. No such losses, damages and expenses shall be included in the Cost of the Work for the purpose of determining CONTRACTOR's Fee. If, however, any such loss or damage requires reconstruction and CONTRACTOR is placed in charge thereof, CONTRACTOR shall be paid for reconstruction services, only at a fee proportionate to that stated in paragraph 11.6.2.

11.4.5.7 The cost of utilities, fuel and sanitary facilities at the Project site.

11.4.5.8 Minor expenses such as telefaxes, long distance telephone calls, telephone service at the Project site, express mailings and similar petty cash items in connection with the Work.

11.4.5.9 Cost of premiums for any additional Bond and insurance coverages required because of any additive Change Orders to the Work.

11.5 The term "Cost of the Work" shall not include any of the following:

11.5.1 Payroll costs and other compensation of CONTRACTOR's officers, executives, principals (of partnership and sole proprietorships), general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks and other personnel employed by CONTRACTOR whether at the Project site or in CONTRACTOR's principal or a branch office for general administration of the Work and not specifically included in the agreed upon Schedule of Job Classifications referred to in paragraph 11.4.1, or specifically covered by paragraph 11.4.4, all of which are to be considered administrative costs covered by the CONTRACTOR's Fee.

11.5.2 Expenses of CONTRACTOR's principal and branch offices, other than any CONTRACTOR's office at the Project site.

11.5.3 Any part of CONTRACTOR's capital expenses, including interest on CONTRACTOR's capital employed for the Work and charges against CONTRACTOR for delinquent CONTRACTOR payments.

11.5.4 Cost of premiums for all Bonds and for all insurance, whether or not CONTRACTOR is required by the Contract Documents to purchase and maintain the types of coverage and amounts thereof (except for the cost of premiums covered by subparagraph 11.4.5.9 above).

11.5.5 Costs resulting from the intentional and/or negligent acts and/or omissions of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them, or for whose acts and/or omissions any of them may be liable, including but not limited to, the correction of defective Work, salvaging or disposal of materials or equipment wrongly supplied, and repairing any damage to real or personal property.

11.5.6 Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in paragraph 11.4.

CONTRACTOR's Fee:

11.6 The CONTRACTOR's Fee allowed to CONTRACTOR for overhead and profit shall be determined as follows:

11.6.1 a mutually acceptable fixed fee; or if none can be agreed upon,

11.6.2 a fee based on the following percentages of the various portions of the Cost of the Work:

11.6.2.1 for costs incurred under paragraphs 11.4.1 and 11.4.2, the CONTRACTOR's Fee shall be fifteen (15%) percent;

11.6.2.2 for costs incurred under paragraph 11.4.3, the CONTRACTOR's Fee shall be five (5%) percent; and if a subcontract is on the basis of Cost of the Work Plus a Fee, the maximum allowable to CONTRACTOR on account of overhead and profit of all Subcontractors shall be fifteen (15%) percent;

11.6.2.3 no fee shall be payable on the basis of costs itemized under paragraphs 11.4.4, 11.4.5 and 11.5;

11.6.2.4 the amount of credit to be allowed by CONTRACTOR to OWNER for any such Contract change which results in a net decrease in cost will be the amount of the actual net decrease, plus a deduction in CONTRACTOR's Fee by an amount equal to ten (10%) percent of the net decrease; and

11.6.2.5 when both additions and credits are involved in any one Contract change, the adjustment in CONTRACTOR'S Fee shall be computed on the basis of the net change in accordance with paragraphs 11.6.2.1 through 11.6.2.4, inclusive.

11.7 Whenever the cost of any Work is to be determined pursuant to paragraph 11.4 or 11.5, CONTRACTOR will timely submit in a written form acceptable to ENGINEER, an itemized cost breakdown together with supporting data.

Cash Allowances:

11.8 It is understood that CONTRACTOR has included in the Contract Price any and all allowances so named in the Contract Documents and shall cause the Work so covered thereby to be done by such Subcontractors or Suppliers, and for such sums within the limit of the allowances as may be acceptable to ENGINEER. CONTRACTOR agrees that:

11.8.1 Any allowances include the cost to CONTRACTOR (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Project site, and all applicable non-exempt taxes; and

11.8.2 CONTRACTOR's costs for managing on the Project site, labor, materials and equipment installation costs, overhead, profit and other expenses already contemplated for determining the allowances have been included in the Contract Price and not in the allowances. No demand for additional payment on account of any of such costs will be valid.

Prior to final payment, an appropriate Change Order will be issued as recommended by ENGINEER to reflect actual amounts due CONTRACTOR on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

Unit Price Work:

11.9

11.9.1 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 established unit prices for each separately identified item of Unit Price Work, multiplied by the estimated quantity of each item as indicated in the Agreement. The ENGINEER'S estimated quantities of items of Unit Price Work are not guaranteed by the OWNER to be actually performed and are solely for the purpose of comparison of bids and determining an initial Contract Price. Determinations of the actual final quantities and classifications of Unit Price Work performed by CONTRACTOR will be made by ENGINEER in accordance with Paragraph 9.10.

11.9.2 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.

11.9.3 Where the quantity of any item of Unit Price Work performed by CONTRACTOR differs materially and significantly from the ENGINEER's estimated quantity of such item indicated in the Contract Documents (generally plus or minus fifteen percent (15%), and there is no corresponding and offsetting adjustment(s) with respect to any other Unit Price item(s) of Work, and if CONTRACTOR believes that CONTRACTOR has incurred additional expense as a result thereof, CONTRACTOR may make a timely claim for an increase in the Contract Price in accordance with Article 11 and any applicable State law, if the Parties are unable to otherwise agree as to the amount of any such increase. OWNER is also able to file a similar timely claim with ENGINEER if OWNER believes that the quantity of Unit Price Work items has significantly increased to the point that OWNER believes it is owed a credit from CONTRACTOR for any volume discount pricing that CONTRACTOR should have received by purchasing such additional quantities.

ARTICLE 12 -- CHANGE OF CONTRACT TIME

12.1 The Contract Time may only be changed by a Change Order or a Written Amendment. Any claim for an extension or shortening of the Contract Time shall be based on initial written notice delivered by the CONTRACTOR or OWNER to the ENGINEER and to the other Party (but in no event later than thirty (30) calendar days) after the occurrence of the event giving rise to the claim, and stating the general nature of the claim. Notice of the extent of the claim with supporting data shall follow and be delivered within sixty (60) calendar days after such occurrence (unless ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by the claimant's written statement that the time adjustment claimed is the entire adjustment to which the claimant has reason to believe it is entitled as a result of the occurrence of said event. All claims for adjustment in the Contract Time shall be determined by ENGINEER in accordance with paragraph 9.11, if OWNER and CONTRACTOR cannot otherwise agree. No claim for an adjustment in the Contract Time will be valid and will be deemed legally waived under this Contract, if not submitted in accordance with the requirements

of this paragraph 12.1.

12.2 The Contract Time will be extended in an amount equal to time lost due to delays beyond the reasonable control of CONTRACTOR, so long as CONTRACTOR has made good faith efforts to mitigate delaying impacts and if a claim is made therefore as provided in paragraph 12.1. Such delays shall include, but not be limited to, acts, omissions, or neglect by OWNER or others performing additional separate work as contemplated by Article 7, or to fires, floods exceeding the 100 year frequency in Cameron County, labor disputes, epidemics, extremely abnormal weather for Cameron County, Texas, as may be described further in these Contract Documents, or Acts of God.

12.3 **ALL TIME LIMITS STATED IN THE CONTRACT DOCUMENTS ARE MUTUALLY AGREED TO BE OF THE ESSENCE OF THE AGREEMENT**. The provisions of this Article 12 shall not exclude recovery for damages (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and court costs) for delay by either Party.

ARTICLE 13 -- WARRANTY AND GUARANTEE; TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

Warranty and Guarantee:

13.1 CONTRACTOR warrants and guarantees to OWNER that all Work will be in accordance with the Contract Documents and will not be defective. Prompt notice of any obvious patent Work defects discovered by OWNER or ENGINEER shall be promptly given to CONTRACTOR in writing. All defective Work, whether or not in place, may be rejected, corrected or accepted as provided in this Article 13. In case of dispute as to the cause of improper functioning of all or any part of the Work, the burden of proof that CONTRACTOR has complied with the Contract Documents rests with CONTRACTOR for this Work. He shall submit in writing to ENGINEER his opinion and basis of proof for the adequacy of his Work. OWNER may have those tests made, which OWNER deems advisable, by an independent testing laboratory of OWNER's choice. If any test so made indicates a defect in material or workmanship, or that one or more manufactured components of the Work are performing below the standard set by the manufacturer's public data and specifications, or the Specifications of these Contract Documents, the entire cost of all such tests shall be paid for by CONTRACTOR, and he shall also pay for retesting of the corrected Work, until in the ENGINEER's opinion, it functions satisfactorily. The Work shall be guaranteed to be free from defects due to faulty workmanship or material for a period of one (1) year from the date of OWNER issue of the Certificate of Acceptance. Work found to be improper or imperfect shall be replaced or redone without cost to OWNER within the one year guarantee period. Neither the Certificate of Acceptance, final payment, or any other provision of the Contract Documents shall relieve CONTRACTOR from his workmanship guarantee. Failure of CONTRACTOR to repair or replace faulty Work entitles OWNER to repair or replace the same and recover the costs from CONTRACTOR and/or his Surety. CONTRACTOR shall be the sole guarantor of the Work installed under this Contract and no third party guarantees/warranties by Subcontractors or suppliers of various components or materials will be acceptable; nor shall agreements with Subcontractors or material or component suppliers by

CONTRACTOR reduce CONTRACTOR's sole responsibility to OWNER under this Agreement. All equipment shall be warrantied and/or guaranteed by either CONTRACTOR or its supplier/manufacturer by assignment to OWNER, for at least one (1) year from the date of OWNER acceptance of the entire Project. It is anticipated by OWNER and acknowledged by CONTRACTOR that many equipment and material warranties from suppliers/manufacturers shall extend well beyond the initial one (1) year post acceptance period. The CONTRACTOR shall transfer by assignment to the OWNER any and all third party supplier and manufacturer warranties and/or guaranties that remain in effect beyond the one (1) year workmanship guarantee/warranty period. At the option of the OWNER, all materials/equipment are also warrantied or guaranteed to OWNER for one (1) year from the date of any early partial acceptance of Work, and beneficial use of a completed system component of Work prior to full integration with the entire completed Project.

Access to Work:

13.2. ENGINEER AND ENGINEER's representatives, other representatives of OWNER, testing agencies and governmental agencies with jurisdictional interests, will have access to the Work at reasonable times for their observation, inspecting and testing. CONTRACTOR shall promptly provide proper and safe conditions for such authorized and identified reasonable access in accordance with any Occupational Safety and Health Administration (OSHA) and CONTRACTOR's safety program and insurance requirements.

It is agreed by CONTRACTOR that OWNER shall be and is hereby authorized to appoint from time to time, OWNER's subordinate supervisors, observers, and/or inspectors, as the OWNER may deem proper to inspect the material furnished and observe the Work performed under this Agreement, and to see that the material is furnished and Work is generally performed in accordance with the Specifications. This OWNER function, for OWNER's sole benefit, does not excuse the CONTRACTOR from his own quality control assurance, which is solely his responsibility. CONTRACTOR shall furnish all reasonable aid and assistance required by the ENGINEER, and OWNER's subordinate supervisors, observers and/or inspectors to perform observation, inspection and examination of the Work and all parts of the Work. CONTRACTOR shall regard and obey the directions and instructions of the ENGINEER and any OWNER subordinate supervisors, observers and/or inspector so appointed, when such directions are consistent with the obligations of the Contact Documents and included Specifications, provided, however, that should CONTRACTOR object to any order by any OWNER subordinate supervisor or inspector, CONTRACTOR may within ten (10) calendar days submit written notice to ENGINEER for his decision. Except as herein before provided, the authority of OWNER's subordinate supervisors or inspectors shall be limited to the rejection of unsatisfactory Work and materials and to the potential short-term suspension of the Work, until the questions of Work acceptability can be referred to ENGINEER.

13.2.1. CONTRACTOR shall cooperate with any OWNER-provided testing laboratory for the purpose of allowing services of the laboratory to be timely and properly performed. CONTRACTOR shall provide OWNER's representative and testing laboratory a minimum of twenty-four (24) hours notice of readiness for all testing as required by the Specifications or customary construction industry standards. OWNER shall bear the cost of

density and concrete testing, for the first test only. Testing of equipment, lines and valves shall be the responsibility of CONTRACTOR and he shall notify ENGINEER and OWNER's Field Representative of his scheduled time for such tests, so that the test can be witnessed by ENGINEER and OWNER'S Field Representative. If initial tests show failure, the CONTRACTOR shall incur the non-reimbursable costs of retesting the areas that failed after CONTRACTOR's corrective action has been taken, including the per diem personnel and equipment costs incurred by OWNER in said retesting. The per diem costs shall be determined based on the hourly wage plus reasonable overhead of ENGINEER's and OWNER's personnel needed to be present at the Project site during retesting, and by the locally prevailing rental rate for the vehicles and equipment utilized in retesting. These retesting costs shall be paid by CONTRACTOR prior to OWNER's interim conditional acceptance of the Work improvements.

Tests and Inspections:

13.3. CONTRACTOR shall give ENGINEER and /or OWNER's Field Representative timely notice of readiness of the Work for all required inspections, tests or approvals.

13.4. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) to specifically be inspected, tested or approved, CONTRACTOR shall assume full responsibility therefore, pay all costs as included in the Contract Price in connection therewith, and furnish ENGINEER the required final certificates of inspection, testing or approval. CONTRACTOR shall also be responsible for and shall pay all non-reimbursable costs in connection with any special inspection or testing required in connection with OWNER's or ENGINEER's approval and acceptance of an alternative Supplier of "or equal" proposed substitutions of materials or equipment proposed by CONTRACTOR to be incorporated in the Work, or of alternative materials or equipment submitted for approval prior to CONTRACTOR's purchase thereof, for incorporation in the Work. The cost of all routine inspections, tests and approvals, other than any of those special inspections which may be required by the Contract Documents to be paid by CONTRACTOR, shall be paid by OWNER (unless otherwise specified).

13.5 All inspections, tests or approvals, other than those required by Laws or Regulations of any public body having jurisdiction, shall be performed by organizations acceptable to OWNER (or by ENGINEER, if so specified).

13.6 If any Work (including the work of others) that is to be inspected, tested or approved is backfilled or otherwise built-in or concealed by CONTRACTOR without written concurrence of ENGINEER, it must, if requested in writing by ENGINEER, be uncovered and revealed for ENGINEER's Resident Project Representative and OWNER Field Representative observation. Such uncovering shall be at CONTRACTOR's non-reimbursable expense, unless CONTRACTOR has given ENGINEER timely written notice of CONTRACTOR's intention to cover the same and ENGINEER has not acted with reasonable promptness (not to exceed three (3) days) in written response to such CONTRACTOR notice.

13.7 Neither observations by ENGINEER nor inspections, tests or approvals by others shall relieve CONTRACTOR from CONTRACTOR's sole obligations to perform the Work and constantly employ quality control in accordance with the Contract Documents.

Uncovering Work:

13.8 If any Work is backfilled contrary to the advanced written request of ENGINEER, it must, if requested by ENGINEER, be uncovered for ENGINEER's observation and replaced at CONTRACTOR's non-reimbursable expense.

13.9 If ENGINEER considers it necessary or advisable that covered Work be observed by ENGINEER or inspected or tested by others, CONTRACTOR, at ENGINEER's written request, shall uncover, expose or otherwise make available for observation, inspection or testing as ENGINEER may require, that portion of the Work in question shall be uncovered by CONTRACTOR by furnishing all necessary labor, material and equipment to uncover same. If it is found that such Work is defective, CONTRACTOR shall bear all direct, indirect and consequential non-reimbursable costs of such uncovering, exposure, observation, inspection and testing, and of the satisfactory repair, replacement and reconstruction, (including but not limited to fees and charges of ENGINEER, architects, attorneys and other professionals), and OWNER shall be entitled to an appropriate decrease in the Contract Price for that portion of these costs that CONTRACTOR does not otherwise reimburse to OWNER; and if the Parties are unable to agree as to the amount thereof, OWNER may make a claim therefore as provided in Article 11. If, however, such Work is not found to be defective, CONTRACTOR may be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, repair, replacement and reconstruction; and, if the Parties are unable to agree as to the amount or extent thereof, CONTRACTOR may make a claim therefore as provided in Articles 11 and 12. All increases or decreases in the Contract Price shall be governed by all State and local laws, statutes, codes, ordinances, rules and regulations governing public competitive bidding and Change Orders.

Owner May Stop the Work:

13.10 If the Work is defective in the opinion of the ENGINEER and OWNER, or CONTRACTOR fails to supply sufficient skilled workers, Subcontractors, or suitable materials or equipment, or otherwise fails to furnish or perform the Work in such a way that the completed Work will conform to the Contract Documents, OWNER may issue a written order for CONTRACTOR to stop the Work, or any portion thereof, until the cause for such stop Work order has been eliminated; however, this right of OWNER to stop the Work shall not give rise to any duty on the part of OWNER to exercise this right for the benefit of CONTRACTOR, or any other entity.

Correction or Removal of Defective Work:

13.11 If required by ENGINEER, CONTRACTOR shall promptly, as directed in writing, either correct all defective Work, whether or not fabricated, installed or completed, if the Work has been rejected by ENGINEER, and remove it from the Project site and replace it with non-defective Work. CONTRACTOR shall bear all direct, indirect and consequential non-reimbursable costs of such correction or removal (including but not limited to fees and charges of ENGINEER, architects, attorneys and other professionals) made necessary thereby.

One Year Workmanship Correction Period:

13.12 If within one (1) year after the date of OWNER issuance of the Certificate of Acceptance, or such longer period of time as may be prescribed by Laws or Regulations, or by the terms of any applicable special guarantee required by the Contract Documents, or by any specific provision of the Contract Documents, any Work is found to be defective, CONTRACTOR shall promptly, without cost to OWNER and in accordance with OWNER's written instructions, either correct such defective Work, or, if it has been rejected by OWNER, remove it from the Project site and replace it with non-defective Work. If CONTRACTOR does not promptly comply with the terms of such OWNER instructions, or in an emergency where CONTRACTOR delay would cause serious risk of loss or damage to OWNER's facilities, OWNER may have the defective Work corrected, or the rejected Work removed and replaced, and all direct, indirect and consequential costs of such removal and replacement (including but not limited to fees and charges of ENGINEER, architects, attorneys and other professionals) will be charged to and paid by CONTRACTOR. In special circumstances, where a particular item of equipment is placed in continuous service by OWNER before acceptance of all the Work, the minimum one (1) year workmanship guarantee and/or equipment warranty correction periods for that item may start to run from an earlier date, if so provided in the Specifications or by Written Contract Amendment.

Acceptance of Defective Work:

13.13 If instead of requiring correction or removal and replacement of defective Work, OWNER (and, prior to ENGINEER's recommendation of final Project payment), prefers to accept it "as is," OWNER may do so in writing. CONTRACTOR shall bear all reasonable direct, indirect and consequential non-reimbursable costs attributable to OWNER's evaluation of, and determination to accept such defective Work (such OWNER costs to be approved by ENGINEER as to reasonableness and may include but not be limited to fees and charges of ENGINEER and any OWNER's, architects, attorneys and other professionals). If any such OWNER acceptance occurs prior to ENGINEER's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions to the Contract Documents with respect to the Work; and OWNER shall be entitled to an appropriate decrease in the Contract Price, and, if the Parties are unable to agree as to the amount thereof, OWNER or CONTRACTOR may make a written claim therefore as provided in Article 11. If the acceptance occurs after such final Project payment, an appropriate amount as determined by OWNER will be charged to and paid by CONTRACTOR to OWNER.

OWNER May Correct Defective Work:

13.14 If CONTRACTOR fails within seven (7) calendar days after written notice by ENGINEER to proceed to correct, and to actually correct defective Work; or to remove and replace rejected Work as required by ENGINEER in accordance with paragraph 13.11; or if CONTRACTOR fails to perform the Work in accordance with the Contract Documents; or if CONTRACTOR fails to comply with any other provision of the Contract Documents; OWNER may, after the pre-requisite seven (7) calendar days written notice to CONTRACTOR, correct and remedy any such CONTRACTOR deficiency. In exercising the rights and remedies under this paragraph, OWNER shall proceed with reasonable expediency. To the extent necessary to

complete corrective and remedial action, OWNER may exclude CONTRACTOR from all or part of the Work and Project site; take possession of all or part of the Work; and temporarily suspend CONTRACTOR's Work related thereto; take possession of CONTRACTOR's tools, appliances, construction equipment and machinery at the Project site; and incorporate in the Work all Project materials, and CONTRACTOR shall allow OWNER and ENGINEER, representatives and employees such access to the Project site as may be necessary to enable OWNER to exercise the rights and remedies under this paragraph. All direct, indirect and consequential costs of OWNER in exercising such rights and remedies will be charged against CONTRACTOR, in an amount approved as to reasonableness by ENGINEER, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and OWNER shall be entitled to an appropriate decrease in the Contract Price, and, if the Parties are unable to agree as to the amount thereof, OWNER or CONTRACTOR may make a claim therefore as provided in Article 11. Such direct, indirect and consequential OWNER costs will include, but not be limited to: fees and charges of ENGINEER; OWNER's architects; attorneys; and other professionals; all court costs; and all costs of repair and replacement of work of others destroyed or damaged by correction, removal or replacement of CONTRACTOR's defective Work. CONTRACTOR shall not be allowed an extension of the Contract Time because of any delay in performance of the Work attributable to the exercise by OWNER of OWNER's rights and remedies under this paragraph 13.4.

ARTICLE 14 -- PAYMENTS TO CONTRACTOR AND COMPLETION

Schedule of Values:

14.1 The Schedule of Values established as provided in paragraph 2.9 will serve as the basis for monthly progress payments and will be incorporated into a form of Application for Payment acceptable to ENGINEER. Progress payments on account of Unit Price Work will be based on the number of units actually completed, multiplied by the per unit price. CONTRACTOR, ENGINEER and OWNER shall also mutually address in the Schedule of Values any periodic CONTRACTOR reimbursements or direct OWNER payments to third-party vendors producing any specially fabricated goods and equipment with longer lead times prior to delivery to the Project site.

Application for Progress Payment:

14.2 At least twenty (20) calendar days before each progress payment is scheduled (but not more often than once a month), CONTRACTOR shall submit to ENGINEER for review, an Application for Payment accurately completed 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. 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 bonded and insured secure location off the nearby Project site as agreed to in an advanced writing signed by CONTRACTOR and OWNER, the Application for Payment shall also be accompanied by a bill of sale, invoice, affidavit of bill(s) paid, or other documentation warrantying that OWNER has actually received the title ownership of Project materials and equipment still within the care, custody and control of CONTRACTOR for Project Work purposes and free and clear of any

attempted liens, charges, security interests and encumbrances (which are hereinafter in these General Conditions referred to as "Encumbrances"), and evidence that the materials and equipment are covered by appropriate property insurance and other security arrangements to protect OWNER's legal interest therein, all of which will be satisfactory to OWNER. The amount of OWNER retainage with respect to progress payments, five percent (5%), is stipulated in the Agreement.

CONTRACTOR's Warranty of Title:

14.3 CONTRACTOR warrants and guarantees that title to any Work equipment and materials itemized in any Application for Payment, whether incorporated in the Project, or delivered and stored at or nearby the Project site, will pass to OWNER no later than the time of any progress payment, free and clear of any and all Encumbrances.

Review of Applications for Progress Payment:

14.4 ENGINEER will, within twenty (20) calendar days after receipt of each Application for Payment from CONTRACTOR, either indicate in writing a recommendation for OWNER payment and process the Application, or return the Application to CONTRACTOR indicating in writing ENGINEER's reasons for refusing to recommend payment. In the latter case, CONTRACTOR will make the necessary corrections and promptly resubmit the Application. Twenty (20) calendar days after presentation of the Application for Payment to OWNER with ENGINEER's recommendation, the payment amount recommended will (subject to the provisions of the last sentence of paragraph 14.7) become due, and when due will be promptly paid by OWNER to CONTRACTOR, preferably by electronic transfer.

14.5 ENGINEER's recommendation of any payment requested in an Application for Payment will constitute a representation by ENGINEER to OWNER, based upon ENGINEER's limited periodic on-site observations of the Work in progress as an experienced and qualified design professional; and on ENGINEER's review of the Application for Payment and the accompanying data and Schedules; that the Work has progressed to the estimated percentage completion point indicated, that, to the best of ENGINEER's knowledge, information and belief, the status of the Work is in apparent general accordance with the Contract Documents (subject to: a later evaluation of the Work as a functioning whole; prior to or upon Substantial Completion; and subject to the results of any subsequent tests called for in the Contract Documents; and subject to a final determination of quantities and classifications for Unit Price Work under paragraph 9.10; and subject to any other qualifications stated in the ENGINEER's recommendation to OWNER); and that CONTRACTOR is entitled to payment of the amount recommended. However, by recommending any such payment, ENGINEER will not thereby be deemed to have represented that exhaustive or continuous on-site inspections have been made to check the CONTRACTOR's quality or the quantity of the Work beyond the responsibilities specifically assigned to ENGINEER in the Contract Documents, or that there may not be other matters or issues between the Parties that might entitle CONTRACTOR to be paid additionally by OWNER, or OWNER to withhold payment to CONTRACTOR.

14.6 ENGINEER's recommendation of final Project payment will constitute an

additional representation by ENGINEER to OWNER that to the best of ENGINEER's knowledge, the conditions precedent to CONTRACTOR's being entitled to final Project payment, as set forth in paragraph 14.13, have been fulfilled.

14.7 ENGINEER may refuse to recommend the whole or any part of any payment if, in ENGINEER's professional opinion, it would be incorrect to make such representations to OWNER. ENGINEER may also refuse to recommend any such payment, or, because of subsequently discovered evidence, or the results of subsequent inspections or tests, nullify any such payment previously recommended, to such extent as may be necessary in ENGINEER's opinion, to protect OWNER from Project loss because:

14.7.1 the Work is defective, or completed Work has been damaged requiring CONTRACTOR correction or replacement.

14.7.2 the Contract Price has been reduced by Written Amendment or Change Order.

14.7.3 OWNER has been required to correct defective Work or complete Work in accordance with paragraph 13.14, or

14.7.4 because of ENGINEER's actual knowledge of the occurrence of any of the events enumerated in paragraphs 15.2.1 through 15.2.9 inclusive.

OWNER may for its own benefit and protection and not for the direct benefit of any third parties, refuse to make CONTRACTOR payment in whole or in part of the amount recommended by ENGINEER, because claims have been made against OWNER on account of CONTRACTOR's improper performance of the Work; or payment bond claims and inquiries have been filed with OWNER or surety by third-parties in connection with the Work and OWNER may wish to consult with CONTRACTOR and/or CONTRACTOR’s surety about the status of CONTRACTOR sub-tier payments, or there are other items entitling OWNER to a set-off against the payment amount recommended, but OWNER must give CONTRACTOR written notice stating the reasons for any non-payment to CONTRACTOR.

Substantial Completion:

14.8 When CONTRACTOR considers the entire Work ready for OWNER’s intended purpose and use, CONTRACTOR shall notify ENGINEER in writing that the entire Work is Substantially Complete (except for minor items specifically listed by CONTRACTOR as incomplete) and request that ENGINEER issue a certificate of Substantial Completion. Within a reasonable time thereafter, OWNER, ENGINEER and CONTRACTOR shall make a joint inspection of the Work to determine the status of Project completion. If ENGINEER does not consider the Work Substantially Complete, ENGINEER will promptly notify CONTRACTOR in writing giving the reasons therefore. If ENGINEER considers the Work Substantially Complete, ENGINEER will prepare and deliver to OWNER a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of pending Work items to be completed or corrected by CONTRACTOR before final

payment ("punch-list"). OWNER shall have ten (10) calendar days after receipt of the tentative certificate during which to make written objection to ENGINEER as to any provisions of the certificate or attached list. If, after considering such objections, ENGINEER concludes that the Work is not Substantially Complete, ENGINEER will within twenty (20) calendar days after submission of the tentative certificate to OWNER, notify CONTRACTOR in writing, stating the reasons for no accomplishment of Substantial Completion. If, after consideration of OWNER's written objections regarding non-issuance of a Substantial Completion certificate, ENGINEER considers the Work Substantially Complete, ENGINEER will within said twenty (20) calendar days execute and deliver to OWNER and CONTRACTOR, a definitive certificate of Substantial Completion (with a final punch list of items to be completed or corrected) reflecting such changes from the tentative list as ENGINEER believes justified, after consideration of any objections from OWNER. At the time of delivery of the definitive certificate of Substantial Completion, ENGINEER will deliver to OWNER and CONTRACTOR a written recommendation as to the division of responsibilities pending final payment between OWNER and CONTRACTOR with respect to any Project security, operation, safety, maintenance, HVAC, utilities, insurance, warranties, and guarantees. OWNER and CONTRACTOR shall agree in writing regarding the final division of responsibilities, and so inform ENGINEER.

14.9 OWNER shall have the right to exclude CONTRACTOR from portions of the Project site after the date of Substantial Completion, but OWNER shall allow CONTRACTOR reasonable access to portions of the Work to complete or correct items on the final punch list.

Partial Utilization:

14.10 Use by OWNER of any finished part of the Work, which has specifically been identified in the Contract Documents, or which OWNER, ENGINEER and CONTRACTOR subsequently agree constitutes a separately functioning and useable part of the Work that can be utilized by OWNER without significant interference with CONTRACTOR's performance of the remainder of the Work, may be accomplished prior to Substantial Completion of all the Work, subject to the following:

14.10.1 OWNER at any time may request CONTRACTOR in writing to permit OWNER to use any such part of the Work which OWNER believes to be ready for OWNER's intended use and purpose and Substantially Complete. If CONTRACTOR agrees, CONTRACTOR will certify in writing to OWNER and ENGINEER that said part of the Work is Substantially Complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. Additionally, CONTRACTOR at any time may notify OWNER and ENGINEER in writing, that CONTRACTOR considers any such part of the Work ready for OWNER's intended use and purpose, and substantially complete, and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. Within a reasonable time after such CONTRACTOR request, OWNER, ENGINEER and CONTRACTOR shall make an inspection of that part of the Work to determine its status of completion. If ENGINEER considers that part of the Work to be Substantially Complete, the provisions of paragraphs 14.8 and 14.9 will apply with respect to issuance of any certification of Substantial Completion for that part of the Work, and finalizing the division of responsibilities and access thereto.

14.10.2 OWNER may at any time request CONTRACTOR in writing to permit OWNER to take over operation of any such part of the Work, although it is not Substantially Complete. A copy of such request will be sent to ENGINEER and within a reasonable time thereafter, OWNER, ENGINEER and CONTRACTOR shall make an inspection of that part of the Work to determine its status of completion and will prepare a punch-list of the items remaining to be completed or corrected thereon before final payment. If CONTRACTOR does not object in writing to OWNER and ENGINEER within seven (7) calendar days that such part of the Work is not ready for separate operation by OWNER, ENGINEER will finalize the list of items to be completed or corrected and will deliver such list to OWNER and CONTRACTOR, together with a written statement as to the division of responsibilities pending final payment between OWNER and CONTRACTOR, with respect to security, operation, safety, maintenance, HVAC, utilities, insurance, warranties and guarantees for that part of the Work, which will become binding upon OWNER and CONTRACTOR at the time when OWNER takes over such operation (unless they shall have otherwise agreed in writing and so informed ENGINEER). During such OWNER operation and prior to Substantial Completion of such part of the Work, OWNER shall allow CONTRACTOR reasonable access to complete or correct items on any punch list, and to complete other related Work.

14.10.3 No OWNER use, occupancy or separate operation of part of the Work will be accomplished prior to compliance with the requirements of paragraph 5.9 in respect of CONTRACTOR's property insurance notice and endorsement.

Final Inspection:

14.11 Upon written notice from CONTRACTOR that the entire Work or an agreed portion thereof is complete, ENGINEER will make a final inspection with OWNER and CONTRACTOR and will notify CONTRACTOR in writing of all particulars (a revised short-list) in which this inspection reveals that the Work is incomplete or defective. CONTRACTOR shall immediately take such corrective measures as are necessary to remedy such remaining deficiencies.

A qualified person(s) representing CONTRACTOR shall be present at this final inspection. Prior to this inspection, all Work shall have been completed, tested, adjusted and in final operating condition, if required by the Project Specifications.

Final Application for Payment:

14.12 After CONTRACTOR has completed all such final Work corrections to the satisfaction of ENGINEER and delivered certificates of inspection, marked-up record documents, if any, depicting as-built conditions (as provided in paragraph 6.21) and other important documents--all as required by the Contract Documents; and after ENGINEER has indicated that the Work is acceptable (subject to the provisions of paragraph 14.16), CONTRACTOR may make application for final payment following the procedure for monthly progress payments. The final Application for Payment shall be accompanied by all documentation called for in the Contract Documents, together with complete and legally effective releases or waivers (satisfactory to OWNER) of all third-party claims arising out of, or filed in connection with the Work. In lieu

thereof and as approved by OWNER, CONTRACTOR may furnish third-party receipts or releases in full; a sworn affidavit of CONTRACTOR that the releases and receipts include prior CONTRACTOR payments for all labor, services, material and equipment for which a timely Payment Bond claim could be filed, and that all payrolls, material and equipment bills, and other CONTRACTOR indebtedness connected with the Work, for which OWNER or OWNER's property might in any way be encumbered, have been paid or otherwise satisfied; and a written consent of the Surety to OWNER's final payment, if any is required by CONTRACTOR's Surety. **IF ANY SUBCONTRACTOR OR SUPPLIER FAILS TO FURNISH CONTRACTOR A RELEASE OR RECEIPT IN FULL, CONTRACTOR MAY FURNISH A SPECIAL INDEMNITY BOND, OR OTHER COLLATERAL SATISFACTORY TO OWNER, TO INDEMNIFY, HOLD HARMLESS, AND FULLY PROTECT OWNER AGAINST ANY POTENTIAL THIRD-PARTY CLAIM.**

Final Payment and Acceptance:

14.13 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 (all as required by the Contract Documents), ENGINEER is satisfied that the Work has been completed and CONTRACTOR's other obligations under the Contract Documents have been fulfilled, ENGINEER will, within twenty (20) calendar days after receipt of the final Application for Payment, indicate in writing, ENGINEER's recommendation to OWNER for payment and process the Application for Payment. Thereupon ENGINEER will give written notice to OWNER and CONTRACTOR that the Work is acceptable, subject to the provisions of paragraph 14.16. Otherwise, ENGINEER will return the Application to CONTRACTOR, indicating in writing the reasons for refusing to recommend final payment, in which case CONTRACTOR shall promptly make the necessary corrections and resubmit the Application. Thirty (30) calendar days after presentation to OWNER of the final Application for Payment and accompanying documentation, in appropriate final form and substance, and with ENGINEER's recommendation and notice of acceptability, the final amount recommended by ENGINEER will become due and will be paid by OWNER to CONTRACTOR.

CONTRACTOR shall submit satisfactory evidence to the OWNER and ENGINEER that all payrolls, and other CONTRACTOR indebtedness connected with the Work have been paid, before a Final Certificate of Acceptance is issued.

14.14 If, through no fault of CONTRACTOR, final completion of the Work is significantly delayed, and if ENGINEER so confirms, OWNER shall, upon receipt of CONTRACTOR's final Application for Payment and recommendation of ENGINEER, and without terminating the Agreement, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by OWNER for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if Bonds have been furnished as required in paragraph 5.1, the written consent of the surety to the partial payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by CONTRACTOR to ENGINEER with the Application for such Payment. Such partial payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a final waiver of claims by OWNER.

Contractor's Continuing Obligation:

14.15 CONTRACTOR'S obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. Neither recommendation of any progress or final payment by ENGINEER; nor the issuance of a Certificate of Substantial Completion or Final Acceptance; nor any payment by OWNER to CONTRACTOR under the Contract Documents; nor any use or occupancy of the Work or any part thereof by OWNER; nor any act of Work acceptance by OWNER; nor any failure to do so; nor the issuance of a notice of acceptability by ENGINEER pursuant to paragraph 14.13; nor any correction of defective Work by OWNER, will constitute an acceptance of Work not in accordance with the Contract Documents, or a release of CONTRACTOR's obligation to perform the Work in accordance with the Contract Documents (except as provided in paragraph 14.16).

Waiver of Claims:

14.16 The making and acceptance of final payment will constitute:

14.16.1 a waiver of all claims by OWNER against CONTRACTOR, except any timely filed third party claims arising from unsettled payment bond claims; from latently defective Work appearing after final inspection pursuant to paragraph 14.11; or from failure to comply with the Contract Documents or the terms of any special guarantees specified therein; however, it will not constitute a waiver by OWNER of any rights regarding CONTRACTOR's continuing obligations under the Contract Documents; and

14.16.2 a waiver of all claims by CONTRACTOR against OWNER, other than those previously, properly, and timely made in writing and still unsettled.

ARTICLE 15 -- SUSPENSION OF WORK AND TERMINATION

Owner May Suspend Work:

15.1 OWNER may, at any time and without cause, suspend the Work or any portion thereof for a period of not more than ninety (90) cumulative (not necessarily consecutive) calendar days by notice in writing to CONTRACTOR and ENGINEER, which will fix the date on which Work will be resumed. CONTRACTOR shall resume the Work on the date so fixed. CONTRACTOR may be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension, if CONTRACTOR demonstrates an approved claim therefore as provided in Articles 11 and 12. Any increase or decrease in the Contract Price shall be governed by all State and local laws, statutes, codes, ordinances, rules and regulations governing public competitive bidding and Change Orders.

Owner May Terminate:

15.2 Upon the occurrence of any one or more of the following events:

15.2.1 if CONTRACTOR commences a voluntary case under any chapter of the

Bankruptcy Code (Title 11, United States Code), as now or hereafter in effect, or if CONTRACTOR takes any equivalent or similar action by filing a petition or otherwise, under any other federal or Texas law in effect at such time, relating to the bankruptcy or insolvency;

15.2.2 if a petition is filed against CONTRACTOR under any chapter of the Bankruptcy Code as now or hereafter in effect at the time of filing, or if a petition is filed seeking any such equivalent or similar relief against CONTRACTOR under any other federal or Texas law in effect at the time relating to bankruptcy or insolvency;

15.2.3 if CONTRACTOR makes a general assignment for the benefit of creditors;

15.2.4 if a trustee, receiver, custodian or agent of CONTRACTOR is appointed under applicable law or under contract, whose appointment or authority to take charge of the property of CONTRACTOR is for the purpose of enforcing a lien against such CONTRACTOR property, or for the purpose of general administration of such CONTRACTOR property, for the benefit of CONTRACTOR's creditors;

15.2.5 if CONTRACTOR admits in writing an inability to pay its debts generally as they become due;

15.2.6 if CONTRACTOR persistently fails to perform the Work in accordance with the Contract Documents (including but not limited to, failure to supply sufficient skilled workers or equipment, or failure to adhere to the Progress Schedule established under paragraph 2.9, as revised from time to time);

15.2.7 if CONTRACTOR disregards Laws or Regulations of any public body having jurisdiction;

15.2.8 if CONTRACTOR disregards the rights of OWNER; or

15.2.9 if CONTRACTOR otherwise violates in any substantial and material way, any provisions of the Contract Documents;

OWNER may, after giving CONTRACTOR and the surety seven (7) calendar days written notice, and to the extent permitted by Laws and Regulations: terminate the services of CONTRACTOR; exclude CONTRACTOR from the Project site and take possession of the Work and of all CONTRACTOR's tools, appliances, construction equipment and machinery at the Project site; and use the same to the full extent they could be used by CONTRACTOR (without OWNER liability to CONTRACTOR for trespass or conversion), and finish the Work as OWNER may deem expedient. In such case, CONTRACTOR shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds the OWNER's direct, indirect and consequential costs of completing the Work (including but not limited to fees and charges of ENGINEER, other engineers, architects, attorneys and other professionals and court costs), such excess will be paid to CONTRACTOR or surety. If such OWNER costs exceed such unpaid balance of the Contract Price, CONTRACTOR or surety shall pay the difference to OWNER. Such costs incurred by OWNER will be approved as to reasonableness by ENGINEER

and incorporated in a Change Order, but when exercising any rights or remedies under this paragraph, OWNER shall not be required to obtain the lowest price for the Work performed.

15.3 Where CONTRACTOR's services have been so terminated by OWNER, that termination will not affect any rights or remedies of OWNER under this continuing Agreement against CONTRACTOR then existing, or which may thereafter accrue. Any retention or payment of moneys due CONTRACTOR by OWNER will not release CONTRACTOR from ongoing liability under this Agreement.

15.4 Upon seven (7) calendar days written notice to CONTRACTOR and ENGINEER, OWNER may, without cause and without prejudice to any other right or remedy, elect to abandon the Work and terminate the Agreement for OWNER's convenience. In such case, CONTRACTOR shall mitigate demobilization costs as best as possible and be paid for all Work properly executed and expenses sustained, plus reasonable termination expenses, which will include, but not be limited to, direct, indirect and consequential costs (including, but not limited to, fees and charges of CONTRACTOR's engineers, architects, attorneys and other professionals).

ARTICLE 16 -- TIME FOR SUBSTANTIAL COMPLETION AND LIQUIDATED DAMAGES.

16.1. IT IS HEREBY UNDERSTOOD AND MUTUALLY AGREED, BY AND BETWEEN THE PARTIES HERETO, THAT THE DATE OF BEGINNING, RATE OF PROGRESS AND THE TIME FOR SUBSTANTIAL COMPLETION OF THE WORK TO BE PERFORMED HEREUNDER ARE ESSENTIAL CONDITIONS OF THIS CONTRACT; and it is further mutually understood and agreed, by and between the Parties hereto, that the time to perform the Work embraced in this Contract shall be commenced on a date to be specified in the Notice to Proceed.

16.2 CONTRACTOR hereby agrees that said Work shall be prosecuted regularly, diligently, and uninterrupted at such rate of progress as will insure Substantial Completion thereof within the time specified. It is expressly understood and mutually agreed, by and between the Parties hereto, that the time for the Substantial Completion of the Work described herein in calendar days is a reasonable time for Substantial Completion of same, taking into consideration the average climatic range and weather conditions the CONTRACTOR must reasonably anticipate is already included in the calculation of the performance time specified herein, and CONTRACTOR has assessed the usual industrial and labor conditions prevailing in the Cameron County area.

16.3 If CONTRACTOR shall neglect, fail or refuse to Substantially Complete the Work within the mutually agreed to time herein specified, then CONTRACTOR does hereby agree, as a part of the consideration for the awarding of this Contract, to pay the OWNER the mutually agreed to amount specified in the Construction Agreement, not as a penalty, but as liquidated damages for such breach of Contract for each and every calendar day that CONTRACTOR shall be in default, after the time stipulated in the Contract Documents for Substantially Completing the Work.

16.4 The damage to OWNER by reason of this Work not being Substantially Completed as of the mutually agreed to performance time period are incapable of definite ascertainment by either Party, and therefore the Parties hereto have mutually fixed and limited such damages to the sum stipulated in the Construction Agreement for each calendar day the Project runs beyond such Substantial Completion date, and the mutual agreement for such damages constitutes a part of the consideration for entering the Agreement. It is further mutually agreed that **TIME IS OF THE ESSENCE** for each and every portion of this Agreement and of the Specifications, wherein a definite and certain length of time is fixed for the performance of any act whatsoever; and where under the Contract, any additional time is allowed for the Substantial Completion of any Work, the new time fixed by such extension shall also be **OF THE ESSENCE** for this Agreement. Provided that CONTRACTOR shall not be assessed with the mutually agreed to liquidated damages or any excess cost when the delay in the Substantial Completion of Work is due:

16.4.1 To any preference, priority or allocation order duly issued by the United States Federal Government.

16.4.2 To unforeseeable causes beyond the control and without the fault or negligence of CONTRACTOR, including, but not restricted to: Acts of God; or of the public enemy; acts of the OWNER; acts of another contractor in the performance of a separate contract with the OWNER; fires; floods exceeding the 100 year frequency in Cameron County, Texas; epidemics; quarantine restrictions; strikes; freight embargoes and unusually severe weather not customary for the Cameron County, Texas area and not already included in the calculation of the performance time specified herein.

16.4.3 To any delays of Subcontractors and/or CONTRACTOR's equipment/material suppliers occasioned by any of the causes specified in 16.4.1 or 16.4.2.

16.4.4 Provided further, that CONTRACTOR shall immediately attempt to mitigate the impacts of the delay, and within seven (7) calendar days from the beginning of such delay, notify OWNER, in writing, of the causes for the delay. ENGINEER and OWNER shall then ascertain the facts and extent of the delay and OWNER will notify CONTRACTOR within a reasonable time of OWNER's decision in the matter regarding any adjustment to the Contract Time and a mutually acceptable Project Schedule recovery plan.

ARTICLE 17 -- MISCELLANEOUS

Giving Notice:

17.1 Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly performed if delivered in person to the CONTRACTOR's Project Superintendent or mailed to an officer of the corporation in the case of the CONTRACTOR; or to the General Manager and CEO of the BPUB in the case of the OWNER; or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the provider of the notice. **PROVIDING TIMELY NOTICE AS REQUIRED BY THE NUMEROUS PARAGRAPHS HEREIN IS A MUTUALLY AGREED TO ESSENTIAL TERM OF THIS CONTRACT FOR BOTH PARTIES, AND FAILURE TO**

PROVIDE SAME CONSTITUTES A MATERIAL BREACH OF THE CONTRACT AND A WAIVER OF CERTAIN REMEDIES THAT OTHERWISE WOULD HAVE BEEN AVAILABLE TO A PARTY HEREUNDER HAD PROPER TIMELY NOTICE BEEN PROVIDED.

Computation of Calendar Day Time:

17.2 When any period of time is referred to in the Contract Documents by "days", and the OWNER'S format for scheduling the performance time on the Project is by utilizing calendar days in lieu of "working days," it will be computed as calendar days, to exclude the first and include the last calendar day of such measured period. If the last calendar day of any such period falls on a calendar day listed as a local BPUB holiday by the Contract Documents, such calendar day will be omitted from the computation.

17.2.1 A calendar day consists of twenty-four (24) hours and is measured from midnight on one day, to the next midnight, and shall constitute a single calendar day.

General:

17.3 Should OWNER suffer injury or damage to person or property because of any error, omission or negligent act of the CONTRACTOR, or of any of the CONTRACTOR's, Subcontractor's, employees or agents, or others for whose negligent acts and/or omissions CONTRACTOR is legally liable, OWNER's claim will be made in writing to the CONTRACTOR within a reasonable time of the first occurrence or observation of such injury or damage. The provisions of this paragraph 17.3 shall not be construed as a substitute for, or a waiver of, the legal provisions of any applicable statute of limitations or repose.

17.4 The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the Parties hereto, and, in particular but without limitation, the conditions, warranties, guarantees and obligations imposed upon CONTRACTOR by paragraphs 6.32, 13.1, 13.12, 13.14, 14.3 and 15.2, and all of the rights and remedies available to OWNER thereunder; are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to OWNER which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this paragraph 17.4 will be as effective as if repeated specifically in all the Contract Documents in connection with each particular duty, obligation, right and remedy to which they apply. All representations, conditions, warranties and guarantees made in the Contract Documents will survive the execution, final payment and termination or completion of the Agreement. All CONTRACTOR recitations contained in any document required by OWNER, whether delivered at the time of the execution of the Construction Agreement, or at a later date, shall constitute legal and binding representations, warranties and guarantees by CONTRACTOR herein.

17.5 CONTRACTOR shall comply with the "anti-kickback" provisions of the Copeland Act now codified at 18 U. S. C. A. §874, and all amendments or modifications of the original Act of June 13, 1934.

SUPPLEMENTARY CONDITIONS

SECTION 1 - WAGE AND LABOR STANDARD PROVISIONS - 100% NON - FEDERALLY FUNDED CONSTRUCTION

Contents

1. GENERAL STATEMENT

This is a 100% Non-Federally funded and competitively bid Public Works Contract and Article 5159a, Revised Civil Statutes of Texas, as amended, requires that not less than the general prevailing wage rates (minimum hourly base pay and minimum hourly fringe benefit contribution) for work of similar character be paid to Contractor and Subcontractor employees. These local prevailing and adopted wage rates are derived from the most current applicable federal prevailing wage rates for Cameron County, Texas as published by the United States Department of Labor, (DOL) Dallas, Texas. Copies of the wage rates applicable to the Project at the time of bidding are contained at the end of this Supplementary Conditions Section 1, and are included instruments of this Contract and full compliance with same shall be required.

Any deviation from Wage and Labor Standard Provisions compliance may be cause for OWNER's withholding either interim or final payment to the CONTRACTOR until such deviations are properly corrected.

2. OWNER'S FINANCE DEPARTMENT WAGE & HOUR OFFICE, PROJECT RESPONSIBILITIES

The OWNER's FINANCE DEPARTMENT is primarily responsible for all Wage and Labor Standard Provisions investigation and enforcement and will monitor CONTRACTOR/Subcontractor practices to assure the OWNER that:

a. Appropriate weekly compliance statements and payroll records are submitted to the OWNER by the CONTRACTOR/Subcontractors and that such are reviewed for compliance with Wage and Labor Standard Provisions.

b. Apprentices/trainees working on the Project are properly identified by CONTRACTOR/Subcontractor on payroll records and documented as being included in programs currently sanctioned by appropriate federal or Texas regulatory agencies.

c. Applicable Wage Determination Decisions, including any applicable modifications, and related statements are posted at the Project Work site by the CONTRACTOR and that proper job classifications and commensurate minimum hourly base and any applicable fringe wage rates are paid.

d. Employees are periodically interviewed (at random) on each Project as required.

e. That no person employed by CONTRACTOR/Subcontractor is induced against his will, by any means, to give up any part of the compensation to which he is otherwise entitled.

f. That any and all periodic administrative directives to the Wage & Hour Monitor (TITLE) from the OWNER's Finance Department and Board of Trustees are being implemented.

3. CLAIMS & DISPUTES PERTAINING TO WAGE RATES

Claims and disputes not promptly and routinely settled by the CONTRACTOR/Subcontractor and employees pertaining to wage rates, or to job classifications of labor employed upon the Work covered by this Contract, shall be reported by the employee in writing, within sixty (60) Calendar Days of employee's receipt of any allegedly incorrect classification, wage or benefit report, to the Wage & Hour Monitor for further investigation. Claims and disputes not reported by the employee to the Wage & Hour Monitor in writing within the sixty (60) Calendar Day period shall be deemed waived by the employee for the purposes of the OWNER administering and enforcing the OWNER's Contract rights against the CONTRACTOR on behalf of the employee. Waiver by the employee of this OWNER intervention shall not constitute waiver by the OWNER or employee to independently pursue contractual rights it has against the CONTRACTOR/Subcontractor for breach of Contract and other sanctions available to enforce the Wage and Labor Standard Provisions.

4. BREACH OF WAGE AND LABOR STANDARD PROVISIONS

The OWNER reserves the right to terminate this Contract for cause if the CONTRACTOR/Subcontractors shall knowingly and continuously breach, without timely restitution or cure, any of these governing Wage and Labor Standard Provisions. A knowing and unremedied proven violation of these Wage and Labor Standard Provisions may also be grounds for a "non-responsibility" determination by OWNER thereby jeopardizing CONTRACTOR/Subcontractor from future OWNER contracts for lack of responsibility to perform future work, as determined by the OWNER. Recurrent violations, whether remedied or not, will be considered by the OWNER when assessing the responsibility history of a potential contractor/subcontractor prior to competitive award of future OWNER Public Works projects. The general OWNER remedies stated in this paragraph 4. above, are not exhaustive and not cumulative, for the OWNER reserves legal and contractual rights to other specific remedies outlined herein below and in other parts of this Contract and as are allowed by applicable OWNER resolutions, Texas and federal statutes.

5. EMPLOYMENT OF LABORERS/MECHANICS NOT LISTED IN WAGE DETERMINATION DECISION

In the event the CONTRACTOR/Subcontractor discovers that construction of a particular Work element requires a certain employee classification and skill that is not listed in the wage determination decision contained in the original Contract Documents, CONTRACTOR/Subcontractors will make prompt inquiry (at least twenty-one (21) Calendar Days before bidding, if possible) to the OWNER identifying that class of laborers/mechanics not listed in the current pre-bid wage determination decision who are intended to be employed, or who are being employed, under the Contract. Using his best judgment and information resources available to him at the time, and any similar, prior OWNER or Federal Department of Labor decisions, the Wage & Hour Monitor, shall

classify said laborers/mechanics by issuing a special local wage determination decision to the bidders or CONTRACTOR/Subcontractor, which shall be enforced by the OWNER.

6. MINIMUM WAGE

All laborers/mechanics employed to construct the Work governed by this Contract shall be paid not less than weekly the full amount of wages due (minimum hourly base pay and any applicable minimum hourly fringe benefit contribution for all hours worked, including overtime) for the immediately preceding pay period, computed at wage and fringe rates not less than those contained in the wage determination decision included in this Contract. Only payroll deductions as are mandated by Texas or federal law, and those legal deductions previously approved in writing by the employee, or as are otherwise permitted by Texas or federal law, may be withheld by the CONTRACTOR/Subcontractor.

Should the CONTRACTOR/Subcontractor subscribe to fringe benefit programs for employees, such programs shall be fully approved by the OWNER in adopting a previous U.S. Department of Labor decision on such fringe benefit programs or by applying DOL criteria, in rendering a local decision on the adequacy of the fringe benefit programs. The approved programs shall be in place at the time of OWNER's Contract execution and the provisions thereof shall be disclosed to the CONTRACTOR, for legal review prior to Project commencement, if a written request for same is submitted by CONTRACTOR/Subcontractor prior to CONTACTOR's execution of the Construction Agreement.

Regular CONTRACTOR/Subcontractor contributions made to, or costs incurred for, approved fringe benefit plans, funds or other benefit programs that cover periods of time greater than the one week payroll period (e.g. monthly or quarterly, etc.) shall be prorated by the CONTRACTOR/Subcontractor on weekly CONTRACTOR payroll records to reflect the equivalent value of the hourly and weekly summary of fringe benefits per employee.

7. OVERTIME COMPENSATION ON NON-FEDERALLY FUNDED PROJECTS

No CONTRACTOR/Subcontractor contracting for any part of the non-federally funded Contract Work (except for Project site related security guard services), which may require or involve the employment of laborers/mechanics, shall require or permit any laborer/mechanic in any seven (7) Calendar Day Work period in which he, she is employed on such Work, to Work in excess of forty (40) hours in such Work period, unless said laborer/mechanic receives compensation at a rate not less than one and one-half (1 ½) times the basic hourly rate of pay for all hours worked in excess of forty (40) hours in a seven (7) Calendar Day Work period. Any applicable fringe benefits must be paid for straight time and overtime; however, fringe benefits are not included when computing the overtime rate.

8. PAYMENT OF CASH EQUIVALENT FRINGE BENEFITS

The CONTRACTOR/Subcontractor is allowed to pay a minimum hourly cash equivalent of any applicable minimum hourly fringe benefits listed in the wage determination decision, in lieu of the contribution of benefits to a permissible fringe benefit plan, for all hours worked, including overtime, as described in paragraphs 6. and 7. above. An employee is not allowed to receive less than the minimum hourly basic rate of pay specified in the applicable wage determination decision.

9. WORK CONDUCTED ON HOLIDAYS-NON-FEDERALLY FUNDED PROJECTS

If a laborer/mechanic is employed in the normal course and scope of his or her Work on the jobsite on New Year's Day, Martin Luther King Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day, Christmas Day, or any additional local OWNER holidays specified by the OWNER in the Contract Documents or the Calendar Days observed as such in any given year, Work shall be paid for at no less than one and one-half (1 1/2) times the regular minimum hourly base pay regardless of the total number of hours the laborer/mechanic has accumulated during the pay period.

10. UNDERPAYMENT OF WAGES OR SALARIES

a. When a "full investigation" (as called for in and as construed under Article 5159a, Sec. 2 and as may be further generally described in any administrative directive to the Wage & Hour Monitor from the OWNER), evidences underpayment of wages by CONTRACTOR/Subcontractor to laborers/mechanics employed upon the Work covered by this Contract, the OWNER, in addition to such other rights as may be afforded it under Texas and/or federal law and/or this Contract, shall withhold from the CONTRACTOR, out of any payments (interim progress and/or final) due the CONTRACTOR, so much thereof as the OWNER may consider necessary to secure ultimate payment by the appropriate entity to such laborers/mechanics, of full wages required by this Contract, plus possible penalty (See b. below). The amount so withheld, excluding any possible penalty to be retained by the OWNER, may be disbursed at an appropriate time after "full investigation" by the Wage & Hour Monitor, for and on behalf of the CONTRACTOR/Subcontractor (as may be appropriate), to the respective laborers/mechanics to whom the same is due, or on their behalf to fringe benefit plans, funds, or programs for any type of minimum fringe benefits prescribed in the applicable wage determination decision.

b. Article 5159a, Revised Civil Statutes of Texas, as amended, states that the CONTRACTOR shall forfeit as a penalty to the OWNER the sum of sixty dollars ($60.00) for each Calendar Day, or portion thereof, for each laborer, workman, or mechanic, who is paid less than the said stipulated rate for any Work done under this Contract, whether by the CONTRACTOR himself, or by any Subcontractor working under him. Pursuant to and supplemental to this statutory authority, the OWNER and the CONTRACTOR/Subcontractor contractually acknowledge and agree that said sixty dollar ($60.00) statutory penalty shall apply to any violations

of paragraphs 6,7, or 9 herein, resulting from CONTRACTOR/Subcontractor underpayment violations.

c. If unpaid or underpaid workers cannot be located by the CONTRACTOR/Subcontractor or the OWNER after diligent efforts to accomplish same, unpaid or underpaid wages shall be reserved by the OWNER in a special "unfound worker's account" established by the OWNER, for such CONTRACTOR/Subcontractor employees. If after one (1) year from the final acceptance of the Project by the OWNER, workers still cannot be located, in order that the OWNER can make effective interim re-use of the penalty money, such wages and any associated statutory penalties may be used to defray actual costs incurred by the OWNER in attempting to locate said workers, and any remaining monies may then revert back to the OWNER's original funding source for the Project. However, unpaid or underpaid workers for which money was originally reserved are eligible to claim recovery from the OWNER for a period of not-to-exceed three (3) years from the final acceptance of the Project by the OWNER. Claimant recovery after expiration of the three (3) year period is prohibited.

11. DISPLAYING WAGE DETERMINATION DECISIONS/AND NOTICE TO LABORERS/MECHANICS STATEMENT

The applicable wage determination decision(s) as described at the end of this Supplementary Conditions Section 1 (and as specifically included in each project contract), outlining the various worker classifications and mandatory minimum wages and minimum hourly fringe benefit deductions, if any, of laborers/mechanics employed and to be employed upon the Work covered by this CONTRACT, shall be displayed by the CONTRACTOR/Subcontractor at the site of Work in a conspicuous and prominent public place, readily and routinely accessible to workmen for the duration of the Project. In addition, the CONTRACTOR/Subcontractor agrees with the contents of the following statement, and shall display same, in English and Spanish, near the display of the wage determination decision at the Project site of Work:

NOTICE TO LABORERS/MECHANICS

Both the Brownsville Public Utilities Board and the CONTRACTOR/Subcontractor agree that you must be compensated with not less than the minimum hourly base pay and any required minimum hourly fringe benefit contribution in accordance with the wage rates publicly posted at this jobsite, and as are applicable to the classification of Work you perform.

Additionally, you must be paid not less than one and one-half times (1 ½) your basic hourly rate of pay for any hours worked over 40 in any seven (7) Calendar Day Work period, and for any Work conducted on New Year's Day, Martin Luther King Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day, and Christmas Day and other possible locally observed holiday(s), or the Calendar Days observed as such in any given year.

Apprentice and trainee hourly wage rates and ratios apply only to apprentices and trainees recognized under approved Federal, or State, apprenticeship training programs registered with the Bureau of Apprenticeship and Training, U.S. Dept. of Labor.

If you believe that your employer is not paying the posted minimum wage for the type of Work you do, you must make direct inquiry to your employer and also inquire in writing, within sixty (60) Calendar Days of your receipt of any allegedly incorrect wage or benefit check or report, to the BPUB Wage & Hour Monitor. It is mandatory that you promptly file written inquiry of any allegedly incorrect wage or benefit checks or reports with the BPUB's Wage & Hour Monitor within the sixty (60) Calendar Day period, so that you do not waive your potential right of recovery under the provisions of the BPUB's construction Contract that governs this Project.

Both the BPUB and the CONTRACTOR/Subcontractor agree that no laborer/mechanic who files a complaint or inquiry concerning alleged underpayment of wages or benefits, shall be discharged by the employer, or in any other manner be discriminated against by the employer, for filing such complaint or inquiry.

12. PAYROLLS & BASIC PAYROLL RECORDS

a. The CONTRACTOR and each Subcontractor shall prepare payroll reports in accordance with the "General Guideline" instructions furnished by the OWNER of the Project. Such payroll submittals shall contain the name and address of each such employee, his correct labor classification, rate of pay, daily and weekly number of hours worked, any deductions made, and actual basic hourly and fringe benefits paid. The CONTRACTOR shall submit payroll records each week, and no later than seven (7) working days following completion of the workweek being processed, to the OWNER. These payroll records shall include certified copies of all payrolls of the CONTRACTOR and of his Subcontractors, it being understood that the CONTRACTOR shall be responsible for the submission and general mathematical accuracy of payrolls from all of his Subcontractors. Each such payroll submittal shall be on forms deemed satisfactory to the Wage & Hour Monitor and shall contain a "Weekly Statement of Compliance", as called for by the Contract Documents. Such payrolls will be forwarded to the Wage & Hour Monitor.

b. Copies of payroll submittals and basic supporting payroll records of the CONTRACTOR/Subcontractors accounting for all laborers/mechanics employed under the Work covered by this Contract, shall be maintained by CONTRACTOR/Subcontractor during the course of the Work, and preserved for a period of three (3) years after completion of the Project. The CONTRACTORS/Subcontractors shall maintain records which demonstrate: any contractor commitment to provide fringe benefits to employees as may be mandated by the applicable wage determination decision; that the plan or program is adjudged financially responsible by the appropriate approving authority, (i.e. U.S. Department of Labor, U.S. Department of Treasury, etc.); and that the provisions, policies, certificates, and description of benefits of the plan or program as may be periodically amended, have been clearly communicated in a timely manner and in writing, to the laborers/mechanics affected, prior to their performing Work on the Project.

c. The CONTRACTOR/Subcontractor shall make the above records available for inspection, copying, or transcribing by the Wage & Hour Monitor of the OWNER at reasonable times and locations for purposes of monitoring compliance with this Contract.

13. LABOR DISPUTES

The CONTRACTOR/Subcontractor shall immediately notify the Wage & Hour Monitor or his designated representative of any actual or impending CONTRACTOR/Subcontractor labor dispute which may affect, or is affecting, the Project Performance Schedule of the CONTRACTOR's or any Subcontractor's Work. In addition, the CONTRACTOR/Subcontractor shall consider all appropriate measures to eliminate or minimize the effect of such labor disputes on the Project Progress Schedule, including but not limited to such measures as: promptly seeking injunctive relief if appropriate; seeking appropriate legal or equitable actions or remedies; taking such measures as establishing a reserved gate, as appropriate; if reasonably feasible, seeking other sources of supply or service; and any other measures that may be appropriately utilized to mitigate or eliminate the adverse Project jobsite and scheduling effects of the labor dispute.

14. COMPLAINTS, PROCEEDINGS, OR TESTIMONY BY EMPLOYEES

No laborers/mechanics to whom the wage, salary, or other labor standard provisions of this Contract are applicable shall be discharged, or in any other manner discriminated against by the CONTRACTOR/Subcontractors, because such employee has filed any formal inquiry or complaint, or instituted or caused to be instituted, any legal or equitable proceeding, or has testified, or is about to testify, in any such proceeding under or relating to the wage and labor standards applicable under this Contact.

15. EMPLOYEE INTERVIEWS TO ASSURE WAGE AND LABOR STANDARD COMPLIANCE

CONTRACTOR/Subcontractors shall allow expeditious jobsite entry of the Wage & Hour Monitor displaying and presenting proper OWNER identification credentials to the jobsite superintendent or his representative. While on the jobsite, the Wage & Hour Monitor shall observe all CONTRACTOR jobsite rules and regulations concerning safety, internal security and fire prevention. CONTRACTOR/Subcontractors shall allow Project employees to be separately and confidentially interviewed at random for a reasonable duration of time by the Wage & Hour Monitor to facilitate compliance determinations regarding adherence by the CONTRACTOR/Subcontractor to these Wage and Labor Standard Provisions.

16. "ANTI-KICKBACK" PROVISION

No person employed in the construction or repair of any OWNER public works Project shall be induced, by any means, to give up to any CONTRACTOR/Subcontractor or public

official or employee, any part of the hourly and/or fringe benefit compensation to which he or she is otherwise entitled.

17. "FALSE OR DECEPTIVE INFORMATION" PROVISION

Any person employed by the CONTRACTOR/Subcontractor in the construction or repair of any OWNER public works Project, who is proven to have knowingly and willfully falsified, concealed or covered up by any deceptive trick, scheme, or device a material fact, or made any false, fictitious or fraudulent statement or representation, or made or used any false writing or document knowing the same to contain any false, fictitious or fraudulent statement or entry, shall be permanently removed from the Project jobsite by the CONTRACTOR/Subcontractor. The OWNER reserves the right to terminate this Contract for cause as a result of serious and uncured violations of this provision.

18. EMPLOYMENT OF APPRENTICES/TRAINEES

a. Apprentices will be permitted to work at less than the predetermined rate for the Work they perform when they are employed and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship & Training, or with a Texas Apprenticeship Agency recognized by the Bureau, or if a person is employed in his first ninety (90) Calendar Days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship & Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen in any craft classification shall not be greater than the ratio under the registered program. Any employee listed on a payroll at an apprentice wage rate, who is not a trainee as defined in (b) below, or is not registered or otherwise employed as stated above, shall be paid the wage rate for the classification of Work he actually performs. The CONTRACTOR/Subcontractor is required to furnish to the Wage & Hour Monitor of the OWNER, a copy of the certification, along with the payroll record that the employee is first listed on. The wage rate paid apprentices shall be not less than the specified rate in the registered program for the apprentice's level of progress expressed as the appropriate percentage of the journeyman's rate contained in the applicable wage determination decision.

b. Trainees will be permitted to work at less than the predetermined rate for the Work performed when they are employed pursuant to an individually registered program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen shall not be greater than that permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for his/her level of progress. Any employee listed on the payroll at a trainee wage rate, who is not registered and participating in a training plan approved by the Employment and Training Administration, shall be paid not less than the wage rate determined by the classification of Work he actually performs. The

CONTRACTOR/Subcontractor is required to furnish a copy of the trainee program certification, registration of employee-trainees, ratios and wage rates prescribed in the program, along with the payroll record that the employee is first listed on, to the Wage & Hour Monitor of the OWNER. In the event the Employment and Training Administration withdraws approval of a training program, the CONTRACTOR/Subcontractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the Work performed until an acceptable program is approved by the Employment and Training Administration.

c. Paragraphs 18.a. and b. above shall not operate to exclude training programs approved by the OFCCP, United States Department of Labor and as adopted by the Associated General Contractors (AGC) of Texas, Highway, Heavy, Utilities and Industrial Branch. Guidelines for these training programs shall be the same as those established for federally funded projects. This sub-paragraph 15.c. shall not apply to those portions of a project deemed to be building construction.

d. **RATIOS, APPRENTICE TO JOURNEYMAN:**

The Ratio of Apprentice to Journeyman for this Project shall be the same as the Ratio permitted under the plan approved by the Employment and Training Administration, Bureau of Apprenticeship and Training, U.S. Department of Labor, by craft. A copy of the allowable Ratios is included with the applicable Wage Determination Decision at the end of this Supplementary Conditions Section 1.

When a "full investigation" (as called for in, and as construed under Article 5159a, Sec. 2), evidences a violation of the Apprentice or Trainee to Journeyman ratios effective for CONTRACTOR/Subcontractor employees working on this Contract, the OWNER, in addition to such other rights as may be afforded it under Texas and/or federal law and/or other sections of this Contract (especially paragraph 10 Underpayment of Wages), shall withhold from the CONTRACTOR, out of any payments (interim progress and/or final) due the CONTRACTOR, the liquidated damages (not a penalty) sum of seventy-five dollars ($75.00) for each Calendar Day, or portion thereof, for each certified Apprentice or Trainee employee assigned to a Journeyman that exceeds the maximum allowable Apprentice/Trainee to Journeyman ratio stipulated for any Work done under this Contract, whether by the CONTRACTOR himself, or by any Subcontractor working under him.

19. JOBSITE CONDITIONS

CONTRACTORS/Subcontractors will not allow any person employed for the Project to work in surroundings or under construction conditions which are unsanitary, unhealthy, hazardous, or dangerous as governed by industry standards and appropriate local, Texas and federal statutes, ordinances, and regulatory guidelines.

20. EMPLOYMENT OF CERTAIN PERSONS PROHIBITED

a. The CONTRACTOR/Subcontractor shall knowingly only employ persons of appropriate ages commensurate with the degree of required skill, strength, maturity and judgment associated with the activity to be engaged in, but not less than the age of fourteen (14) years, as governed by Chapter 51 "Employment of Children", Texas Labor Code, (Vernon's Texas Codes Annotated) (as may be amended), and Texas Department of Labor and Standards rulings and interpretations associated with that statute. It is hereby noted that in some circumstances generally governed by this paragraph, a federal statute (see: Fair Labor Standards Act, 29 USCS Section 212; Volume 6A of the Bureau of National Affairs Wage Hour Manual at Paragraph 96:1; "Child Labor Requirements in Nonagricultural Occupations" WH Publication 1330, July 1978 as may be amended), could pre-empt the Texas Statute and therefore be the controlling law on this subject. The CONTRACTOR/Subcontractor should seek clarification from Texas and federal agencies and legal counsel when hiring adolescent employees for particular job classifications.

b. Prohibited persons not to be employed are also those persons who, at the time of employment for this Contract, are serving sentence in a penal or correctional institution, except that prior approval by the Wage & Hour Monitor is required to employ any person participating in a supervised work release or furlough program that is sanctioned by appropriate Texas or federal correctional agencies.

c. The CONTRACTOR/Subcontractors shall be responsible for compliance with the provisions of the "Immigration Reform and Control Act of 1986" Public Law 99-603, and any related Texas enabling or implementing statutes, especially as they apply in combination to the unlawful employment of aliens and unfair immigration-related employment practices affecting this Contract.

21. PROVISIONS TO BE INCLUDED IN SUBCONTRACTS

The CONTRACTOR shall cause these Wage and Labor Standard Provisions, or reasonably similar contextual adaptations hereof, and any other appropriate Texas and federal labor provisions, to be inserted (or referenced by "flow down" provisions) in all subcontracts relative to the Work to bind Subcontractors (and any sub-tier subcontractors) to the same Wage and Labor Standards as contained in these Supplementary Conditions and other Contract Documents insofar as applicable to the Work of Subcontractors or sub-tier subcontractors, and to give the CONTRACTOR similar, if not greater, general contractual authority over the Subcontractor, or sub-tier subcontractors, as the OWNER may exercise over the CONTRACTOR.

WAGE DETERMINATION SCHEDULE

General Decision Number: TX20220003 02/25/2022
Superseded General Decision Number: TX20210003
State: Texas

Construction Types: Heavy and Highway

Counties: Cameron, Hidalgo and Webb Counties in Texas.

HEAVY & HIGHWAY CONSTRUCTION PROJECTS

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

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022: Executive Order 14026 generally applies to the contract. The contractor must pay all covered workers at least $15.00 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2022.

If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022: Executive Order 13658 generally applies to the contract. The contractor must pay all covered workers at least $11.25 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2022.

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

Additional information on contractor requirements and worker protections under the Executive Orders is available at https://www.dol.gov/agencies/whd/government-contracts.

Modification Number	Publication Date
0	01/07/2022
1	02/25/2022

* SUTX2011-003 08/02/2011

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER (Paving & Structures)	$ 12.46	**
FORM BUILDER/FORM SETTER (Structures)	$ 12.30	**
FORM SETTER (Paving & Curb)	$ 12.16	**
LABORER		
Asphalt Raker	$ 10.61	**
Flagger	$ 9.10	**
Laborer, Common	$ 9.86	**
Laborer, Utility	$ 11.53	**
Pipelayer	$ 11.87	**
Work Zone Barricade Servicer	$ 12.88	**
POWER EQUIPMENT OPERATOR:		
Asphalt Distributor	$ 13.48	**
Asphalt Paving Machine	$ 12.25	**
Broom or Sweeper	$ 10.33	**
Crane, Lattice Boom 80 Tons or Less	$ 14.39	**
Crawler Tractor	$ 16.63	
Excavator, 50,000 lbs or less	$ 12.56	**
Excavator, over 50,000 lbs.	$ 15.23	
Foundation Drill, Truck Mounted	$ 16.86	
Front End Loader Operator, Over 3 CY	$ 13.69	**
Front End Loader, 3 CY or less	$ 13.49	**
Loader/Backhoe	$ 12.77	**
Mechanic	$ 15.47	
Milling Machine	$ 14.64	**
Motor Grader Operator, Rough	$ 14.62	**
Motor Grader, Fine Grade	$ 16.52	
Scraper	$ 11.07	**
Servicer	$ 12.34	**
Steel Worker (Reinforcing)	$ 14.07	**
TRUCK DRIVER		
Lowboy-Float	$ 13.63	**
Single Axle	$ 10.82	**
Single or Tandem Axle Dump	$ 14.53	**
Tandem Axle Tractor with		

Semi Trailer.....$ 12.12 **

WELDER.....$ 14.02 **

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.
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** Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 ($15.00) or 13658 ($11.25). Please see the Note at the top of the wage determination for more information.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year.

Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at https://www.dol.gov/agencies/whd/government-contracts.

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

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

Union Rate Identifiers

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

internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

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

Survey Rate Identifiers

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

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

Union Average Rate Identifiers

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

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

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:
* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

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

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

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

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

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

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

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

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

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

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END OF GENERAL DECISION

PART II – TECHNICAL SPECIFICATIONS

DIVISION 01

GENERAL REQUIREMENTS

01 11 00 SUMMARY OF WORK

PART 1 - GENERAL

1.01 SUMMARY

A. Construct Work as described in the Contract Documents.

1. Provide the materials, equipment, and incidentals required to make the Project completely and fully operable.
2. Provide the labor, equipment, tools, and consumable supplies required for a complete Project.
3. Provide the civil, architectural, structural, mechanical, electrical, instrumentation, and all other Work required for a complete and operable Project.
4. Test and place the completed Project in operation.
5. Provide the special tools, spare parts, lubricants, supplies, or other materials as indicated in the Contract Documents for the operation and maintenance of the Project.
6. The Contract Documents do not indicate or describe all Work required to complete the Project. Additional details required for the correct installation of selected products are to be provided by the Contractor and coordinated with the Construction Manager.

1.02 DESCRIPTION OF WORK

A. Work is described in general, non-inclusive terms as:

1. Removal of existing sluice gate F104 and installation of a new sluice gate F104 upstream in the influent channel of Chlorine Contact Basin 1.
2. Removal of existing sluice gate F105 and installation of a new sluice gate F105 upstream in the influent channel of Chorine Contact Basin 2.
3. Removal of existing sluice gate F100, construction of a new concrete wall downstream of the existing gate and installing a new sluice gate F100 on the new wall in Chlorine Contact Basin 3.
4. Replacing the manual crank of all three gates with an electric actuator with the ability to control the gates remotely.
5. Associated structural, mechanical, electrical, instrumentation, and controls improvements

1.03 WORK UNDER OTHER CONTRACTS

A. The following items of work are not included in this Contract, but may impact construction scheduling, testing, and startup:

Owner	Description
BPUB	B20-032 South WWTP Improvements including work at the plant's headworks, aeration basins, and digesters 1 and 2.

B. Bring any discrepancies in the list to the attention of the Construction Manager. It will be deemed that the Contractor included the more expensive listing in the Contract Price if the Contractor fails to bring any discrepancies to the attention of the Construction Manager prior to executing the Agreement.

C. Completion of the Work described in this Contract may impact the construction and testing of the items listed above.

1. Coordinate construction activities through the Construction Manager.

2. Pay claims for damages which result from the late completion of the Project or any specified Milestones.

1.04 WORK BY OWNER

A. The Owner has no knowledge of work, other than the Work included in this Contract that may impact construction scheduling, testing, and startup.

B. The Owner plans to perform the following items of work which are not included in this Contract, but may impact construction scheduling, testing, and startup:

Owner	Description
BPUB	No work is anticipated to impact construction activities. BPUB operations staff will confirm anticipated work at the time of Notice to Proceed.

C. Bring any discrepancies between the projects listed above and those specified elsewhere in the Contract Documents to the attention of the Construction Manager. It will be deemed that the Contractor included the more expensive listing in the Contract Price if the Contractor fails to bring any discrepancies to the attention of the Construction Manager prior to executing the Agreement.

D. Completion of the Work described in this Contract may impact the construction and testing of the items listed above.

1. Coordinate construction activities through the Construction Manager.

2. Pay claims for damages which result from the late completion of the Project or any specified Milestones.

E. Owner will provide normal operation and maintenance of the existing facilities during construction, unless otherwise stated.

1.05 CONSTRUCTION OF UTILITIES

A. Existing utilities will be used for this Project. Coordinate with others performing Work associated with this Project.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01 26 00 CHANGE MANAGEMENT

PART 1 - GENERAL

1.01 REQUESTS FOR CHANGE PROPOSAL

A. Construction Manager will initiate Modifications by issuing a Request for Change Proposal (RCP).

1. Construction Manager and Design Professional will prepare a description of proposed Modifications.

2. Construction Manager will issue the Request for Change Proposal form to Contractor. A number will be assigned to the Request for a Change Proposal when issued.

3. Return a Change Proposal in accordance with Paragraph 1.02 for evaluation by the OPT.

1.02 CHANGE PROPOSALS

A. Submit a Change Proposal (CP) to the Construction Manager for Contractor initiated changes in the Contract Documents or in response to a Request for Change Proposal. Submit the Change Proposal and attach the forms provided by the Construction Manager.

1. Use the Change Proposal form provided by the Construction Manager.

2. Include with the Change Proposal:

a. A complete description of the proposed Modification if Contractor initiated or proposed changes to the OPT's description of the proposed Modification.

b. The reason the Modification is requested, if not in response to a Request for a Change Proposal.

c. A detailed breakdown of the cost of the change if the Modification requires a change in Contract Price. The itemized breakdown is to include:

1) List of materials and equipment to be installed;

2) Man hours for labor by classification;

3) Equipment used in construction;

4) Consumable supplies, fuels, and materials;

5) Royalties and patent fees;

6) Bonds and insurance;

7) Overhead and profit;

8) Field office costs;

9) Home office cost; and

10) Other items of cost.

d. Provide the level of detail outlined in the paragraph above for each Subcontractor or Supplier actually performing the Work if Work is to be provided by a

Subcontractor or Supplier. Indicate appropriate Contractor mark ups for Work provided through Subcontractors and Suppliers. Provide the level of detail outlined in the paragraph above for self-performed Work.

e. Submit Change Proposals that comply with the General Conditions for Cost of Work.

f. Provide a revised schedule. Show the effect of the change on the Project Schedule and the Contract Times.

B. Submit a Change Proposal to the Construction Manager to request a Field Order.

C. A Change Proposal is required for all substitutions or deviations from the Contract Documents.

D. Request changes to products in accordance with Section 01 33 02 “Shop Drawings.”

1.03 CONSTRUCTION MANAGER WILL EVALUATE THE REQUEST FOR A MODIFICATION

A. Construction Manager will issue a Modification per the General Conditions if the Change Proposal is acceptable to the Owner. Construction Manager will issue a Change Order or Contract Amendment for any changes in Contract Price or Contract Times.

1. Change Orders and Contract Amendments will be sent to the Contractor for execution with a copy to the Owner recommending approval. A Work Change Directive may be issued if Work needs to progress before the Change Order or Contract Amendment can be authorized by the Owner.

2. Work Change Directives, Change Orders, and Contract Amendments can only be approved by the Owner.

a. Work performed on the Change Proposal prior to receiving a Work Change Directive or approval of the Change Order or Contract Amendment is performed at the Contractor’s risk.

b. No payment will be made for Work on Change Orders or Contract Amendments until approved by the Owner.

B. Contractor may be informed that the Change Proposal is not approved and construction is to proceed in accordance with the Contract Documents.

1.04 EQUAL NON-SPECIFIED PRODUCTS

A. The products of the listed manufacturers are to be furnished where the Specifications list several manufacturers and do not specifically list “or equal” or “or approved equal” products. Use of any products other than those specifically listed is a substitution. Follow the procedures in Paragraph 1.05 for a substitution.

B. Contractor may submit other manufacturers’ products that are in full compliance with the Specifications where Specifications list one or more manufacturers followed by the phrase “or equal” or “or approved equal.”

1. Submit a Shop Drawing as required by Section 01 33 02 “Shop Drawings” to document that the proposed product is equal or superior to the specified product.

2. Prove that the product is equal. It is not the OPT's responsibility to prove the product is not equal.

    a. Indicate on a point-by-point basis for each specified feature that the product is equal to the Contract Document requirements.

    b. Make a direct comparison with the specified manufacturer's published data sheets and available information. Provide this printed material with the Shop Drawing.

    c. The decision of the Design Professional regarding the acceptability of the proposed product is final.

3. Provide a certification that, in furnishing the proposed product as an equal, the Contractor:

    a. Has thoroughly examined the proposed product and has determined that it is equal or superior in all respects to the product specified.

    b. Has determined that the product will perform in the same manner and result in the same process as the specified product.

    c. Will provide the same warranties and/or bonds as for the product specified.

    d. Will assume all responsibility to coordinate any modifications that may be necessary to incorporate the product into the construction and will waive all claims for additional Work which may be necessary to incorporate the product into the Project which may subsequently become apparent.

    e. Will maintain the same time schedule as for the specified product.

C. A Change Proposal is not required for any product that is in full compliance with the Contract Documents. If the product is not in full compliance, it may be offered as a Substitution.

1.05 SUBSTITUTIONS

A. Substitutions are defined as any product that the Contractor proposes to provide for the Project in lieu of the specified product. Submit a Change Proposal per Paragraph 1.02 along with documents required for a Shop Drawing as required by Section 01 33 02 "Shop Drawings" to request approval of a substitution.

B. Prove that the product is acceptable as a substitute. It is not the Design Professional's responsibility to prove the product is not acceptable as a substitute.

1. Indicate on a point-by-point basis for each specified feature that the product is acceptable to meet the intent of the Contract Documents requirements.

2. Make a direct comparison with the specified Suppliers published data sheets and available information. Provide this printed material with the Shop Drawing.

3. The decision of the Design Professional regarding the acceptability of the proposed substitute product is final.

C. Provide a certification that, in making the substitution request, the Contractor:

1. Has determined that the substituted product will perform in substantially the same manner and result in the same ability to meet the specified performance as the specified product;
2. Will provide the same warranties and/or bonds for the substituted product as specified or as would be provided by the manufacturer of the specified product;
3. Will assume all responsibility to coordinate any modifications that may be necessary to incorporate the substituted product into the Project and will waive all claims for additional Work which may be necessary to incorporate the substituted product into the Project which may subsequently become apparent; and
4. Will maintain the same time schedule as for the specified product.

D. Pay for review of substitutions in accordance with Section 01 33 02 “Shop Drawings.”

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01 29 00 APPLICATION FOR PAYMENT PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

A. Submit Applications for Payment for completed Work and for materials and equipment in accordance with the General Conditions, the Supplementary Conditions, the Agreement, and this Section. The Contract Price is to include costs for:

1. Providing the Work in accordance with the Contract Documents;
2. Installing Owner furnished equipment and materials, if any;
3. Providing Work for alternates and allowances, if any;
4. Providing Work for extra work items, if any and if authorized
5. Commissioning, startup, training, and initial maintenance and operation;
6. Acceptance testing at the manufacturer's facilities or at the Site;
7. All home office overhead costs and expenses, including profit made directly or indirectly from the Project;
8. Project management, contract administration, and field office and field operations staff including supervision, clerical support, and technology system support;
9. Professional services including design fees, legal fees, and other professional services;
10. Bonds and insurance;
11. Permits, licenses, patent fees, and royalties;
12. Taxes;
13. Providing all documentation and Samples required by the Contract Documents;
14. Facilities and equipment at the Site including:
    a. Field offices, office furnishings, and all related office supplies, software, and equipment,
    b. Storage facilities for Contractor's use and storage facilities for stored materials and equipment including spare parts storage,
    c. Shops, physical plant, construction equipment, small tools, vehicles, and technology and telecommunications equipment,
    d. Safety equipment and facilities to provide safe access and working conditions for workers and for others working at the Site,
    e. Temporary facilities for power and communications,
    f. Potable water and sanitation facilities, and
    g. Mobilization and demobilization for all these facilities and equipment.
15. Products, materials, and equipment stored at the Site or other suitable location in accordance with Section 01 31 00 "Project Management and Coordination";

16. Products, materials, and equipment permanently incorporated into the Project;
17. Temporary facilities for managing water including facilities for pumping, storage, and treatment as required for construction and protection of the environment;
18. Temporary facilities for managing environmental conditions and Constituents of Concern;
19. Temporary facilities such as sheeting, shoring, bracing, formwork, embankments, storage facilities, working areas, and other facilities required for construction of the Project;
20. Temporary and permanent facilities for protection of all overhead, surface, or underground structures or features;
21. Temporary and permanent facilities for removal, relocation, or replacement of any overhead, surface, or underground structures or features;
22. Products, materials, and equipment consumed during the construction of the Project;
23. Contractor labor and supervision to complete the Project including that provided through Subcontractors or Suppliers;
24. Correcting Defective Work during the Contract Times, during the Correction Period, or as required to meet any warranty provision of the Contract Documents;
25. Risk associated with weather and environmental conditions, startup, and initial operation of facilities including equipment, processes, and systems;
26. Contractor safety programs, including management, administration, and training;
27. Maintenance of facilities including equipment, processes, and systems until operation is transferred to Owner;
28. Warranties, extended or special warranties, or extended service agreements;
29. Cleanup and disposal of any and all surplus materials; and
30. Demobilization of all physical, temporary facilities not incorporated into the Project.

B. Include the cost not specifically set forth as an individual payment item but required to provide a complete and functional system in the Contract Price.

C. Provide written approval of the surety company providing performance and payment bonds for the Schedule of Values, Application for Payment form, and method of payment prior to submitting the first Application for Payment. Submit approval using the “Consent of Surety Company to Payment Procedures” form provided by the Construction Manager. Payment will not be made without this approval.

D. Construction Manager may withhold processing the Applications for Payment if any of the following processes or documentation is not up to date:

1. Progress Schedule per Section 01 33 05 “Construction Progress Schedule.”
2. Record Documents per Section 01 31 13 “Project Coordination.”

1.02 SCHEDULE OF VALUES

A. Divide the Contract Price into an adequate number of line items to allow more accurate determination of the earned value for each line item when evaluating progress payments. Submit a detailed Schedule of Values for the Project at least 10 days prior to submitting the first Application for Payment using forms provided by the Construction Manager.

B. Do not apply for payment until the Schedule of Values has been approved by the Construction Manager.

C. Divide the cost associated with each line item in the Schedule of Values into installation and materials components.

1. Installation cost is to include all cost associated with the line item except materials cost.

2. Materials cost is the direct cost (as verified by invoice values) for products, materials, and equipment to be permanently incorporated into the Project associated with the line item.

3. Installation cost is to include all direct costs and a proportionate amount of the indirect costs for the Work associated with each line item. Include costs not specifically set forth as an individual payment item but required to provide a complete and functional system.

4. The sum of materials and installation costs for all line items must equal the Contract Price.

D. Use each unit price line item in the Agreement as a line item in the Schedule of Values. The sum of materials and installation costs for each line item for unit price contracts must equal the value of the line item in the Agreement. In addition to the installation cost described in Paragraph 1.02.C.3, installation costs for unit price items are to include costs for waste and overages.

1. Installation and materials cost may be left as a single installation component if:

a. Contractor does not intend to request payment for stored materials for that line item; or

b. Work in the line item will be completed within a single payment period.

2. Provide adequate detail to allow a more accurate determination of the earned value for installation costs, expressed as a decimal fraction of Work completed, for each line item.

3. Installation cost line items may not exceed $50,000.00. Items that are not subdivided into smaller units may only be included in the Application for Payment when Work on the entire unit is complete.

4. Lump sum items may be divided into an estimated number of units to estimate earned value. The estimated number of units times the cost per unit must equal the lump sum amount for that line item.

5. Include Contractor’s overhead and profit in the installation costs each line item in proportion to the value of the line item to the Contract Price.

6. Include cost not specifically set forth as an individual payment item but required to provide a complete and functional system in the Contract Price for each item.

7. Line items may be used to establish the value of Work to be added or deleted from the Project.

E. Include a breakdown of both mobilization and demobilization costs in the Schedule of Values. The total cost for both mobilization and demobilization may not exceed five percent of the total Contract Price. Payment for mobilization and demobilization will be based on the earned value of Work completed. Payment for these costs will only be made for Work completed for the following:

1. Bonds and insurance;

2. Transportation and setup for equipment;

3. Transportation and/or erection of all field offices, sheds, and storage facilities;

4. Salaries for preparation of documents required before the first Application for Payment; and

5. Salaries for field personnel directly related to the mobilization of the Project.

1.03 SCHEDULE OF ANTICIPATED PAYMENTS

A. Submit a schedule of the anticipated Application for Payments showing the anticipated application numbers, submission dates, and the amount to be requested for each Application for Payment on the form provided by the Construction Manager.

B. Update the schedule of anticipated payments as necessary to provide a reasonably accurate indication of the funds required to make payments each month to the Contractor for Work performed.

1.04 ALTERNATES, ALLOWANCES, AND EXTRA WORK ITEMS

A. Include line items and amounts for specified alternate Work and allowances for Work in the Agreement, if any, and as described in Section 01 23 10 “Alternates and Allowances.”

B. Include line items and amounts for Extra Work items in the Agreement, if any, and as described in Section 01 29 01 “Measurement and Basis for Payment.”

1.05 RETAINAGE AND SET-OFFS

A. Retainage will be withheld from each Application for Payment per the Agreement.

B. Reduce payments for set-offs per the General Conditions as directed by the Construction Manager.

1.06 PROCEDURES FOR SUBMITTING AN APPLICATION FOR PAYMENT

A. Submit a draft Application for Payment to the Construction Manager each month at least 20 days before the date established in the Agreement for Owner to make progress payments. Do not submit Applications for Payment more often than monthly. Review the

draft Application for Payment with the Construction Manager to determine concurrence with:

1. Values requested for materials and equipment, stored or incorporated into the Project as documented by invoices;
2. The earned value for installation costs for each line item in the Application for Payment form expressed as a percent complete for that line item;
3. The quantity of Work completed for each unit price item;
4. Amount of retainage to be held; and
5. Set-offs included in the Application for Payment.

B. Submit Applications for Payment to the Construction Manager after agreement has been reached on the draft Application for Payment with the Construction Manager.

C. Provide all information requested in the Application for Payment form. Do not leave any blanks incomplete. If information is not applicable, enter "N/A" in the space provided.

1. Number each application sequentially and include the dates for the application period.
2. Complete the "Contract Time Summary" section on the Application for Payment form. If the Final Completion date shows the Project is more than 30 days behind schedule, revise the Schedule of Anticipated Payments to correspond to the updated schedule required per Section 01 33 05 "Construction Progress Schedule."
3. Complete the "Summary of Earned Value and Set-offs" section on the Application for Payment form. Show the total amounts for earned value of original Contract performed, earned value for Work on approved Contract Amendments and Change Orders, retainage and set-offs.
4. Sign and date the Contractor's Certification on the Application for Payment form that all Work, including materials, covered by this Application for Payment have been completed or delivered and stored in accordance with the Contract Documents, that all amounts have been paid for Work, materials, and equipment for which previous Payment has been made by the Owner, and that the current payment amount shown in this Application for Payment is now due.
5. Include "Attachment A - Tabulation of Earned Value of Original Contract Performed" to show the value of materials stored and successfully incorporated into the Project and the earned value for installation of the Work for each line item in the Application for Payment for Work. Attachment A includes Work on the original Contract Price and on approved Contract Amendments and Change Orders.
6. Include "Attachment B - Tabulation of Values for Materials and Equipment" to track invoices used to support amounts requested as materials in Attachment A. Enter materials to show the amount of the invoice assigned to each item in Attachment A if an invoice includes materials used on several line items.
7. Include "Attachment C - Summary of Set-offs" to document set-offs made per the Contract Documents. Show each set-off as it is applied. Show a corresponding line item to reduce the set-off amount if a payment held by a set-off is released for payment.

8. Include “Attachment D - Retainage Calculation” to show method for calculating retainage. The amount of retainage with respect to progress payments is stipulated in the Agreement. Any request for a reduction in retainage must be accompanied by a Consent of Surety to Reduction or Partial Release of Retainage.

9. Include “Attachment E - EVA Calculation” and the EVA Chart showing the anticipated and actual total earned value of fees, Work, and materials. Create a graphic representation (curve) of the anticipated progress on the Project each month. Compare the anticipated cumulative total earned value of fees, Work, and materials to the actual total earned value of fees, Work, and materials to determine performance on budget and schedule. Adjust the table and curve to incorporate Modifications.

D. Submit attachments in Portable Document Format (PDF).

1. Generate attachments to the Application for Payment using the Excel spreadsheet provided by the Construction Manager.

2. Submit PDF documents with adequate resolution to allow documents to be printed in a format equivalent to the document original. Documents are to be scalable to allow printing on standard 8-1/2 x 11 or 11 x 17 paper.

1.07 ADJUSTMENTS TO THE SCHEDULE OF VALUES IN THE APPLICATION FOR PAYMENT

A. Submit a Change Proposal to request any changes to the Schedule of Values incorporated into the Application for Payment once approved. A Field Order will be issued by the Construction Manager to modify the Application for Payment form if approved.

B. Payment for materials and equipment shown in the Application for Payment will be made for the total of associated invoice amounts, up to the value shown for materials in the Application for Payment for that line item.

1. If the total amount for invoices for materials and equipment for a line item are less than the amount shown for the materials component of that line item in the Application for Payment, and it can be demonstrated that no additional materials or equipment are required to complete Work described in that item, the difference between the total invoice for materials and equipment and the materials component for that line item can be added to the installation component of that Work item.

2. Costs for material and equipment in excess of the value shown in the Schedule of Values may not be paid for under other line items.

1.08 CONSTRUCTION MANAGER’S RESPONSIBILITY

A. Construction Manager will review each draft Application for Payment with Contractor to reach an agreement on the amount to be recommended to Owner for payment. Contractor is to revise the Application for Payment to incorporate changes, if any, resulting from this review process.

B. Construction Manager will review the Application for Payment to determine that the Application for Payment has been properly submitted and is in accordance with the agreed to draft Application for Payment.

C. Construction Manager will either recommend payment of the Application for Payment to Owner or notify the Contractor of the reasons for not recommending payment. Contractor

may make necessary corrections and resubmit the Application for Payment. Construction Manager will review resubmitted Application for Payment and reject or recommend payment of the Application for Payment to Owner as appropriate.

D. Construction Manager's recommendation of the Application for Payment constitutes a representation that based on its experience and the information available:

1. The Work has progressed to the point indicated;
2. The quality of the Work is generally in accordance with the Contract Documents; and
3. Requirements prerequisite to payment have been met.

E. This representation is subject to:

1. Further evaluation of the Work as a functioning whole;
2. The results of subsequent tests called for in the Contract Documents; or
3. Any other qualifications stated in the recommendation.

F. Construction Manager does not represent by recommending payment that:

1. Inspections made to check the quality or the quantity of the Work as it was performed were exhaustive or extended to every aspect of the Work in progress; or
2. Other matters or issues that might entitle Contractor to additional compensation or entitle Owner to withhold payment to Contractor exist.

G. Neither Construction Manager's review of Contractor's Work for the purposes of recommending payments nor Construction Manager's recommendation of payment imposes responsibility on the Construction Manager or Owner:

1. To supervise, direct, or control the Work;
2. For the means, methods, techniques, sequences, or procedures of construction, or safety precautions and programs;
3. For Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work;
4. To make examinations to ascertain how or for what purposes Contractor has used the monies paid on account of the Contract Price; or
5. To determine that title to the Work, materials, or equipment has passed to Owner free and clear of Liens.

1.09 FINAL APPLICATION FOR PAYMENT

A. Include adjustments to the Contract Price in the final Application for Payment for:

1. Approved Change Orders and Contract Amendments;
2. Allowances not previously adjusted by Change Order;
3. Deductions for Defective Work that have been accepted by the Owner;
4. Penalties and bonuses;
5. Deduction for all final set-offs; and

6. Other adjustments if needed.

B. Construction Manager will prepare a final Change Order reflecting the approved adjustments to the Contract Price which have not been covered by previously approved Change Orders and, if necessary, to reconcile estimated unit price quantities with actual quantities.

C. Submit the final Application for Payment per the General Conditions, including the final Change Order. Provide the following with the final Application for Payment:

1. Evidence of payment or release of Liens on the forms provided by the Construction Manager and as required by the General Conditions.

2. Consent from surety to final payment.

D. Final payment will also require additional procedures and documentation per Section 01 70 00 “Execution and Closeout Requirements.”

1.10 PAYMENT BY OWNER

A. Owner is to pay the amount recommended for monthly payments within 30 days after receipt of the Construction Manager’s recommended Application for Payment.

B. Final payment may take longer than 30 days since Owner’s Board must approve final payment.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01 29 01 MEASUREMENT AND BASIS FOR PAYMENT

PART 1 - GENERAL

1.01 PAYMENT FOR MATERIALS AND EQUIPMENT

A. Payment will be made for materials and equipment materials properly stored and successfully incorporated into the Project less the specified retainage.

B. Provide a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of Liens. Provide documentation of payment for materials and equipment with the next Application for Payment. Remove items from the tabulation of materials and equipment if this documentation is not provided with the next Application for Payment.

C. Provide evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest.

D. The Work covered by progress payments becomes the property of the Owner at the time of payment. The Contractor's obligations with regard to proper care and maintenance, insurance, and other requirements are not changed by this transfer of ownership until final acceptance in accordance with the General Conditions.

E. Payment for materials and equipment does not constitute acceptance of the product.

1.02 MEASUREMENT AND BASIS FOR PAYMENTS ON LUMP SUM ITEMS

A. Measurement for progress payments is the invoice value for stored materials and the earned value for all other cost for constructing each item. Earned value is expressed as the value of the Work completed divided by the total value of installation cost. The total amount paid will be equal to the total lump sum amount for that item.

1.03 MEASUREMENT AND BASIS FOR PAYMENT FOR BASE ITEMS

A. Item A-01 - Mobilization:

1. Measuring for payment is on a lump sum basis. Payment for mobilization will be based on the earned value of Work completed.

B. Item A-02 - Demobilization:

1. Measuring for payment is on a lump sum basis. Payment for demobilization will be based on the earned value of Work completed

C. Item A-04 - Demolition and Removal of Existing Gates

1. Measuring for payment is on a lump sum basis. Payment for demolition and removal of existing gates will be based on the earned value of Work completed

D. Item A-04 - Installation of Sluice Gates and Actuators

1. Measuring for payment is on a lump sum basis. Payment for installation of sluice gates and actuators will be based on the earned value of Work completed.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01 31 00 PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.01 SUMMARY

A. Furnish resources required to complete the Project in accordance with the Contract Documents and within the Contract Times.

B. Construct Project in accordance with current safety practices.

C. Manage Site to allow access to Site and control construction operations.

D. Construct temporary facilities to provide and maintain control over environmental conditions at the Site. Remove temporary facilities when no longer needed.

E. Provide temporary controls for pollution, management of water, and management of excess earth as required in Section 01 57 00 “Temporary Controls.”

1.02 STANDARDS

A. Perform Work to comply with:

1. Requirements of the Contract Documents;

2. Laws and Regulations; and

3. Specified industry standards.

1.03 DOCUMENTATION

A. Provide documents in accordance with Section 01 33 00 “Document Management.”

B. Provide copies of Supplier’s printed storage instructions prior to furnishing materials or products and installation instructions prior to beginning the installation.

C. Incorporate field notes, sketches, recordings, and computations made by the Contractor in Record Drawings per Section 01 31 13 “Project Coordination.”

1.04 PERMITS

A. Obtain building permits for the Project, if required, from the local authorities having jurisdiction.

B. Obtain environmental permits required for construction at the Site.

C. Provide required permits for transporting heavy or oversized loads.

D. Provide other permits required to conduct any part of the Work.

E. Arrange for inspections and certification by agencies having jurisdiction over the Work and include the cost for these inspections and certifications in the Contract Price.

F. Make arrangements with private utility companies and pay fees associated with obtaining services or inspections.

G. Retain copies of permits and licenses at the Site and comply with all regulations and conditions of the permit or license.

1.05 SAFETY REQUIREMENTS

A. Manage safety to protect the safety and welfare of persons at the Site.

B. Provide safe access to move through the Site. Provide protective devices to warn and protect from hazards at the Site.

C. Provide safe access for those performing tests and inspections.

D. Maintain a supply of personal protective equipment for visitors to the Site.

E. Comply with latest provisions of the Occupational Health and Safety Administration (OSHA) and other Laws and Regulations.

F. Cooperate with accident investigations. Provide two copies of all reports, including insurance company reports, prepared concerning accidents, injuries, or deaths related to the Project to the Construction Manager as Record Data per Section 01 31 13 “Project Coordination.”

1.06 ACCESS TO THE SITE

A. Maintain access to the facilities at all times. Do not obstruct roads, pedestrian walks, or access to the various buildings, structures, stairways, or entrances. Provide safe access for normal operations during construction.

B. Provide adequate and safe access for inspections. Leave ladders, bridges, scaffolding, and protective equipment in place until inspections have been completed. Construct additional safe access if required for inspections.

C. Use roadways for construction traffic only with written approval of the appropriate representatives of each entity. Roadways may not be approved for construction traffic. Obtain written approval to use roads to deliver heavy or oversized loads to the Site. Furnish copies of the written approvals to the Construction Manager as Record Data per Section 01 31 13 “Project Coordination.”

1.07 CONTRACTOR’S USE OF THE SITE

A. Limit the use of Site for Work and storage to those areas designated on the Drawings or approved by the Construction Manager. Coordinate the use of the Site with the Construction Manager.

B. Provide security at the Site as necessary to protect against vandalism and loss by theft.

C. Park construction equipment in designated areas only and provide spill control measures as discussed in Section 01 57 00 “Temporary Controls.”

D. Park employees’ vehicles in designated areas only.

E. Obtain written permission of the property owner before entering privately-owned land outside of the Owner’s property, rights-of-way, or easements.

F. Cooperate with public and private agencies with facilities operating within the limits of the Project. Provide 48 hours’ notice to any applicable agency when Work is anticipated to proceed in the vicinity of any facility by using **Texas 811**

G. Conduct of Contractor's or Subcontractor's Employees:

1. Do not permit alcoholic beverages or illegal substances on the Site. Do not allow persons under the influence of alcoholic beverages or illegal substances to enter or remain on the Site at any time. Persons on Site under the influence of alcoholic beverages or illegal substances will be permanently prohibited from returning to the Site. Criminal or civil penalties may also apply.

2. Do not allow the use of offensive language or sexual harassment in any form. These actions will cause immediate and permanent removal of the offender from the premises. Criminal or civil penalties may apply.

3. Require workers to wear clothing that is inoffensive and meets safety requirements. Do not allow sleeveless shirts, shorts, or any exceedingly torn, ripped, or soiled clothing to be worn on the Site.

4. Do not allow the use, possession, concealment, transportation, promotion, or sale of the following prohibited items anywhere on the Site:

   a. Firearms (including air rifles and pistols and BB or pellet guns) and ammunition;

   b. Bows, crossbows, arrows, bolts, or any other projectile weapons;

   c. Explosives of any kind, including fireworks;

   d. Illegal knives;

   e. Other weapons prohibited by state Laws and Regulations; and

   f. Any other item that has been designed or intended to be used as a weapon.

   No exceptions will be made for the possession of a firearm by a person that has a valid state-issued license to carry a firearm. Remove any of the prohibited items listed above from the Site immediately and permanently. Any person found to be in possession of any prohibited item must also be removed from the Site and may be reported to local law enforcement.

1.08 PROTECTION OF EXISTING STRUCTURES AND UTILITIES

A. Examine the Site and review the available information concerning the Site. Locate utilities, underground facilities, and existing structures. Verify the elevations of the structures adjacent to excavations. Report any discrepancies from information in the Contract Documents to the Construction Manager before beginning construction.

B. Determine if existing structures, poles, piping, or other utilities at excavations will require relocation or replacement. Prepare a Plan of Action per Section 01 31 13 "Project Coordination." Coordinate Work with local utility company and others for the relocation or replacement.

C. Protect utilities, underground facilities and existing structures unless they are shown to be replaced or relocated on the Drawings. Restore damaged items to the satisfaction of the Owner and utility or property owner.

D. Carefully support and protect all structures and/or utilities so that there will be no failure or settlement where excavation or demolition endangers adjacent structures and utilities. Do not take existing utilities out of service unless required by the Contract Documents or

approved by the Construction Manager. Notify and cooperate with the utility owner if it is necessary to move services, poles, guy wires, pipelines, or other obstructions.

E. Protect existing trees and landscaping at the Site. Mark trees that may be removed during construction and review with the Construction Manager for approval before removing. Protect trees to remain from damage limiting activity, including stockpiling of materials within the drip line of the tree.

F. Protect buildings from damage when handling material or equipment. Protect finished surfaces, including floors, doors, and jambs. Remove doors and install temporary wood protective coverings over jambs, if needed.

1.09 DISRUPTION TO SERVICES/CONTINUED OPERATIONS

A. Owner's facilities are to continue in service as usual during the construction unless noted otherwise. Owner or utilities must be able to operate and maintain the facilities. Keep disruptions to existing utilities, piping, process piping, or electrical services to a minimum.

1. Do not restrict access to critical valves, operators, or electrical panels.

2. Do not store material or products inside structures unless authorized by the Construction Manager.

3. Limit operations to the minimum amount of space needed to complete the specified Work.

4. Maintain storm sewers and sanitary sewers in service at all times. Provide temporary service around the construction or otherwise construct the Work in a manner that flow is not restricted.

B. Provide a Plan of Action in accordance with Section 01 35 00 "Special Procedures" if facilities must be taken out of operation.

1.10 FIELD VERIFICATION

A. Perform complete field measurements prior to purchasing products or beginning construction for products required to fit existing conditions.

B. Verify property lines, control lines, grades, and levels indicated on the Drawings.

C. Verify pipe class, equipment capacities, existing electrical systems, and power sources for existing conditions.

D. Check Shop Drawings and indicate the actual dimensions available where products are to be installed.

E. Include field measurements in Record Documents as required in Section 01 31 13 "Project Coordination."

1.11 DELIVERY AND STORAGE

A. Deliver products and materials to the Site in time to prevent delays in construction.

B. Deliver packaged products to Site in original undamaged containers with identifying labels attached. Open cartons as necessary to check for damage and to verify invoices. Reseal cartons and store properly until used. Leave products in original packages or other

containers until installed. If original packages or containers are damaged, repackage in containers and include packing slips, labels and other information from the original packaging.

C. Deliver products that are too large to fit through openings to the Site in advance of the time enclosing walls and roofs are erected. Set in place, raised above floor on cribs or pallets.

D. Assume full responsibility for the protection and safekeeping of products stored at the Site.

E. Store products at locations acceptable to the Construction Manager and to allow Owner access to maintain and operate existing facilities.

F. Store products in accordance with the Supplier's storage instructions immediately upon delivery. Leave seals and labels intact. Arrange storage to allow access for maintenance of stored items and for inspection. Store unpacked and loose products on shelves, in bins, or in neat groups of like items.

G. Provide additional storage areas as needed for construction. Store products subject to damage by elements in substantial weather-tight enclosures or storage sheds. Provide and maintain storage sheds as required for the protection of products. Provide temperature, humidity control, and ventilation within the ranges stated in the Supplier's instructions. Remove storage facilities at the completion of the Project.

H. Protect the pipe interior. Keep all foreign materials such as dirt, debris, animals, or other objects out of the pipe during the Work.

I. Provide adequate exterior storage for products that may be stored out-of-doors.

1. Provide substantial platforms, blocking, or skids to support materials and products above ground which has been sloped to provide drainage. Protect products from soiling or staining.

2. Cover products subject to discoloration or deterioration from exposure to the elements, with impervious sheet materials. Provide ventilation to prevent condensation below covering.

3. Store loose, granular materials on clean, solid surfaces, or on rigid sheet materials, to prevent mixing with foreign matter.

4. Provide surface drainage to prevent erosion and ponding of water.

5. Prevent mixing of refuse or chemically injurious materials or liquids with stored materials.

6. Pipes and conduits stored outdoors are to have open ends sealed to prevent the entrance of dirt, moisture, and other injurious materials. Protect PVC pipe from ultraviolet light exposure.

7. Store products to prevent wind damage.

J. Protect and maintain mechanical and electrical equipment in storage.

1. Provide Supplier's service instructions on the exterior of the package.

2. Service equipment on a regular basis as recommended by the Supplier. Maintain a log of maintenance services. Submit the log as Record Data per Section 01 31 13 “Project Coordination” when Owner assumes responsibility for maintenance and operation.

3. Provide power to and energize space heaters for all equipment for which these devices are provided.

4. Provide temporary enclosures for all electrical equipment, including electrical systems on mechanical devices. Provide and maintain heat in the enclosures until equipment is energized.

K. Maintain storage facilities. Inspect stored products on a weekly basis and after periods of severe weather to verify that:

1. Storage facilities continue to meet specified requirements;

2. Supplier’s required environmental conditions are continually maintained; and

3. Products that can be damaged by exposure to the elements are not adversely affected.

L. Replace any stored item damaged by inadequate protection or environmental controls.

M. Payment may be withheld for any products not properly stored.

1.12 CLEANING DURING CONSTRUCTION

A. Provide positive methods to minimize raising dust from construction operations and provide positive means to prevent air-borne dust from disbursing into the atmosphere. Control dust and dirt from demolition, cutting, and patching operations.

B. Clean the Site as Work progresses and dispose of waste materials, keeping the Site free from accumulations of waste or rubbish. Provide containers at the Site for waste collection. Do not allow waste materials or debris to blow around or off of the Site. Control dust from waste materials. Transport waste materials with as few handlings as possible.

C. Comply with Laws and Regulations. Do not burn or bury waste materials. Remove waste materials, rubbish, and debris from the Site and legally dispose of these at public or private disposal facilities.

1.13 MAINTENANCE OF ROADS, DRIVEWAYS, AND ACCESS

A. Maintain roads and streets in a manner that is suitable for safe operations of public vehicle during all phases of construction unless the Owner approves a street closing. Do not close public roads overnight. Coordinate and arrange for emergency vehicle access when streets are to be closed.

B. Submit a Notification by Contractor for Owner’s approval of a street closing. The request must state:

1. The reason for closing the street and how long the street will remain closed.

2. Procedures to be taken to maintain the flow of traffic.

C. Obtain permits and permissions of the entity that owns the road prior to any Work and provide a copy of the permit or permission Record Data per Section 01 31 13 “Project Coordination.”

D. Construct temporary detours, including by-pass roads around construction, with adequately clear width to maintain the free flow of traffic at all times. Maintain barricades, signs, and safety features around the detour and excavations. Maintain barricades, signs, and safety features around the Work in accordance with all provisions of the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD).

E. Assume responsibility for any damage resulting from construction along roads or drives.

1.14 BLASTING

A. Blasting is not allowed for any purpose.

1.15 ARCHAEOLOGICAL REQUIREMENTS

A. Cease operations immediately and contact the Owner for instructions if historical or archaeological artifacts are found during construction.

B. Conduct all construction activities to avoid adverse impact of the sites where significant historical or archaeological artifacts are found or identified as an area where other artifacts could be found.

1. Obtain details for working in these areas from regulatory agencies.

2. Maintain confidentiality regarding the site(s) of artifacts.

3. Adhere to the requirements of applicable local, state, and federal Laws and Regulations.

4. Notify the Construction Manager and any local, state, or federal agency as required by applicable Laws and Regulations.

C. Do not disturb archaeological sites.

1. Obtain the services of a qualified archaeological specialist to instruct construction personnel on how to identify and protect archaeological finds on an emergency basis.

2. Coordinate activities to permit archaeological work to take place within the area.

a. Attempt to archaeologically clear areas needed for construction as soon as possible and provide a determination of priority for such areas.

D. Assume responsibility for any unauthorized destruction that might result to such sites by construction personnel, and pay all penalties assessed by state or federal agencies for non-compliance with these requirements.

E. Contract Times will be modified to compensate for delays caused by such archaeological finds. No additional compensation will be paid for delays.

1.16 ENDANGERED SPECIES RESOURCES

A. Do not perform any activity that is likely to destroy or adversely modify the habitat or jeopardize the continued existence of a threatened or endangered species as listed or proposed for listing under the Federal Endangered Species Act (ESA) or applicable state Laws and Regulations.

B. Cease Work immediately in the area of the encounter and notify the Construction Manager if a threatened or endangered species is encountered during construction. Construction Manager will implement actions in accordance with the ESA and applicable state statutes. Resume construction in the area of the encounter when authorized to do so by the Construction Manager.

1.17 OCCUPANCY

A. Owner has the right to occupy or operate any portion of the Project that is ready for use after notifying the Contractor of its intent to do so.

B. Testing of equipment and appurtenances including specified test periods, training, and startup does not constitute acceptance for operation.

C. Owner may accept the facility for continued use after startup and testing at the option of the Owner. If acceptance is delayed at the option of the Owner, shut down facilities per approved operation and maintenance procedures.

D. The execution of bonds is understood to indicate the consent of the surety to these provisions for occupancy of the structures and use of equipment.

E. Provide an endorsement from the insurance carrier permitting occupancy of the structures and use of equipment during the remaining period of construction.

F. Conduct operations to ensure the least inconvenience to the Owner and general public.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01 31 13 PROJECT COORDINATION

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Administer contract requirements to construct the Project. Provide documentation per the requirements of this Section. Provide information as requested by the OPT.

1.02 DOCUMENTATION

A. Provide documents in accordance with Section 01 33 00 “Document Management.”

1.03 COMMUNICATION DURING THE PROJECT

A. Construction Manager is to be the first point of contact for all parties on matters concerning this Project.

B. Construction Manager will coordinate correspondence concerning:

1. Contract administration;
2. Clarification and interpretation of the Contract Documents;
3. Contract modifications;
4. Observation of Work and testing; and
5. Claims.

C. Construction Manager will normally communicate only with the Contractor. Any required communication with Subcontractors or Suppliers will only be with the direct involvement of the Contractor.

D. Direct written communications to the Construction Manager at the address indicated at the pre-construction conference. Include the following with communications as a minimum:

1. Name of the Owner;
2. Project name;
3. Contract title;
4. Project number;
5. Date; and
6. A reference statement.

E. Submit communications on the forms referenced in this Section or in Section 01 33 00 “Document Management.”

1.04 PROJECT MEETINGS

A. Pre-Construction Conference:

1. Attend a pre-construction conference;
2. The location of the conference will be determined by the Construction Manager;

3. The time of the conference will be determined by the Construction Manager, but will be after the Notice of Award is issued and not later than 15 days after the Notice to Proceed is issued;
4. The OPT, Contractor's project manager and superintendent, representatives of utility companies, and representatives from major Subcontractors and Suppliers may attend the conference; and
5. Provide and be prepared to discuss:
    a. Preliminary construction schedule per Section 01 33 05 "Construction Progress Schedule";
    b. Preliminary Schedule of Documents per Section 01 33 00 "Document Management";
    c. Schedule of Values and anticipated schedule of payments per Section 01 29 00 "Application for Payment Procedures";
    d. List of Subcontractors and Suppliers;
    e. Contractor's organizational chart as it relates to this Project; and
    f. Letter indicating the agents of authority for the Contractor and the limit of that authority with respect to the execution of legal documents, contract modifications, and payment requests.

B. Progress Meetings:
1. Attend meetings with the Construction Manager, Design Professional, and Owner.
    a. Meet monthly or as requested by the Construction Manager to discuss the Project.
    b. Meet at the Site or other location as designated by the Construction Manager.
    c. Contractor's superintendent and other key personnel are to attend the meeting. Other individuals may be requested to attend to discuss specific matters.
    d. Notify the Construction Manager of any specific items to be discussed a minimum of 1 week prior to the meeting.
2. Provide information as requested by the Construction Manager, Design Professional or Owner concerning this Project. Prepare to discuss:
    a. Status of overall project schedule;
    b. Contractor's detailed schedule for the next month;
    c. Anticipated delivery dates for equipment;
    d. Coordination with the Owner;
    e. Status of documents;
    f. Information or clarification of the Contract Documents;
    g. Claims and proposed modifications to the Contract;
    h. Field observations, problems, or conflicts; and

i. Maintenance of quality standards.

3. Construction Manager will prepare a record of meeting proceedings. Review the record of the meeting and notify the Construction Manager of any discrepancies within 10 days of the date the record of the meeting is provided. The record will not be corrected after the 10 days have expired. Corrections will be reflected in the record of the following meeting.

C. Pre-Documentation and Pre-Installation Meetings:

1. Conduct pre documentation and pre installation meetings as required in the individual technical Specifications or as determined necessary by the Construction Manager (for example, instrumentation, roofing, concrete mix design, etc.).

2. Set the time and location of the meetings when ready to proceed with the associated Work. Submit a Notification by Contractor in accordance with Paragraph 1.07 for the meeting 2 weeks before the meeting. OPT must approve of the proposed time and location.

3. Attend the meeting and require the participation of appropriate Subcontractors and Suppliers in the meeting.

4. Construction Manager will prepare a record of meeting proceedings. Review the record of the meeting and notify the Construction Manager of any discrepancies within 10 days of the date the record of the meeting is provided. The record will not be corrected after the 10 days have expired. Corrections will be reflected in the record of the following meeting.

D. Weekly Coordination Meetings: Meet on a weekly basis with the Construction Manager or designated on-site representative of the OPT to discuss Work planned for the following week, review coordination issues, testing required, or other issues. Records of these meetings are not required.

1.05 REQUESTS FOR INFORMATION

A. Submit a Request for Information to the Construction Manager to obtain additional information or clarification of the Contract Documents.

1. Submit a separate Request for Information for each item on the form provided by the Construction Manager.

2. Attach adequate information to permit a response without further clarification. Construction Manager will return requests that do not have adequate information to the Contractor for additional information. Contractor is responsible for all delays resulting from multiple reviews due to inadequate information.

3. A response will be made when adequate information is provided. The response will be made on the Request for Information form provided by the Construction Manager.

B. Response to a Request for Information is given to provide additional information, interpretation, or clarification of the requirements of the Contract Documents, and does not modify the Contract Documents.

1. Submit a Change Proposal per Section 01 26 00 “Change Management” if a contract modification is suggested or required.

C. Use the Decision Register to document decisions made at meetings and actions to be taken in accordance with Paragraph 1.06.

D. Use the Action Item Register to document assignments for actions to be taken in accordance with Paragraph 1.06.

1.06 DECISION AND ACTION ITEM REGISTER

A. Construction Manager will maintain a Decision Register to document key decisions made during meetings, telephone conversations, or visits to the Site using the format provided by the Construction Manager:

1. Review the Decision Register prior to each regular meeting.

2. Report any discrepancies to the Construction Manager for correction or discussion at the next monthly meeting.

B. Construction Manager will maintain an Action Item Register in conjunction with the Decision Register to track assignments made during meetings, telephone conversations or visits to the Site using the format provided by the Construction Manager:

1. Review the Action Item Register prior to each regular meeting.

2. Report actions taken after the previous progress meeting on items in the register assigned to the Contractor or through the Contractor to a Subcontractor or Supplier to the Construction Manager. Report on status of progress 1 week prior to each progress meeting established in Paragraph 1.04 to allow Construction Manager to update the register prior to the Progress Meetings.

3. Be prepared to discuss the status at each meeting.

C. Decisions or action items in the register that require a change in the Contract Documents will have the preparation of a Modification as an action items if appropriate. The Contract Documents can only be changed by a Modification.

1.07 NOTIFICATION BY CONTRACTOR

A. Notify the Construction Manager of:

1. Need for testing;

2. Intent to work outside regular working hours;

3. Request to shut down facilities or utilities;

4. Proposed utility connections;

5. Required observation by Construction Manager, Engineer, or inspection agencies prior to covering Work; and

6. Training.

B. Provide notification a minimum of 2 weeks in advance to allow OPT time to respond appropriately to the notification.

C. Use the Notification by Contractor form provided by the Construction Manager.

1.08 REQUESTS FOR MODIFICATIONS

A. Submit requests for Modifications per Section 01 26 00 “Change Management.”

1.09 PLAN OF ACTION

A. Submit a written Plan of Action for approval for shutting down essential services. These include:
   1. Electrical power;
   2. Control power;
   3. Process piping;
   4. Process equipment;
   5. Communications equipment; and
   6. Other designated functions.

B. Describe the following in the Plan of Action:
   1. Scheduled dates for construction;
   2. Work to be performed;
   3. Utilities, piping, or services affected;
   4. Length of time the service or utility will be disturbed;
   5. Procedures to be used to carry out the Work;
   6. Plan of Action to handle emergencies;
   7. List of manpower, equipment, and ancillary supplies;
   8. Backups for key pieces of equipment and key personnel; and
   9. Contingency plan that will be used if the original schedule cannot be met.

C. Submit plan 2 weeks prior to beginning the Work.

1.10 RECORD DATA

A. Submit information required by the Contract Documents that is not related to a product as Record Data using the form provided by the Construction Manager.

1.11 RECORD DOCUMENTS

A. Maintain one complete set of printed Record Documents at the Site including:
   1. Drawings;
   2. Specifications;
   3. Addenda;
   4. Modifications;
   5. Product Data and approved Shop Drawings;

6. Construction photographs;
7. Test Reports;
8. Clarifications and other information provided in Request for Information responses; and
9. Reference standards.

B. Store printed Record Documents and Samples in the Contractor's field office.
1. Record Documents are to remain separate from documents used for construction.
2. Provide files and racks for the storage of Record Documents.
3. Provide a secure storage space for the storage of Samples.
4. Maintain Record Documents in clean, dry, legible conditions, and in good order.
5. Make Record Documents and Samples available at all times for inspection by the OPT.

C. Maintain an electronic record of Specifications and Addenda to identify products provided in PDF format.
1. Reference the Product Data number, Shop Drawing number, and O&M manual number for each product and item of equipment furnished or installed.
2. Reference Modifications by type and number for all changes.

D. Maintain an electronic record of Drawings in PDF format.
1. Reference the Product Data number, Shop Drawing number, and O&M manual number for each product and item of equipment furnished or installed.
2. Reference Modifications by type and number for all changes.
3. Record information as construction is being performed. Do not conceal any Work until the required information is recorded.
4. Mark drawings to record actual construction.
    a. Depths of various elements of the foundation in relation to finished first floor datum or the top of walls.
    b. Horizontal and vertical locations of underground utilities and appurtenances constructed, and existing utilities encountered during construction.
    c. Location of utilities and appurtenances concealed in the Work. Refer measurements to permanent structures on the surface. Include the following equipment:
        1) Piping;
        2) Ductwork;
        3) Equipment and control devices requiring periodic maintenance or repair;
        4) Valves, unions, traps, and tanks;
        5) Services entrance;
        6) Feeders; and

7) Outlets.

d. Changes of dimension and detail.

e. Changes by Modifications.

f. Information in Requests for Information or included in the Decision Register.

g. Details not on the original Drawings. Include field verified dimensions and clarifications, interpretations, and additional information issued in response to Requests for Information.

5. Mark Drawings with the following colors:

a. Highlight references to other documents, including Modifications in blue.

b. Highlight mark ups for new or revised Work (lines added) in yellow.

c. Highlight items deleted or not installed (lines to be removed) in red.

d. Highlight items constructed per the Contract Documents in green.

6. Submit Record Documents to Construction Manager for review and acceptance 30 days prior to Final Completion of the Project.

E. Applications for Payment will not be recommended for payment if Record Documents are found to be incomplete or not in order. Final payment will not be recommended without complete Record Documents.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01 33 00 DOCUMENT MANAGEMENT

PART 1 - GENERAL

1.01 SUMMARY

A. Submit documentation as required by the Contract Documents and as requested by the Construction Manager.

B. Use the Project Management Information System (PMIS) provided. Software for the PMIS is FNiManager which has the following system requirements:

1. Operating Systems: Windows 7 or later and OS X v10.8 or later.

2. Supported Internet Browsers: Internet Explorer 11.0 or later, Google Chrome 70.0 or later, Firefox 63.0 or later, Safari 11.0 or later, and Microsoft Edge 17.0 or later.

3. Screen Resolution: The recommended screen resolution is 1280 x 1024 or higher. The minimum screen resolution required to support all features is 1024 x 768.

1.02 QUALITY ASSURANCE

A. Submit legible, accurate, complete documents presented in a clear, easily understood manner. Documents not meeting these criteria will be returned without review as “Not Approved.”

1.03 CONTRACTOR’S RESPONSIBILITIES

A. Review documents prior to submission. Make certifications as required by the Contract Documents and as indicated on Construction Manager provided forms.

B. Provide a Schedule of Documents to list the documents that are to be submitted, the dates on which documents are to be sent to the Construction Manager for review. Use the form provided by the Construction Manager for this list.

C. Incorporate the dates for processing documents into the Progress Schedule required by Section 01 33 05 “Construction Progress Schedule.”

1. Provide documents in accordance with the schedule so construction of the Project is not delayed.

2. Allow a reasonable time for the review of documents when preparing the Progress Schedule. Assume a 14-day review cycle for each document unless a longer period of time is indicated in the Contract Documents or agreed to by Construction Manager and Contractor.

3. Schedule delivery of review documents to provide all information for interrelated Work at one time.

4. Allow adequate time for processing documents so construction of the Project is not delayed.

1.04 FORMS AND WORKFLOWS

A. Use the forms or workflow process provided by the Construction Manager for project documentation.

1.05 DOCUMENT PREPARATION AND DELIVERY PROCEDURES

A. Deliver documents in electronic format as directed by the Construction Manager.

1. Do not leave any blanks incomplete. If information is not applicable, enter NA in the space provided.

2. Deliver all documents in Portable Document Format (PDF).

a. Create PDF document using Bluebeam Revu software.

b. Create PDF documents from native format files unless files are only available from scanned documents.

c. Rotate pages so that the top of each document appears at the top of the monitor screen when opened in PDF viewing software.

d. Provide PDF document with adequate resolution to allow documents to be printed in a format equivalent to the document original. Documents are to be scalable to allow printing on standard 8-1/2 x 11 or 11 x 17 paper.

e. Submit color PDF documents where color is required to interpret the document.

f. Create or convert documents to allow text to be selected for comments or searched using text search features. Run scanned documents through Optical Character Recognition (OCR) software if necessary.

g. Flatten markups in documents to prevent markups made by Contractor from being moved or deleted. Flatten documents to allow markup recovery.

h. Use Bluebeam Revu software to reduce file size using default settings except the option for “Drop Metadata”. Uncheck the “Drop Metadata” box when reducing file size.

i. Add footers to each document with the name of the Project.

B. Software Requirements:

1. OPT and Contractor will each acquire the software and software licenses necessary to create and transmit Electronic Documents and to read and to use any Electronic Documents received from the other party (and if relevant from third parties), using the following software formats:

Document	Document Format
Email	.htm, .rtf, or .txt without formatting that impairs legibility of content on screen or in printed copies
Submittals	Bluebeam PDF
Applications for Payment	Bluebeam PDF and Microsoft® Excel
Progress Schedules	PDF and Schedule in Native Format

Document	Document Format
Layouts and drawings to be submitted to Owner for future use and modification.	Autodesk® AutoCAD .dwg format
Document submitted to OPT for future word processing use and modification.	Microsoft® Word
Spreadsheets and data submitted to OPT for future data processing use and modification.	Microsoft® Excel

2. Software will be the version currently published at the time Contract is signed, unless a specific software version in listed in the Supplementary Conditions. Prior to using any updated version of the software required in this Section for sending Electronic Documents to the other party, the originating party will first notify and receive concurrence from the other party for use of the updated version or convert to comply with this Paragraph 1.05.B.

1.06 DOCUMENTATION

A. Furnish documents as indicated in Section 01 33 01 “Document Register” or in the individual Specification Sections. Submit documents per the procedures described in the Contract Documents.

B. Submit documents per the Specification Sections shown in the following table:

Document Type	Specification Section
Application for Payment	01 29 00
Certified Test Report	01 33 02 for approval of product 01 40 00 to demonstrate compliance
Change Management	01 26 00
Equipment Installation Report	01 75 00
Notification by Contractor	01 31 13
Operation & Maintenance Manuals	01 33 04
Product Data	01 33 03
Progress Schedules	01 33 05
Record Data	01 31 13
Request for Information	01 31 13
Schedule of Values	01 29 00
Shop Drawing	01 33 02
Substitutions	01 26 00
Suppliers and Subcontractors	01 31 13 01 33 03

1.07 Electronic Documents Protocol

A. The parties shall follow the provisions in this Section, referred to as the Electronic Documents Protocol (“EDP”), for exchange of electronic transmittals.

B. Basic Requirements:

1. Except as otherwise stated elsewhere in the Contract Documents, the OPT and Contractor will send and accept Electronic Documents sent by Electronic Means using the protocols provided in this Section.

2. The contents of the information in any Electronic Document will be the responsibility of the transmitting party. Electronic Documents may be used in the same manner as the printed versions of the same documents that are exchanged using non-electronic format and methods, and are subject to the same governing requirements, limitations, and restrictions, set forth in the Contract Documents.

3. Provisions of this Contract regarding Electronic Documents must be incorporated into other agreements or subcontracts on the Project. Nothing in this paragraph reduces or eliminates requirements:

   a. to create, provide, or maintain an original printed record version of Drawings and Specifications, signed and sealed according to applicable Laws and Regulations;

   b. to comply with any applicable Law or Regulation governing the signing and sealing of design documents and related Modifications or the signing and electronic transmission of any other documents; or

   c. to comply with the notice requirements.

4. When sending Electronic Documents by Electronic Means the sending party makes no representations as to long-term compatibility, usability, or readability of the Electronic Documents resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or sending Electronic Documents.

C. System Infrastructure for Electronic Document Exchange:

1. Contractor will provide hardware, operating system(s) software, internet, e-mail, and large file transfer functions ("System Infrastructure") at its own cost. System Infrastructure must comply with these requirements.

2. The maximum size of an email attachment for exchange of Electronic Documents under this EDP is 100 MB. Attachments larger than that may be exchanged in parts or by using large file transfer functions or physical media.

3. Contractor assumes full and complete responsibility for its own costs, delays, deficiencies, and errors associated with converting, translating, updating, verifying, licensing, or otherwise enabling its System Infrastructure, including operating systems and software.

4. Contractor is responsible for its own system operations, security, back-up, archiving, audits, printing resources, and other Information Technology ("IT") for maintaining operations of its System Infrastructure during the Project, including coordination with individual(s) or entity responsible for managing its System Infrastructure and capable of addressing routine communications and other IT issues affecting the exchange of Electronic Documents.

5. Contractor will operate and maintain industry-standard, industry-accepted, ISO standard, commercial-grade security software and systems that are intended to

protect others from: software viruses and other malicious software like worms, trojans, adware; data breaches; loss of confidentiality; and other threats in the transmission to or storage of information from the other parties, including transmission of Electronic Documents by physical media such as CD/DVD/flash drive/hard drive. Contractor will not be liable to others for any breach of system security to the extent that Contractor maintains and operates required security software and systems.

6. In the case of disputes, conflicts, or modifications to the use of Electronic Documents required to address issues affecting System Infrastructure, Contractor and OPT will cooperatively resolve the issues; but, failing resolution, OPT is authorized to make and require reasonable and necessary changes meet its original intent. Contractor may submit a Change Proposal if the changes cause additional cost or time to Contractor that could not have reasonably been anticipated.

7. Contractor and OPT are both responsible for their own back-up and archive of documents sent and received during the term of the contract. Contractor and OPT remain solely responsible for its own post-Project back-up and archive of Project documents after the term of the Contract as each party deems necessary for its own purposes.

8. If a Contractor or OPT receives an obviously corrupted, damaged, or unreadable Electronic Document, the receiving party will advise the sending party of the incomplete transmission. The parties will attempt to complete a successful transmission of the Electronic Document or use an alternative delivery method to complete the communication.

9. OPT will operate a project information management system (Project Website) for use of OPT and Contractor during the Project for exchange and storage of Project-related communications and information. Except as otherwise provided in this Contract, use of the Project Website will be mandatory for exchange of Project documents, communications, submittals, and other Project-related information.

D. Software Requirements:

1. OPT and Contractor will each acquire the software and software licenses necessary to create and transmit Electronic Documents and to read and to use any Electronic Documents received from the other party (and if relevant from third parties), using the following software formats:

Document	Document Format
Email	.htm, .rtf, or .txt without formatting that impair legibility of content on screen or in printed copies
Submittals	Bluebeam PDF
Applications for Payment	Bluebeam PDF and Microsoft® Excel
Progress Schedules	PDF and Schedule in Schedule in Native Format
Layouts and drawings to be submitted to Owner for future use and modification	Autodesk® AutoCAD .dwg format

Document	Document Format
Document submitted to OPT for future word processing use and modification	Microsoft® Word
Spreadsheets and data submitted to OPT for future data processing use and modification	Microsoft® Excel

2. Software will be the version currently published at the time Contract is signed, unless a specific software version in listed in the Supplementary Conditions. Prior to using any updated version of the software required in this section for sending Electronic Documents to the other party, the originating party will first notify and receive concurrence from the other party for use of the updated version or convert to comply with this Section.

3. The parties agree not to intentionally edit, reverse engineer, decrypt, remove security or encryption features, or convert to another format for modification purposes any Electronic Document or information contained therein that was transmitted in a software data format, including Portable Document Format (PDF), intended by sender not to be modified, unless the receiving party obtains the permission of the sending party or is citing or quoting excerpts of the Electronic Document for Project purposes.

E. Requests by Contractor for Electronic Documents in Other Formats:

1. Release of any Electronic Documents developed during the design process (including Contract Documents, Technical Data, Drawings, and computer models) in formats other than those identified in this Section will be at the discretion of the OPT.

2. To the extent determined by OPT, release of Electronic Documents and other project information requested by Contractor ("Request") in formats other than those identified in this Section will be subject to the provisions of Owner's response to the Request, and to the following conditions:

a. The content included in the Electronic Documents covered by the Request was prepared by Design Professional as an internal working document or electronic computer model solely for Design Professional's purposes and not for any construction processes, and is being provided to Contractor on an "AS IS" basis without any warranties of any kind, including, any implied warranties of fitness for any purpose. As such, Contractor is advised and acknowledges that the content may not be suitable for Contractor's application, or may require substantial modification and independent verification by Contractor. The content may include limited resolution of models, not-to-scale schematic representations and symbols, use of notes to convey design concepts in lieu of accurate graphics, approximations, graphical simplifications, undocumented intermediate revisions, and other devices that may affect subsequent reuse.

b. Electronic Documents containing text, graphics, metadata, or other types of data that are provided by Design Professional to Contractor under the Request are only for convenience of Contractor. Any conclusion or information obtained or derived from such data will be at the Contractor's sole risk and Contractor waives any claims against the Design Professional or Owner arising from use of data in Electronic Documents covered by the Request.

c. **CONTRACTOR SHALL INDEMNIFY AND HOLD HARMLESS THE OWNER AND DESIGN PROFESSIONAL AND THEIR SUBCONSULTANTS FROM ALL CLAIMS, DAMAGES, LOSSES, AND EXPENSES, INCLUDING ATTORNEYS' FEES AND DEFENSE COSTS ARISING OUT OF OR RESULTING FROM THE CONTRACTOR'S USE, ADAPTATION, OR DISTRIBUTION OF ANY ELECTRONIC DOCUMENTS PROVIDED UNDER THE REQUEST.**

d. Contractor agrees not to sell, copy, transfer, forward, give away or otherwise distribute this information (in source or modified file format) to any third party without the direct written authorization of Design Professional, unless such distribution is specifically identified in the Request and is limited to the Contractor's subcontractors. Contractor warrants that subsequent use by the Contractor's subcontractors complies with all terms of the Contract Documents and the Owner's response to Request.

3. In the event that Owner elects to provide or directs Design Professional to provide to Contractor any Contractor-requested Electronic Document versions of project information that is not explicitly identified in the Contract Documents as being available to Contractor, Owner shall be reimbursed by Contractor on an hourly basis for any costs necessary to create or otherwise prepare the data in a manner deemed appropriate by Design Professional in accordance with the General Conditions.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01 33 01 DOCUMENT REGISTER

This document register is not a comprehensive list of the required documents.

Specification Section	Specification Description	Paragraph No.	Types of Documents Required		
			Product Information	Sample or Mockup	Operation Data
03 30 00	Cast in Place Concrete		Shop Drawing	None	None
05 50 00	Metal Fabrications		Shop Drawing	None	None
26 01 26	Testing of Electrical Systems		Shop Drawing	None	None
26 05 00	Common Work Results for Electrical		Shop Drawing	None	None
26 05 19	Low Voltage Electrical Power Conductors and Cables		Shop Drawing	None	None
26 05 23	Control-Voltage Electrical Power Cables		Shop Drawing	None	None
26 05 26	Grounding and Bonding for Electrical Systems		Shop Drawing	None	None
26 05 29	Hangers and Supports for Electrical Systems		Shop Drawing	None	None
26 05 33	Raceways and Boxes for Electrical Systems		Shop Drawing	None	None
26 05 53	Identification for Electrical Systems		Shop Drawing	None	None
26 05 73.13	Short-Circuit Studies		Shop Drawing	None	None
26 05 73.16	Coordination Studies		Shop Drawing	None	None
26 05 73.19	Arc-Flash Hazard Analysis		Shop Drawing	None	None
40 05 50	Fabricated Gates		Shop Drawing	None	O&M Manual
40 90 02	Supervisory Control and Data Aquisition		Shop Drawing	None	None

01 33 02 SHOP DRAWINGS

PART 1 - GENERAL

1.01 SUMMARY

A. Shop Drawings are required for those products that cannot adequately be described in the Contract Documents to allow fabrication, erection, or installation of the product without additional detailed information from the Supplier.

B. Submit Shop Drawings as required by the Contract Documents and as reasonably requested by the Construction Manager to:

1. Record the products incorporated into the Project;

2. Provide detailed information for the products proposed for the Project regarding their fabrication, installation, commissioning, and testing; and

3. Allow the Design Professional to advise the Owner if products proposed for the Project by the Contractor conform, in general, to the design concepts of the Contract Documents.

C. Contractor's responsibility for full compliance with the Contract Documents is not relieved by the review of Shop Drawings, Samples, or mockups.

D. Submit a Change Proposal per Section 01 26 00 "Change Management" to request modifications to the Contract Documents, including those for approval of "or equal" products when specifically allowed by the Contract Documents or as a substitution for specified products or procedures. Deviations from the Contract Documents can only be approved Change Order or Field Order.

1.02 QUALITY ASSURANCE

A. Submit legible, accurate, and complete documents presented in a clear, easily understood manner. Shop Drawings not meeting these criteria will not be approved.

B. Demonstrate that the proposed products are in full compliance with the design criteria and requirements of the Contract Documents, or will be if deviations requested per Paragraph 1.09 are approved.

C. Furnish and install products that fully comply with the information included in the Shop Drawings.

1.03 CONTRACTOR'S RESPONSIBILITIES

A. Furnish Shop Drawings for products as indicated in Section 01 33 01 "Document Register" or in the individual Specification Sections.

B. Include Shop Drawings in the Document Register required by Section 01 33 00 "Document Management" to indicate the Shop Drawings to be submitted, the dates on which Shop Drawings are to be sent to the Construction Manager for review, and proposed dates that the product will be incorporated into the Project.

C. Incorporate the dates for processing Shop Drawings into the Progress Schedule required by Section 01 33 05 “Construction Progress Schedule.”

1. Submit Shop Drawings in accordance with the schedule so construction of the Project is not delayed.
2. Submit Shop Drawings for interrelated Work at one time.
3. Allow adequate time for ordering, fabricating, delivering, and installing products so construction of the Project is not delayed.

D. Complete the following before submitting a Shop Drawing or Sample:

1. Prepare and review the Shop Drawing or Sample. Coordinate the Shop Drawing or Sample with other Shop Drawings and Samples, with the requirements of the Work, and the Contract Documents;
2. Determine and verify specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect to Shop Drawings and Samples;
3. Determine and verify the suitability of materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
4. Determine and verify information relative to Contractor’s responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

E. Determine and verify:

1. Field measurements, quantities, and dimensions are shown on the Shop Drawing and are accurate;
2. Location of existing structures, utilities, and equipment related to the Shop Drawing have been shown and conflicts between the products, existing structures, utilities, and equipment have been identified;
3. Conflicts that impact the installation of the products have been brought to the attention of the Construction Manager;
4. Shop Drawing is complete for its intended purpose; and
5. Conflicts between the Shop Drawing related to the various Subcontractors and Suppliers have been resolved.

F. Review Shop Drawings prior to submitting to the Construction Manager. Certify that all Shop Drawings have been reviewed by the Contractor and are in strict conformance with the Contract Documents as modified by Addenda, Change Order, Field Order, or Contract Amendment when submitting Shop Drawings except for deviations specifically brought to the Construction Manager’s attention on an attached Shop Drawing Deviation Request form in accordance with Paragraph 1.09.

G. Fabrication or installation of any products prior to the approval of Shop Drawings is done at the Contractor’s risk. Defective products may be rejected at the Owner’s option.

H. Payment will not be made for products for which Shop Drawings or Samples are required until these are approved by the Construction Manager and Design Professional.

1.04 DOCUMENTATION

A. Provide adequate information in Shop Drawings and with Samples so the Design Professional can:

1. Compare the proposed features of the product with the specified features and advise Owner that the product does, in general, conform to the Contract Documents.

2. Compare the performance features of the proposed product with those specified and advise the Owner that the product does, in general, conform to the performance criteria specified in the Contract Documents.

3. Review required certifications, guarantees, warranties, and service agreements for compliance with the Contract Documents.

B. Include a complete description of the material or equipment to be furnished, including:

1. Type, dimensions, size, arrangement, model number, and operational parameters of the components;

2. Weights, gauges, materials of construction, external connections, anchors, and supports required;

3. Performance characteristics, capacities, engineering data, motor curves, and other information necessary to allow a complete evaluation of mechanical components;

4. All applicable standards;

5. Fabrication and installation drawings, setting diagrams, manufacturing instructions, templates, patterns, and coordination drawings;

6. Wiring and piping diagrams and related controls;

7. Mix designs for concrete, asphalt, or other materials proportioned for the Project; and

8. Complete and accurate field measurements for products which must fit existing conditions. Indicate on the document that the measurements represent actual dimensions obtained at the Site.

C. Submit Shop Drawings that require coordination with other Shop Drawings for fabrication at the same time. Shop Drawings requiring coordination with other Shop Drawings will not be approved until a complete package is submitted, unless approved by the Construction Manager.

D. Submit information for all of the components and related equipment required for a complete and operational system in one Submittal.

1. Include electrical, mechanical, and other information required to indicate how the various components of the system function together as a system.

2. Provide certifications, warranties, and written guarantees and service contracts with the document package for review when these are required.

1.05 SPECIAL CERTIFICATIONS AND REPORTS

A. Provide all required special certifications, reports, and other documentation with the Shop Drawings as specified in the individual Specification Sections which may include:

1. Certified Test Reports (CTR): A report prepared by an approved testing agency giving results of tests performed on products to indicate their compliance with the Specifications. This report is to demonstrate that the product, when installed, will meet the requirements of the Contract Documents and is part of the Shop Drawing. Field tests may be performed by the Owner to determine that in place materials or products meet the same quality as indicated in the CTR submitted as part of the Shop Drawing.

2. Certification of Local Field Service (CLS): A certified letter stating that field service is available from a factory or supplier approved service organization located within a 300-mile radius of the Site. Include the names, addresses, and telephone numbers of approved service organizations with the certificate.

3. Certification of Adequacy of Design (CAD): A certified letter from the manufacturer of the equipment stating that the equipment has been designed to be structurally stable and to withstand all imposed loads without deformation, failure, or adverse effects to the performance and operational requirements of the unit. The letter must state that mechanical and electrical components have been adequately sized to be fully operational for the conditions specified or normally encountered by the product's intended use.

4. Certification of Applicator/Subcontractor (CSQ): A certified letter stating that the applicator or subcontractor proposed to perform a specified function is duly designated as factory authorized and trained for the application of the specified product.

1.06 WARRANTIES AND SERVICE AGREEMENTS

A. Provide warranties and service agreements per Section 01 78 36 "Warranties and Service Agreements."

1.07 SHOP DRAWING SUBMITTAL PROCEDURES

A. Submit Shop Drawings to the Construction Manager. Send all documents in digital format for processing.

1. Provide all information requested. Do not leave any blanks incomplete. If information is not applicable, enter NA in the space provided.

2. Submit all documents in Portable Document Format (PDF) as required by Section 01 33 00 "Document Management." Provide color PDF documents where color is required to interpret the Shop Drawing. Provide Samples and color charts per Paragraph 1.08.

3. Submit each specific product, class of material, or equipment system separately so these can be tracked and processed independently. Do not submit Shop Drawings for more than one independent system in the same Submittal.

4. Submit items specified in different Specification Sections separately unless they are part of an integrated system.
5. Define abbreviations and symbols used in Shop Drawings.
    a. Use terms and symbols in Shop Drawings consistent with the Contract Drawings.
    b. Provide a list of abbreviations and their meaning as used in the Shop Drawings.
    c. Provide a legend for symbols used on Shop Drawings.
6. Mark Shop Drawings to reference:
    a. Related Specification Sections;
    b. Drawing number and detail designation;
    c. Equipment designation or name;
    d. Schedule references;
    e. System into which the product is incorporated; and
    f. Location where the product is incorporated into the Project.

B. Use the following conventions to markup Shop Drawings for review:
1. Make comments and corrections in the color blue. Add explanatory comments to the markup.
2. Highlight items in black (redact) that are not being furnished when the Supplier's standard drawings or information sheets are provided so that only the products to be provided are in their original color.
3. Make comments in yellow where selections or decisions by the Design Professional are required, but such selections do not constitute a deviation from the Contract Documents. Add explanatory comments to the markup to indicate the action requested of the Design Professional.
4. Make comments in orange that are deviation requests. Include the deviation request number on the Shop Drawing that corresponds to the deviation request on the Shop Drawing Deviation Request form. Include explanatory comments in the Shop Drawing Deviation Request form.
5. Mark dimensions with the prefix "FD" to indicate field verified dimensions on the Shop Drawings.

C. Designate a document as requiring priority treatment to place the review of the Shop Drawing ahead of other Shop Drawings previously delivered. Shop Drawings are typically reviewed in the order received, unless Contractor requests that a different priority be assigned. Priority Shop Drawings will be reviewed before other Shop Drawings already received but not yet reviewed. Use of this priority designation for Shop Drawings may delay the review of Shop Drawings previously submitted. Contractor is responsible for delays resulting from the use of the priority designation status on Shop Drawings.

D. Complete the certification required by Paragraph 1.03.F.

1.08 SAMPLE AND MOCKUP SUBMITTAL PROCEDURES

A. Submit color charts and Samples for every product requiring color, texture, or finish selection.

1. Submit color charts and Samples only after Shop Drawings for the products have been approved.

2. Deliver all color charts and Samples at one time.

3. Provide Samples of adequate size to clearly illustrate the functional characteristics of the product, with integrally related parts and attachment devices.

4. Indicate the full range of color, texture, and patterns.

5. Deliver color charts and Samples to the field office and store for the duration of the Project.

6. Notify the Construction Manager that color charts and Samples have been delivered for approval using the Notification by Contractor form.

7. Submit color charts and Samples not less than 30 days prior to when these products are to be ordered or released for fabrication to comply with the Project schedule.

8. Remove Samples that have not been approved. Submit new Samples following the same process as for the initial Sample until Samples are approved.

9. Dispose of Samples when related Work has been completed and approved and disposal is approved by the Construction Manager. At Owner's option, Samples will become the property of the Owner.

B. Construct mockups for comparison with the Work being performed.

1. Construct mockups from the actual products to be used in construction per the detailed specifications.

2. Construct mockups of the size and in the area indicated in the Contract Documents.

3. Construct mockups complete with texture and finish to represent the finished product.

4. Notify the Construction Manager that mockups have been constructed and are ready for approval using the Notification by Contractor form. Allow 2 weeks for Construction Manager to approve of the mockup before beginning the Work represented by the mockup.

5. Remove mockups that have not been approved. Construct new mockups following the same process as for the initial mockup until mockup is approved.

6. Protect mockups until Work has been completed and accepted by the Construction Manager.

7. Dispose of mockups when related Work has been completed and disposal is approved by the Construction Manager.

1.09 REQUESTS FOR DEVIATION

A. Submit a Change Proposal per Section 01 26 00 "Change Management" to request modifications to the Contract Documents, including those for approval of "or equal"

products when specifically allowed by the Contract Documents or as a substitution for specified products or procedures.

B. Provide a Shop Drawing with the Change Proposal that clearly identifies deviations for any product or component of the product that does not fully comply with the Contract Documents using the Shop Drawing Deviation Request form provided by the Construction Manager. Mark deviations on the Shop Drawing per Paragraph 1.07.B.

C. Include a description of why the deviation is required and the impact on Contract Price or Contract Times. Include the amount of any cost savings to the Owner for deviations that result in a reduction in cost.

D. Identify each deviation request as a separate item. Include all requested deviations that must be approved as a group together and identify them as a single item.

E. Construction Manager will issue a Field Order or Change Order to approve acceptable deviations. Approval of a requested Shop Drawing deviation by the Design Professional on the Shop Drawings Deviation Request form indicates approval of the requested deviation only on its technical merits as generally conforming to the Contract Documents. Deviations from the Contract Documents can only be approved by a Modification issued by the Construction Manager.

1.10 CONSTRUCTION MANAGER AND DESIGN PROFESSIONAL RESPONSIBILITIES

A. Shop Drawings will be received by the Construction Manager. Construction Manager will log the documents and forward to the Design Professional for review per this Section for general conformance with the Contract Documents.

1. Design Professional's review and approval will be only to determine if the products described in the Shop Drawing or Sample will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

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

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

B. Comments will be made on items called to the attention of the Design Professional for review and comment. Any marks made by the Design Professional do not constitute a blanket review of the document or relieve the Contractor from responsibility for errors or deviations from the Contract requirements.

1. Design Professional will respond to Contractor's markups by either making markups directly in the Shop Drawing file using the color red or by attaching a Document Review Comments form with review comments keyed to the Drawings or Shop Drawing Deviation Request.

2. Shop Drawings that are reviewed will be returned with one or more of the following status designations:

    a. Approved: Shop Drawing is found to be acceptable as submitted.

    b. Approved as Noted: Shop Drawing is approved so long as corrections or notations made by Design Professional are incorporated into the Shop Drawing.

    c. Not Approved: Shop Drawing or products described are not acceptable.

    d. Cancelled: This action indicates that for some reason, the Shop Drawing is to be removed from consideration and all efforts regarding the processing of that document are to cease.

3. Shop Drawings will also be designated for one of the following actions:

    a. Documents Filed: Shop Drawing is acceptable without further action and has been filed as a record document.

    b. Shop Drawing Not Required: A Shop Drawing was not required by the Contract Documents. Resubmit the document per Section 01 33 03 “Product Data.”

    c. Cancelled: This action indicates that for some reason, the Shop Drawing is to be removed from consideration and all efforts regarding the processing of that document are to cease.

    d. Revise and Resubmit: Shop Drawing has deviations from the Contract Documents, significant errors, or is inadequate and must be revised and resubmitted for subsequent review.

    Actions “a” through “c” will close out the Shop Drawing review process and no further action is required as a Shop Drawing. Action “d” requires follow up action to close out the review process.

4. Drawings with a significant or substantial number of markings by the Contractor may be marked “Approved as Noted.” These drawings are to be revised to provide a clean record of the document. Proceed with ordering products as the documents are revised.

5. Dimensions or other data that do not appear to conform to the Contract Documents will be marked as “At Variance With” (AVW) the Contract Documents or other information provided. The Contractor is to make revisions as appropriate to comply with the Contract Documents.

C. Bring deviations to the Shop Drawings to the attention of the Design Professional for approval by using the Shop Drawing Deviation Request form. Use a single line for each requested deviation so the Status and Action for each deviation can be determined for that requested deviation. If approval or rejection of a requested deviation will impact other requested deviation, then all related deviations should be included in that requested deviation line so the status and action can be determined on the requested deviation as a whole.

D. Requested deviations will be reviewed as a possible Modification to the Contract Documents.

1. A requested deviation will be marked as “Not Approved” if the requested deviation is unacceptable. Contractor is to revise and resubmit the Shop Drawing with corrections for approval.
2. A Field Order will be issued by the Construction Manager for deviations approved by the Design Professional if the requested deviation is acceptable and if the requested deviation will not result in a change in Contract Price or Contract Times. Requested deviations from the Contract Documents may only be approved by Field Order.
3. A requested deviation will not be approved if the requested deviation is acceptable but the requested deviation will or should result in a change in Contract Price or Contract Times. Submit any requested deviation that requires a change in Contract Price or Contract Times as a Change Proposal for approval prior to resubmitting the Shop Drawing.

E. Contractor is to resubmit a complete Shop Drawing incorporating revisions until it is acceptable and marked “Approved” or “Approved as Noted” and is assigned an action per Paragraph 1.10.B.3 that indicates that the Shop Drawing process is closed.

F. Information that is submitted as a Shop Drawing that should be submitted as Product Data or other type of document, or is not required may be returned without review, or may be deleted. No further action is required and the Shop Drawing process for this document will be closed.

1.11 RESUBMISSION REQUIREMENTS

A. Make all corrections or changes required by the Design Professional in the document and resubmit to the Construction Manager until approved.

B. Resubmit a complete Shop Drawing for each resubmittal. The last approved Shop Drawing must not rely on previous submissions. The final Shop Drawing is to provide a complete record for the Owner’s records.

C. Revise initial drawings or data and resubmit as specified for the reviewed document.

1. Highlight or cloud in green those revisions which have been made in response to the previous reviews by the Design Professional. This will include changes previously highlighted or clouded in yellow to direct attention to Design Professional to items requiring selections, decisions by the Design Professional or highlighted or clouded in orange for a requested deviation from the Contract Documents, or comments in red made by the Construction Manager.
2. Highlight and cloud new items in yellow where selections or decisions by the Design Professional are required, but such selections do not constitute a deviation from the Contract Documents. Add explanatory comments to the markup to indicate the action to be taken by the Design Professional.
3. Highlight and cloud new items in orange that are deviation requests. Include the deviation request number on the Shop Drawing that corresponds to the deviation request on the Shop Drawing Deviation Request form. Numbering for these new items is to start with the next number following the last Shop Drawing deviation requested. Include explanatory comments in the Shop Drawing Deviation Request form.

D. Pay for excessive review of Shop Drawings.

1. Excessive review of Shop Drawings is defined as any review required after the original review has been made and the first resubmittal has been checked to see that corrections have been made.
2. Review of Shop Drawings or Samples will be an additional service requiring payment by the Contractor if the Contractor submits a substitution for a product for which a Shop Drawing or Sample has previously been approved, unless the need for such change is beyond the control of Contractor.
3. Cost for additional review time will be billed to the Owner by the Design Professional for the actual hours required for the review of Shop Drawings by Design Professional and in accordance with the rates listed in in the table in "Supplementary Conditions." below. These ranges and/or rate will be adjusted annually in February (Last updated February 2020).

Position	**Hourly Rate**
Professional 1	119
Professional 2	144
Professional 3	164
Professional 4	187
Professional 5	219
Professional 6	252
Construction Manager 1	103
Construction Manager 2	128
Construction Manager 3	138
Construction Manager 4	173

4. A set-off will be included in each Application for Payment to pay the cost for the additional review. The set-off will be based on invoices submitted to the Owner for these services.
5. Need for more than one resubmission or any other delay in obtaining Design Professional's approval of Shop Drawings will not entitle the Contractor to an adjustment in Contract Price or an extension of Contract Times.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01 33 03 PRODUCT DATA

PART 1 - GENERAL

1.01 SUMMARY

A. Submit Product Data as required by the Contract Documents and as reasonably requested by the Construction Manager. Provide Product Data for all products unless a Shop Drawing is required for the same item.

B. Submit Product Data to provide documents that allow the Owner to:

1. Record the products incorporated into the Project;

2. Record detailed information about products regarding their fabrication, installation, commissioning, and testing; and

3. Provide replacement or repair of products at some future date.

C. Contractor's responsibility for full compliance with the Contract Documents is not relieved by the receipt or cursory review of Product Data.

D. Submit a Change Proposal per Section 01 26 00 "Change Management" to request modifications to the Contract Documents, including those for approval of "or equal" products when specifically allowed by the Contract Documents or as a substitution for specified products or procedures. Deviations from the Contract Documents can only be made by an approved Change Order or Field Order.

1.02 QUALITY ASSURANCE

A. Submit legible, accurate, and complete documents presented in a clear, easily understood manner. Product Data not meeting these criteria will not be accepted and must be resubmitted.

1.03 CONTRACTOR'S RESPONSIBILITIES

A. Furnish Product Data for products as indicated in Section 01 33 01 "Document Register" or in the individual Specification Sections.

B. Include Product Data in the Document Register required by Section 01 33 00 "Document Management" to indicate the Product Data to be submitted, the dates on which documents are to be sent to the Construction Manager for review, and proposed dates that the product will be incorporated into the Project.

C. Complete the following before submitting Product Data:

1. Prepare Product Data and coordinate with Shop Drawings, Samples, Product Data for related products, and with the requirements of the Contract Documents;

2. Determine and verify specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information;

3. Determine and verify the suitability of materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

4. Determine and verify information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

D. Determine and verify:

1. Field measurements, quantities, and dimensions are shown on the Product Data and are accurate;

2. Location of existing structures, utilities, and equipment related to the Product Data have been shown and conflicts between the products, existing structures, utilities, and equipment have been brought to the attention of the Construction Manager;

3. Conflicts that impact the installation of the products have been brought to the attention of the Construction Manager;

4. Product Data is complete for its intended purpose; and

5. Conflicts between the Product Data related to the various Subcontractors and Suppliers have been resolved.

E. Review Product Data prior to submitting to the Construction Manager. Certify that all Product Data has been reviewed by the Contractor and is in strict conformance with the Contract Documents as modified by Addenda, Change Order, Field Order, or Contract Amendment when submitting Product Data.

1.04 DOCUMENTATION

A. Include a complete description of the material or equipment to be furnished, including:

1. Type, dimensions, size, arrangement, model number, and operational parameters of the components;

2. Weights, gauges, materials of construction, external connections, anchors, and supports required;

3. Performance characteristics, capacities, engineering data, motor curves, and other information necessary to allow a complete evaluation of mechanical components;

4. All applicable standards;

5. Fabrication and installation drawings, setting diagrams, manufacturing instructions, templates, patterns, and coordination drawings;

6. Wiring and piping diagrams and related controls;

7. Mix designs for concrete, asphalt, or other materials proportioned for the Project; and

8. Complete and accurate field measurements for products which must fit existing conditions. Indicate on the document that the measurements represent actual dimensions obtained at the Site.

B. Submit information for all components and related equipment required for a complete and operational system in one submittal.

1. Include electrical, mechanical, and other information required to indicate how the various components of the system function together as a system.

2. Provide certifications, warranties, and written guarantees and service contracts with the document package for review when these are required.

1.05 SPECIAL CERTIFICATIONS AND REPORTS

A. Provide all required certifications with the Product Data as specified in the individual Specification Sections:

1. Certified Test Reports (CTR): A report prepared by an approved testing agency giving results of tests performed on products to indicate their compliance with the Specifications. This report is to demonstrate that the product when installed will meet the requirements of the Contract Documents and is part of the Product Data. Field tests may be performed by the Owner to determine that in place materials or products meet the same quality as indicated in the CTR submitted as part of the Product Data.

2. Certification of Local Field Service (CLS): A certified letter stating that field service is available from a factory or supplier approved service organization located within a 300-mile radius of the Site. Include the names, addresses, and telephone numbers of approved service organizations with the certificate.

3. Certification of Adequacy of Design (CAD): A certified letter from the manufacturer of the equipment stating that the equipment has been designed to be structurally stable and to withstand all imposed loads without deformation, failure, or adverse effects to the performance and operational requirements of the unit. The letter must state that mechanical and electrical components have been adequately sized to be fully operational for the conditions specified or normally encountered by the product's intended use.

4. Certification of Applicator/Subcontractor (CSQ): A certified letter stating that the applicator or subcontractor proposed to perform a specified function is duly designated as factory authorized and trained for the application of the specified product.

1.06 WARRANTIES AND SERVICE AGREEMENTS

A. Provide warranties and service agreements per Section 01 78 36 "Warranties and Service Agreements."

1.07 PRODUCT DATA SUBMITTAL PROCEDURES

A. Submit Product Data to the Construction Manager. Send all documents in digital format for processing.

1. Provide all information requested. Do not leave any blanks incomplete. If information is not applicable, enter NA in the space provided.

2. Submit all documents in Portable Document Format (PDF) as required by Section 01 33 00 "Document Management." Provide color PDF documents where color is required to interpret the Product Data.

3. Submit each specific product, class of material, or equipment system separately so these can be tracked and processed independently. Do not submit Product Data for more than one system in the same Submittal.

4. Submit items specified in different Specification Sections separately unless they are part of an integrated system.
5. Define abbreviations and symbols used in Product Data.
    a. Use terms and symbols in Product Data consistent with the Contract Drawings.
    b. Provide a list of abbreviations and their meaning as used in the Product Data.
    c. Provide a legend for symbols used on Product Data.
6. Mark Product Data to reference:
    a. Related Specification Sections;
    b. Drawing number and detail designation;
    c. Equipment designation or name;
    d. Schedule references;
    e. System into which the product is incorporated; and
    f. Location where the product is incorporated into the Project.

B. Complete the certification required by Paragraph 1.03.E.

1.08 CONSTRUCTION MANAGER AND DESIGN PROFESSIONAL RESPONSIBILITIES

A. Product Data will be received by the Construction Manager, logged, and provided to Owner as the Project record.
1. Product Data may be reviewed to see that the information provided is adequate for the purpose intended. Product Data not meeting the requirements of Paragraph 1.02 may not be approved.
2. Product Data is not reviewed for compliance with the Contract Documents. Comments may be returned if deviations from the Contract Documents are noted during the cursory review performed to see that the information is adequate.
3. Contractor's responsibility for full compliance with the Contract Documents is not relieved by the review of Product Data. Contract modifications can only be approved by a Change Order or Field Order.

B. Construction Manager may take the following action in processing Product Data:
1. File Product Data as received if the cursory review indicates that the document meets the requirements of Paragraph 1.02. Document will be marked "Filed as Received" and "Documents Filed." No further action is required on that Product Data.
2. Not approve the Product Data for one of the following reasons:
    a. The documentation requirements of the Contract Documents indicate that the document submitted as Product Data should have been submitted as a Shop Drawing. The Product Data will be marked "Not Approved" and "Submit as Shop Drawing." No further action is required on this document as Product Data and the Product Data process will be closed. Resubmit the document as a Shop Drawing per Section 01 33 02 "Shop Drawings."

b. The cursory review indicates that the document does not meet the requirements of Paragraph 1.02. The Product Data will be marked “Not Approved” and “Revise and Resubmit.” Contractor is to resubmit the Product Data until it is acceptable and marked “Filed as Received.” When Product Data is filed, no further action is required and the Product Data process will be closed.

c. The Product Data is not required by the Contract Documents nor is applicable to the Project. The Product Data will be marked “Not Approved” and “Cancelled.” No further action is required and the Product Data process will be closed.

C. Contractor is to resubmit the Product Data until it is acceptable and marked “Filed as Received.”

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01 33 04 OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.01 SUMMARY

A. Prepare a complete and detailed operation and maintenance manual (manual) for each type and model of equipment or product furnished and installed under this Contract.

B. Prepare manuals in the form of an instruction manual for the Owner. The manuals are to be suitable for use in providing the operation and maintenance instructions required by Section 01 79 00 “Training of Operation and Maintenance Personnel.”

C. Provide complete and detailed information specifically for the products or systems provided for this Project. Include the information required to operate and maintain the product or system.

D. Manuals are to be provided in addition to any information packed with or attached to the product when delivered. Remove information packed with or attached to the product and include this information as an attachment to the manual.

E. Include cost for manuals provided by Suppliers and Subcontractors as described in this Section in the Cost of Work for that equipment item.

1.02 DOCUMENTATION

A. Submit manuals in accordance with Section 01 33 00 “Document Management.” Attach a copy of the Operation and Maintenance Manual Review Report form provided by the Construction Manager to each manual with pertinent information completed.

B. Provide one preliminary electronic copy of the manual to the Construction Manager for review within 15 days after review of any equipment submittal by the OPT.

C. Provide one electronic copy and three printed copies of the final manual after:

1. Preliminary manuals have been approved;

2. Field test records have been incorporated into the manual; and

3. Record Documents per Section 01 31 13 “Project Coordination” have been approved and have been incorporated in the final manual.

D. Provide copies of the manufacturer’s warranties, guarantees, or service agreements in accordance with Section 01 70 00 “Execution and Closeout Requirements.”

PART 2 - PRODUCTS

2.01 MATERIALS

A. Provide digital files for each manual as specified in Paragraph 2.02.

1. Use filenames that correspond to the equipment designation shown in the Contract Documents or other equipment designations provided by the OPT.

2. Submit a preliminary version of the electronic manual for review. Provide a final version of the manual incorporating OPT’s comments.

B. Provide printed copies of each manual as specified in Paragraph 2.03.

2.02 ELECTRONIC MANUAL FORMAT

A. Manual contents are to be submitted in electronic format to the Construction Manager.

B. Provide individual electronic files for each manual.

1. Maximum file size is 75 MB. If manual is greater than maximum allowable file size, provide individual files for each major section of manual.

2. Acceptable file types for written documents are Portable Document File (PDF) or provide manual text in Microsoft Word. Provide drawings in native format and PDF format. All files must be compatible with the latest software version available.

3. Filename must identify the equipment location, equipment manufacturer, and date equipment placed in service, e.g. JCC1-Pump Room-Manufacturer-200503.pdf.

4. Each electronic file must contain a table of contents at the beginning of the file which includes hypertext links or bookmarks to navigate the file contents per section/chapter.

5. Scanned images of written documents are not acceptable. Document must allow character selection. Text within a file must be transferable to other documents.

6. Drawing files must have the ability to turn on/off drawing layers within the file.

2.03 PRINTED MANUAL FORMAT

A. Printed copies of each manual are to be submitted as follows:

1. Print manuals on heavy, first quality 8-1/2 x 11 paper.

a. Reduce drawings and diagrams to 8-1/2 x 11 paper size.

b. When reduction is not practical, fold drawings and place each separately in a clear, super heavy weight, top loading polypropylene sheet protector designed for three-ring binder use. Provide a typed identification label on each sheet protector.

c. Punch paper for standard three-ring binders.

2. Place manuals in heavy duty presentation, d-ring binders with clear front, back, and spine covers.

3. Identify each manual by placing a printed cover sheet in the front cover of the binder and as the first page in the manual. The first page is to be placed in a clear polypropylene sheet protector. The information on first page and the cover page are to include:

a. Name of Owner;

b. Project name;

c. Volume number; and

d. Table of contents.

4. Insert the name of the Project and volume number into the spine covers.

5. Sheet lifters are to be provided.
6. Minimum size is 2-inch capacity. Maximum size is 3-inch capacity. Fill binders to only three-fourths of its indicated capacity to allow for addition of materials to each binder by the Owner.
7. Provide index tabs for each section of the manual. Indexes are to be constructed of heavy-duty paper with a reinforced binding edge. The designation on each index tab is to correspond to the number and letter assigned in the Table of Contents.
8. Manuals for several products or systems may be provided in the same binder. Correlate the data into related groups when multiple products or systems are included in the same binder.
    a. Sections for each product or system must be included in the same binder.
    b. Sections must be in numerical order from volume to volume.

PART 3 - EXECUTION

3.01 MANUAL ORGANIZATION AND CONTENTS

A. Provide a table of contents listing each section of the manual for each product or system.
    1. Assign a number and letter to each section in the manual.
        a. The number is to correspond to the Owner's equipment numbering system or other system designated in the Contract Documents.
        b. The letter assigned will represent the part of the manual, consistent with the manual contents as required by this Section.
    2. Identify each product or system using the nomenclature shown in the Contract Documents. Provide a cross reference to the Owner's numbering system and designations for equipment indicated in the Contract Documents if these are different.
B. Include only the information that pertains to the product described. Annotate each sheet to:
    1. Clearly identify the specific product or component installed;
    2. Clearly identify the data applicable to the installation; and
    3. Delete or strike through references to inapplicable information.
C. Supplement manual information with drawings as necessary to clearly illustrate relations of component parts of equipment and systems, and control and flow diagrams.
D. Manuals for several products or systems may be provided in the same binder.
E. Fill binders to only three-fourths of its indicated capacity to allow for addition of information by the Owner.

3.02 EQUIPMENT AND SYSTEMS MANUAL CONTENT

A. Provide the following information in the first tabbed section of each manual:
    1. A description of the unit and component parts and how it functions.

2. Operating instructions for pre-startup, startup, normal operations, regulation, control, shutdown, emergency conditions, and limiting operating conditions.

3. The sequence of operation by the controls manufacturer. Provide control diagrams by the manufacturer, modified to reflect the as-built, as-installed condition.

4. Include general assembly contract drawings, sections, and photographic views as necessary to completely depict and properly identify the equipment. Indicate the dimensions, weight, capacity, and design conditions for the equipment.

B. Include detailed information to allow for the proper installation, calibration, testing, preventative, and corrective maintenance procedures in the second section of the manual or of each section of the manual information if the manual covers a multi-component equipment system. This information should include the following:

1. Maintenance instructions including assembly, installation, alignment, clearances, tolerances, and interfacing equipment requirements, adjustment, and checking instructions. Include any special rigging required to place the equipment into place, and any special test equipment required to place the equipment in service.

2. A safety subsection which addresses all safety and tag-out procedures necessary to safely operate and maintain the equipment.

3. Lubrication schedule and lubrication procedures. Include a cross reference for recommended lubrication products.

4. Troubleshooting guide.

5. A table showing the schedule of routine maintenance requirements and seasonal work which is not performed at a set frequency. Preventative maintenance tasking must address:

   a. Daily/weekly inspections performed by operations personnel;

   b. Routine preventative maintenance scheduled weekly, monthly, quarterly, semi-annually, or annually through major overhauls by maintenance personnel; and

   c. Predictive maintenance work such as alignment, analysis of the equipment, vibration, flow, oil sampling, etc.

6. Description of sequence of operation by the control manufacturer.

7. Warnings for detrimental maintenance practices.

8. Detailed corrective maintenance procedures including:

   a. Detail equipment for complete disassembly and assembly;

   b. Cross-sectional drawings or exploded views with all parts numbered to correspond with the numbers in the parts list to permit identification of the various parts;

   c. A table of normal clearances, diameters, thickness of new parts, and limits permissible for wearing parts; and

   d. List torque settings for nuts, bolts, and fasteners when critical to the equipment's performance.

C. Include all necessary diagrammatic piping and wiring diagrams and miscellaneous contract drawings and equipment in the third section of the manual or of each section of the manual if the manual covers a multi-component equipment system.

D. Provide spare parts information in the fourth section of the manual including:

1. Part numbers for ordering new parts;
2. Assembly illustrations showing an exploded view of the complex parts of the product;
3. Predicted life of parts subject to wear;
4. List of the manufacturer's recommended spare parts, current prices with effective date, and number of parts recommended for storage;
5. Directory of a local source of supply for parts with company name, address, and telephone number;
6. Complete nomenclature and list of commercial replacement parts; and
7. Complete list of spare parts, spare equipment, tools, and materials that are turned over to the Owner.

E. Provide statistical information from the original equipment manufacturer as to performance such as pump curves, flow charts insulation resistance, calibration, or test data sheets in the fifth section of the manual, including all field testing records used to verify actual performance.

F. Provide equipment name plate data installed on equipment and valves and equipment data sheets as required and furnished by the Owner in the sixth section of the manual.

G. Provide a copy of warranties and the date the warranty expires for equipment in the seventh section of the manual.

3.03 ELECTRICAL AND ELECTRONICS SYSTEMS MANUAL

A. Provide all of the information listed in Paragraph 3.02 as appropriate and include the following information:

1. Control schematics and point to point wiring diagrams prepared for field installation;
2. Circuit directories of panel boards and terminal strips and as installed color coded wiring diagrams; and
3. Other information as may be required by the individual Specification Sections.

3.04 ARCHITECTURAL PRODUCTS MANUAL

A. Provide the following information:

1. Information required for ordering replacement products;
2. Instructions for care and maintenance;
3. List of the manufacturer's recommended lubricants;
4. The manufacturer's recommendations for types of cleaning agents and methods;

5. Cautions against cleaning agents and methods that are detrimental to the product; and

6. Recommended maintenance and cleaning schedule.

B. Final balancing reports for mechanical systems.

C. Other information as may be required by the individual Specification Sections.

3.05 LIST OF SERVICE ORGANIZATIONS

A. Provide a directory of authorized service organizations with company name, address, telephone number, email address, and the contact person for warranty repair.

END OF SECTION

01 33 05 CONSTRUCTION PROGRESS SCHEDULE

PART 1 - GENERAL

1.01 SUMMARY

A. Prepare and submit a Progress Schedule for the Work and update the schedule on a monthly basis for the duration of the Project.

B. Provide Progress Schedule in adequate detail to allow Owner to monitor progress and to relate submittal processing to sequential activities of the Work.

C. Incorporate Contract Milestones into the schedule and show activities leading to achievement of these milestones.

D. Assume complete responsibility for maintaining the progress of the Work per the Progress Schedule submitted.

1.02 DOCUMENTATION

A. Submit the schedules to the Construction Manager. Send all documents in digital format for processing.

B. Do not leave any blanks incomplete. If information is not applicable, enter NA in the space provided.

C. Provide schedules, schedule updates and revisions to the Construction Manager in electronic format in its originating software and in Portable Document Format (PDF) as required by Section 01 33 00 “Document Management.”

D. Submit a preliminary Progress Schedule at the pre-construction conference.

E. Submit a detailed Progress Schedule at least 10 days prior to the first payment request.

F. Submit Progress Schedule updates monthly within 10 days after submitting Applications for Payment to indicate the progress made on the Project to the closing date for the Application for Payment. Failure to submit Progress Schedules will cause delay in the review and approval of subsequent Applications for Payment.

1.03 PROGRESS SCHEDULE REQUIREMENTS

A. Progress Schedule is to be in adequate detail to:

1. Ensure adequate planning, scheduling, and reporting during the execution of the Work;

2. Ensure the coordination of the Work of the Contractor and the various Subcontractors and Suppliers;

3. Monitor the progress of the Work; and

4. Evaluate the impact of proposed changes to the Contract Times and Project Schedule.

B. Provide personnel with 5 years’ minimum experience in scheduling construction work comparable to this Project. Prepare the Progress Schedule using acceptable scheduling software.

C. Provide the Progress Schedule in the form of a computer-generated critical path schedule which includes Work to be performed on the Project. It is intended that the Progress Schedule accomplish the following:

1. Give early warning of delays in time for correction.
2. Provide detailed plans for the execution of the Work in the form of future activities and events in sequential relationships.
3. Establish relationships of significant planned Work activities and provide a logical sequence for planned Work activities.
4. Provide continuous current status information.
5. Allow analysis of the Contractor's program for the completion of the Project.
6. Permit schedules to be revised when the existing schedule is not achievable.
7. Log the progress of the Work as it actually occurs.

D. Provide a time-scaled horizontal bar chart which indicates graphically the Work scheduled at any time during the Project. The chart is to indicate:

1. Complete sequence of construction by activity;
2. Identification of the activity by structure, location, and type of Work;
3. Chronological order of the start of each item of Work;
4. The activity start and stop dates;
5. The activity duration; and production rates used to determine the duration;
6. Successor and predecessor relationships for each activity;
7. A clearly indicated single critical path; and
8. Projected percentage of completion, based on dollar value of the Work included in each activity as of the first day of each month.

E. Provide a Progress Schedule for Submittals:

1. Indicate the specific dates each document is to be delivered to the Construction Manager.
2. Allow a reasonable time to review each document, taking into consideration the size and complexity of the document, other documents being processed, and other factors that may affect review time.
3. Include time for making revisions to the Shop Drawings and resubmitting the Shop Drawing for at least a second review.
4. Assume a 14-day review cycle for each time a Shop Drawing is submitted for review unless a longer period is indicated in the Contract Documents or provided by the Construction Manager.
5. Contractor is responsible for delays associated with additional time required to review incomplete or erroneous documents and for time lost when documents are submitted for products that do not meet specification requirements.

1.04 PROGRESS SCHEDULE REVISIONS

A. Revise the Progress Schedule if it appears that the schedule no longer represents the actual progress of the Work.

1. Submit a Plan of Action for schedule recovery if the Progress Schedule or earned value analysis indicates that the Project is more than 30 days behind schedule. The report is to include:

a. Number of days behind schedule;

b. Narrative description of the steps to be taken to bring the Project back on schedule; and

c. Anticipated time required to bring the Project back on schedule.

2. Submit a revised Progress Schedule indicating the action that the Contractor proposes to take to bring the Project back on schedule.

B. Revise the Progress Schedule to indicate any adjustments in Contract Times approved by a Modification.

1. Include a revised Progress Schedule with Change Proposals if a change in Contract Times is requested.

2. Construction Manager will deem any Change Proposal that does not have a revised Progress Schedule and request for a change in Contract Times as having no impact on the ability of the Contractor to complete the Project within the Contract Times.

C. Updating the Progress Schedule to reflect actual progress is not considered a revision to the schedule.

D. Applications for Payment will not be recommended for payment without a revised Progress Schedule and if required, the report indicating the Contractor's plan for bringing the Project back on schedule.

1.05 FLOAT TIME

A. Define float time as the amount of time between the earliest start date and the latest start date of a chain of activities on the construction schedule.

B. Float time is not for the exclusive use or benefit of either the Contractor or Owner.

C. Where several subsystems each have a critical path, the subsystem with the longest time of completion is the critical path and float time is to be assigned to other subsystems.

D. Schedule completion date must be the same as the Contract completion date. Time between the end of construction and the Contract completion date is float time.

1.06 MODIFICATION OF CONTRACT TIMES

A. Contract Times cannot be changed by the submission of a Progress Schedule. Contract Times can only be modified by a Change Order or Contract Amendment.

B. Submit a Change Proposal for any proposed change in Contract Times, and include justification for the change in accordance with the provisions of the Contract Documents.

1.07 NEAR-TERM LOOK AHEAD SCHEDULES

A. Provide a near-term look ahead schedule (NTLA Schedule) every 30 days, typically at periodic coordination meetings, using the form provided by the Construction Manager which shows the days of planned activity for the following:

1. Submittals to be provided and day of anticipated return;
2. Equipment and material deliveries;
3. Arrival and departure of key construction equipment; and
4. Activities for the Contractor and each Subcontractor.

B. Coordinate NTLA Schedule with Project Schedule. Submit a report with each NTLA Schedule identifying deviations from the Project Schedule.

C. Submit a report of near-term work planned in the previous NTLA Schedule that was delayed or not executed by marking actual activity on the previous near term look ahead schedule. Provide explanation of why planned work was not executed and plan to execute in the future and regain time lost.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01 35 00 SPECIAL PROCEDURES

PART 1 - GENERAL

1.01 CONSTRUCTION SEQUENCE

A. Perform the Work as required to complete the entire Project while meeting the following two conditions:

1. At least one Chlorine Contact Basin needs to be in operation at all times.

2. There must be no interruption to the chlorine feed to the Chlorine Contact Basins.

B. Consider the governing factors outlined in this Section to prepare the schedule for the Work.

C. Perform the Work not specifically described in this Section as required to complete the entire Project within the Contract Times.

1.02 OWNER ASSISTANCE

A. The Owner will assist the Contractor in operating gates, valves, pumps, and treatment processes. The Owner will approve the Contractor moving to subsequent sequencing tasks.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01 40 00 QUALITY MANAGEMENT

PART 1 - GENERAL

1.01 OVERVIEW

A. Quality management refers to the overall process of delivering a completed Project to the Owner that complies with the requirements of the Contract Documents. Quality management applies to documentation, products, services and the Work.

B. The Contractor is responsible for the quality of documentation, products, services and the Work provided.

1. Contractor is to integrate quality control procedures into the execution of the Work that are adequate to produce a Project that meets the requirements of the Contract Documents while minimizing loss of time and increased cost. Contractor is solely responsible for time and cost impacts of correcting Defective Work.

2. Contractor is to provide all testing and inspection required to control the quality of the Work in progress to determine that completed Work will comply with the requirements of the Contract Documents.

3. Contractor is to provide verification or acceptance testing as required by the Contract Documents to demonstrate that the completed Work complies with the requirements of the Contract Documents, except for those test that the Owner's Project Team (OPT) has determined are to be conducted independent of the Contractor and identified as OPT testing in the Owner's Quality Management Plan.

1.02 STANDARDS

A. Provide testing laboratories that comply with the American Council of Independent Laboratories (ACIL) "Recommended Requirements for Independent Laboratory Qualifications."

B. Perform testing per recognized test procedures as listed in the various Sections of the Specifications, standards of the State Department of Transportation, ASTM International (American Society for Testing and Materials), or other testing associations. Perform tests in accordance with published procedures for testing issued by these organizations.

1.03 DOCUMENTATION

A. Provide documentation which includes:

1. Contractor's Quality Management Plan that establishes the methods of ensuring compliance with the Contract Documents. Submit this plan as Product Data per Section 01 31 13 "Project Coordination."

2. A statement of qualifications for any proposed testing laboratory that includes a list of the engineers and technical staff that will provide testing services on the Project, descriptions of the qualifications of these individuals, list of tests that can be

performed, equipment used with date of last certification, and a list of recent projects for which testing has been performed with references for those projects.

3. Certified Test Reports for products to be incorporated into the Project. Provide reports to indicate that the proposed products comply with the Contract Documents or indicate that the proposed products do not comply with the Contract Documents and why those products do not comply. Submit Certified Test Reports as part of a Shop Drawing submitted per Section 01 33 02 “Shop Drawings.”

4. Certified Test Reports for inspections and testing required in this Section and in other Sections of the Specifications. Provide reports to indicate that the Work complies with the Contract Documents or indicate that the Work does not comply with the Contract Documents and why the Work does not comply. Submit these test reports on forms provided by the Construction Manager per Section 01 33 00 “Document Management.”

5. Certified Test Reports of Defective Work and Certified Test Reports documenting that successful corrective action has produced Work that complies with the Contract Documents. Construction Manager will maintain a Defective Work register. Progress on correction of Defective Work will be discussed at progress meetings as described in Paragraph 1.05.E. The final Defective Work register will be incorporated into closeout documentation required per Section 01 70 00 “Execution and Closeout Requirements” as a record that all Defective Work has been corrected.

1.04 OWNER’S QUALITY MANAGEMENT ACTIVITIES

A. OPT may perform its own verification testing independent of the Contractor. Owner’s Quality Management Plan describes the OPT’s anticipated verification testing program for this Project. This plan outlines the anticipated testing in general terms and may not reflect the actual testing performed by the OPT. Actual testing will depend on the Contractor’s means, methods, and procedures of construction which will not be known until the Contractor submits the Contractor’s Quality Control Plan (CQCP) to the OPT. There is no guarantee that all testing in the preliminary OQMP included in the Bidding/Proposal Documents will be performed by the OPT. Contractor will arrange and pay for all production control testing deemed necessary by the Contractor to produce quality results.

B. Quality management activities of the OPT are for verifying the results of the Contractor’s Work complies with the requirements of the Contract Documents. Performance or non-performance of verification activities by the OPT:

1. Does not relieve the Contractor of its responsibility to provide Work and furnish products that comply with the requirements of the Contract Documents;

2. Does not relieve the Contractor of its responsibility to provide adequate quality control measures to produce quality documents, products, services or Work;

3. Does not relieve the Contractor of its responsibility for damage to or loss of Work or products before OPT’s acceptance; and

4. Does not affect the continuing rights of the Owner after OPT’s acceptance of the completed Work.

C. The Work is subject to OPT's observations or testing at any time. Products which have been tested or inspected and accepted by the OPT at a supply source or staging area may be inspected or tested again by the OPT before, during, or after incorporation into the Work and rejected if products do not comply with the Contract Documents. Verification testing performed by the OPT will be paid for by the Owner, except for testing related to Defective Work as discussed in Paragraph 3.03.

1.05 CONTRACTOR'S RESPONSIBILITIES

A. Review the OQMP and provide a Contractor's Quality Control Plan (CQCP) outlining testing to be provided by the Contractor per Paragraph 1.07.

B. Implement the CQCP to provide Work that complies with the requirements of the Contract Documents.

1. Provide quality documents meeting the requirements of the Contract Documents.

2. Provide services meeting the requirements of the Contract Documents.

3. Provide the services of a Construction Materials Inspection and Testing (CMIT) provider meeting the requirements of this Section to provide testing required by the Contract Documents to demonstrate that products proposed for the Project in Shop Drawings and Product Data fully comply with the Contract Documents.

4. Inspect and test products to be incorporated into the Project to identify defects before installing them. Do not install Defective products. Conspicuously mark Defective products and remove from the Site. If products are installed before the defect is recognized, remove the Defective products, mark them as Defective and remove them from the Site when the defect is recognized.

5. Integrate production quality control measures into construction activities to produce Work meeting the requirements of the Contract Documents. Inspect self-performed Work and the Work of Subcontractors and Suppliers to identify defects. Correct or replace Defective Work.

6. Provide facilities, equipment, and Samples required for inspections and tests.

a. Give the Construction Manager adequate notice before proceeding with Work that would interfere with inspections or testing.

b. Notify the Construction Manager and CMIT provider prior to the time that testing is required, providing adequate lead time to allow arrangements for inspections or testing to be performed.

c. Do not proceed with Work that would impact the ability to correct defects, or with Work that would require that it be removed to correct defects, until testing is complete, and test results indicate that the corrected Work is acceptable.

d. Provide safe access for all CMIT activities, including those to be conducted as part of the Owner's Quality Management Program.

e. Cooperate fully with the performance of sampling, inspection, and testing. Provide personnel to assist with sampling or to assist in making inspections and field tests.

f. Provide Samples and products in adequate quantities for testing at the Site or at the production source of the product for testing.

g. Provide facilities required to store and cure test Samples.

h. Provide calibrated scales and measuring devices for OPT's use in performing inspections and testing.

i. Provide adequate lighting to allow OPT observations.

j. Make Contract Documents available to testing agencies when requested.

C. Perform tests as indicated in Contract Documents. All verification testing is to be observed by the Construction Manager or its designated representative.

D. Submit test reports to the Construction Manager.

E. Provide an update on quality control activities performed the previous month and planned for the coming month at monthly progress meetings required by Section 01 31 13 "Project Coordination."

F. Determine testing or inspections required to implement the CQCP. Include costs for additional testing and inspections required to meet Contractor's quality control obligations in the Contract Price.

1.06 CONTRACTOR'S QUALITY CONTROL MANAGER

A. Provide a Quality Control Manager for the Project. The Quality Control Manager must have authority to reject Defective Work, redirect the efforts of the Contractor, Subcontractor and Suppliers to correct Defective Work and implement steps to prevent future Defective Work.

B. An individual other than the resident superintendent must serve as Quality Control Manager. The person named as Quality Control Manager, while working under the supervision of the Contractor's superintendent, must have time to direct project quality control efforts and take appropriate action as required. Quality control duties must take priority over any other assigned duties.

1.07 CONTRACTOR'S QUALITY CONTROL PLAN

A. Provide a CQCP that describes testing and inspections for Work performed at the Site and at remote locations. Include Work by Subcontractors and Suppliers. The CQCP is to include:

1. A description of the quality control organization, including an organization chart showing lines of authority to control the quality of Work;

2. Documentation describing name, qualifications (in resume format), duties, responsibilities, and level of authority of the Quality Control Manager.;

3. The name, qualifications (in resume format), duties, responsibilities, and authorities of other persons assigned a quality control function;

4. Procedures for scheduling, reviewing, certifying, and managing documentation including documentation provided by Subcontractors and Suppliers;

5. Control, verification, and acceptance testing procedures for each specific test. Include:
    a. Name of tests to be performed,
    b. Specification paragraph requiring test,
    c. Parameters of Work to be tested,
    d. Test frequency,
    e. Persons responsible for each test, and
    f. Applicable industry testing standards and laboratory facilities to be used for the test;
6. Incorporate the testing specified in the OQMP into the CQCP, specifically identifying the tests or inspections that will be provided by the OQMP;
7. Procedures for tracking and documenting quality management efforts per Paragraph 1.03.
8. Reporting procedures which incorporate the use of forms provided by the Construction Manager.
9. The name of the proposed testing laboratories along with documentation of qualifications per Paragraph 1.03.

B. Use the Contractor's Quality Control Plan Checklist provided by the Construction Manager to review the CQCP before submitting and include a copy of the completed checklist with the CQCP. Do not begin Work until the CQCP is accepted. Submit an interim plan covering only the portion of Work to be performed if the Contractor plans to begin Work prior to submitting the complete CQCP for the Project. Do not begin Work on other parts of the Project until the complete CQCP is accepted.

C. Meet with the OPT 7 days after CQCP is submitted and before start of construction to discuss the CQCP.

D. Notify the Construction Manager of any changes to the CQCP or quality control personnel.

1.08 CONTRACTOR'S USE OF OWNER'S TEST REPORTS

A. Contractor will receive copies of all test reports documenting Owner's verification tests. Contractor is entitled to rely on the accuracy of these tests results and use these as part of its quality control efforts.

B. Contractor may submit a Change Proposal if the Owner's testing program deviates significantly from the OQMP. Contractor must demonstrate that actual testing and inspection costs were incurred implementing the CQCP as a result of OPT's decision to not provide testing described in the OQMP.

1.09 LIMITATION OF AUTHORITY OF THE TESTING LABORATORY

A. The testing laboratory representatives are limited to providing testing services and interpreting the results of the test performed.

B. The testing laboratory is not authorized to:

1. Alter the requirements of the Contract Documents;

2. Accept or reject any portion of the Work;
3. Perform any of the duties of the Contractor; or
4. Direct or stop the Work.

1.10 TEST REPORTS

A. Certified Test Reports are to be prepared for all tests.
   1. Tests performed by testing laboratories may be submitted on their standard test report forms if acceptable to the OPT using the process directed by the Construction Manager. These reports must include the following:
      a. Name of the Owner, Project title and number, and name of the Contractor;
      b. Name, address, and telephone number of the laboratory;
      c. Name and signature of the laboratory personnel performing the test;
      d. Description of the product being sampled or tested;
      e. Date and time of sampling, inspection, and testing;
      f. Date the report was issued;
      g. Description of the test performed;
      h. Weather conditions and temperature at time of test or sampling;
      i. Location at the Site or structure where the test was taken;
      j. Standard or test procedure used in making the test;
      k. A description of the results of the test;
      l. Statement of compliance or non-compliance with the Contract Documents; and
      m. Interpretations of test results, if appropriate.
   2. Submit reports on tests performed by Contractor, Subcontractors, or Suppliers on the as directed by the Construction Manager.
   3. OPT will prepare test reports on tests performed by the OPT.

B. Submit test reports as directed by the Construction Manager within 24 hours of completing the test. Flag tests reports with results that do not comply with Contract Documents for immediate attention. Notify the Construction Manager using acceptable means other than the test report, immediately of any test that fails to comply with the Contract Documents.

1.11 DELIVERY, STORAGE, AND HANDLING

A. Handle and protect test specimens of products and construction materials at the Site in accordance with recognized test procedures. Provide facilities for storing, curing, and processing test specimens as required by test standards to maintain the integrity of Samples. Transport test specimens in a manner to prevent damage to specimens while in transit.

PART 2 - PRODUCTS

2.01 TESTING APPARATUS

A. Furnish testing apparatus and related accessories necessary to perform the tests.

2.02 SAMPLE PRODUCTS

A. Provide Samples of products in adequate quantity for testing.

PART 3 - EXECUTION

3.01 IMPLEMENTING CONTRACTOR'S QUALITY CONTROL PLAN

A. Perform quality control observations and testing as required in each Section of the Specifications and where indicated on the Drawings.

B. Include the following phases for each definable work task. A definable work task is one which is separate and distinct from other tasks, has separate control requirements, may be provided by different trades or disciplines, or may be work by the same trade in a different environment.

1. Planning Phase: Perform the following before beginning each definable work task:

a. Review the Contract Documents.

b. Review documents the Contractor will submit and determine that they are complete in accordance with the Contract Documents.

c. Check to ensure that all materials and/or equipment have been tested, submitted, and approved.

d. Examine the work area to ensure that all required preliminary Work has been completed and complies with the Contract Documents.

e. Examine required materials, equipment, and sample Work to ensure that they are on hand, conform to Contract Documents, Shop Drawings and Product Data, and are properly stored.

f. Review requirements for quality control inspection and testing.

g. Discuss procedures for controlling quality of the Work. Document construction tolerances and workmanship standards for the work task.

h. Check that the portion of the plan for the Work to be performed incorporates document review comments.

i. Discuss results of planning phase with the Construction Manager. Conduct a meeting attended by the Construction Manager, Quality Control Manager, superintendent, other quality control personnel as applicable, and the foreman responsible for the work task. Instruct applicable workers as to the acceptable level of workmanship required to meet the requirements of the Contract Documents. Document the results of the planning phase actions by separate meeting minutes prepared by the Quality Control Manager and attached to the quality control report.

j. Do not move to the next phase unless results of investigations required for the planning phase indicate that requirements have been met.

2. Work Phase: Complete this phase after the planning phase:

a. Notify the Construction Manager at least 1 week in advance of beginning the Work and discuss the review of the planning phase effort to indicate that requirements have been met.

b. Check the Work to ensure that it is in full compliance with the Contract Documents.

c. Verify adequacy of controls to ensure full compliance with Contract Documents. Verify required control inspection and testing is performed.

d. Verify that established levels of workmanship meet acceptable workmanship standards. Compare with required Sample panels as appropriate.

e. Repeat the work phase for each new crew to work on-site, or any time acceptable specified quality standards are not being met.

3. Follow-Up Phase: Perform daily checks to ensure control activities, including control testing, are providing continued compliance with contract requirements:

a. Make checks daily and record observations in the quality control documentation.

b. Conduct follow-up checks and correct all defects prior to the start of additional work tasks that may be affected by the Defective Work. Do not build upon nor conceal Defective Work.

c. Conduct a review of the Work at least 1 month prior to the expiration of the correction period prescribed in the General Conditions with the OPT. Correct defects as noted during the review.

C. Conduct additional planning and work phases if:

1. The quality of on-going Work is unacceptable;

2. Changes are made in applicable quality control staff, on-site production supervision, or crews;

3. Work on a task is resumed after a substantial period of inactivity; or

4. Other quality problems develop.

3.02 DEFECTIVE WORK

A. Immediately correct any Defective Work or notify the Construction Manager why the Work is not to be corrected immediately and when corrective action will be completed.

B. Work performed that is connected or adjacent to Defective Work or Work that would have to be removed to correct Defective Work is also considered to be Defective. Contractor is responsible for all costs associated with replacing any acceptable Work that must be removed, or might be damaged by corrective actions.

C. Document Defective Work, corrective actions taken to correct defects and that corrected Work complies with the Contract Documents.

D. Implement countermeasures to prevent future Defective Work.

E. No payment will be made for Defective Work. Remove Work from the Application for Payment if Work paid for on a previous Application for Payment is found to be Defective.

F. Owner will withhold payment for Defective Work or Work that has not been tested or inspected in accordance with the CQCP, OQCP, or the Contract Documents.

3.03 VERIFICATION TESTING FOR CORRECTED DEFECTS

A. Provide verification testing on corrected Work when corrective action is complete to demonstrate that the corrected Work complies with the Contract Documents. Conduct the same tests or inspections used to determine that the original Work was Defective. Different tests or methods may be used if approved by the OPT. Document that Defective Work has been corrected with the Construction Manager.

B. Pay for verification testing until Work meets quality requirement set forth in the Contract Documents. OPT may perform verification testing as part of its Quality Management Program and impose a Set-off to recover the cost for this testing.

3.04 OWNER'S PRELIMINARY QUALITY CONTROL PLAN

Spec. Section	Test / Frequency	OPT or Contractor
03 30 00	Compressive strength. One set of three cylinders for each concrete placement with one additional set of cylinders for each 50 yards in a single placement.	OPT
40 05 50	Pressure and leakage test	Contractor

END OF SECTION

01 50 00 TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 SUMMARY

A. Provide temporary facilities, Contractor's field offices, storage sheds, workshops, and other facilities needed to complete the Work.

B. Provide temporary utilities needed to support the operation of the facilities and construction activities.

C. Provide and maintain temporary project identification signs for Owner.

D. Provide temporary informational signs to identify key elements of construction and direct the flow of traffic.

E. Provide a weatherproof kiosk for display of permits and other notices required by Laws and Regulations.

1.02 QUALITY ASSURANCE

A. Inspect and test each utility before using facilities. Arrange for all required inspections and tests by regulatory agencies, and obtain required certifications and permits for use of facilities.

1.03 DELIVERY, STORAGE, AND HANDLING

A. Transport, unload, and set up all temporary buildings and utilities.

1.04 JOB CONDITIONS

A. Locate buildings and sheds at the Site as indicated or as approved by the OPT.

B. Prepare the Site by removing trees, brush, or debris and performing demolition or grubbing needed to clear a space adequate for the structures.

C. Provide Contractor's temporary facilities and utilities in time to avoid delays in the performance of the Work.

D. Provide and maintain temporary facilities and utilities.

E. Operate temporary facilities in a safe and efficient manner.

1. Restrict loads on utilities to operate within their designed or designated capacities.

2. Provide sanitary conditions. Prevent public nuisance or hazardous conditions from developing or existing at the Site.

3. Prevent freezing of pipes, flooding, or the contamination of water.

4. Maintain site security and protection of the facilities.

F. Remove temporary facilities and utilities when construction is complete and removal is approved by the Construction Manager.

PART 2 - PRODUCTS

2.01 SIGN MATERIALS

A. Provide wood or metal signs in sound condition, structurally adequate to withstand wind and weather.

B. Provide 3/4-inch exterior grade A/D face veneer plywood with medium density overlay for sign surface.

C. Provide galvanized or stainless steel bolts, brackets, fasteners, and other hardware.

D. Provide exterior quality coatings.

2.02 CONTRACTOR'S FIELD OFFICE

A. Furnish a field office of adequate size for Contractor's use.

B. Subcontractors may provide their own field offices only when space is available on the Site and the OPT agrees to its size, condition, and location.

2.03 TEMPORARY STORAGE BUILDINGS

A. Furnish storage buildings of adequate size to store any materials or equipment delivered to the Site that might be affected by weather.

2.04 TEMPORARY SANITARY FACILITIES

A. Provide sanitary facilities at the Site for the entire duration of the Project. Maintain these facilities in a clean and sanitary condition at all times, and comply with the requirements of the local health authority. On large sites, provide portable toilets at such locations so that no point at the Site will be more than 600 feet from a toilet.

B. Use these sanitary facilities. Do not use restrooms within existing or Owner-occupied buildings.

2.05 TEMPORARY HEAT

A. Provide heating devices needed to protect buildings during construction. Provide fuel needed to operate the heating devices and attend the heating devices at all times they are in operation, including overnight operations.

2.06 TEMPORARY UTILITIES

A. Provide the temporary utilities for administration, construction, testing, disinfection, and startup of the Work, including electrical power, water, and telephone. Pay all costs associated with furnishing temporary utilities.

1. Provide a source of temporary electrical power of adequate size for construction procedures.

a. Use existing power systems where spare capacity is available. Provide temporary power connections that do not adversely affect the existing power supply. Submit connections to the Construction Manager for approval prior to installation.

b. Provide electrical pole and service connections that comply with Laws and Regulations and the requirements of the power company.

2. Provide temporary water. Potable water may be purchased from Owner.

B. Provide power for construction and storage. Provide power to energize space heaters for stored electrical equipment.

2.07 WATER FOR CONSTRUCTION

A. Provide temporary water. Potable water may be purchased from the Owner by obtaining a water meter from the Owner and transporting water from a water hydrant. Non-potable water may be used for hydraulic testing of non-potable basins or pipelines. Include the cost of water in the Contract Price.

PART 3 - EXECUTION

3.01 LOCATION OF TEMPORARY FACILITIES

A. Locate temporary facilities in areas approved by the Construction Manager. Construct and install signs at locations approved by the Construction Manager. Install informational signs so they are clearly visible.

3.02 PROJECT IDENTIFICATION SIGNS

A. Arrange for a professional sign painter to paint and erect a sign for the Site in accordance with the sign information provided in the Contract Documents or provided by Owner. Sign will include identification of the OPT and Contractor (including appropriate logos, as required) and other Project information as determined by the Construction Manager. Paint sign on a 4-foot by 8-foot by 3/4-inch exterior grade plywood board. Frame plywood with 2 x 4 wood frame and mount on not less than two 4 x 4 posts. House plywood board in a channel routed 1/2 inch deep in the 2 x 4 frame. Shoulder, glue, and screw corners.

3.03 TEMPORARY LIGHTING

A. Provide temporary lighting inside buildings once buildings are weatherproof.

B. Provide exterior security lighting.

C. Provide lighting that is adequate to perform Work within any space. Temporary lights may be removed once the permanent lighting is in service.

D. Provide portable flood lights at any time that Work will be performed outside the structure at night. Provide adequate lighting at any location Work is being performed.

3.04 DRINKING WATER

A. Provide all field offices with potable water. Provide a dispenser and cooling apparatus if bottled drinking water is provided.

B. Pay for water services and maintain daily.

3.05 CONSTRUCTION FENCE

A. Install and maintain a chain-link construction fence around the Site and off-site storage yards. Fence must be a minimum 6 feet high. Provide gates with padlocks.

3.06 REMOVAL OF TEMPORARY FACILITIES

A. Remove temporary buildings, sheds, and utilities at the conclusion of the Project and restore the Site to original condition or finished condition in accordance with the Drawings.

B. Remove informational signs upon completion of construction.

C. Remove project identification signs, framing, supports, and foundations upon completion of the Project.

3.07 MAINTENANCE AND JANITORIAL SERVICE

A. Empty trash receptacles daily or as needed.

B. Maintain signs and supports in a neat, clean condition. Repair damage to structures, framings, or signs.

C. Repair any damage to Work caused by placement or removal of temporary signage.

END OF SECTION

01 57 00 TEMPORARY CONTROLS

PART 1 - GENERAL

1.01 SUMMARY

A. Provide labor, materials, equipment, and incidentals necessary to construct temporary facilities to provide and maintain control over environmental conditions at the Site. Remove temporary facilities when no longer needed.

B. Construct temporary impounding works, channels, diversions, furnishing, and operation of pumps, installing piping and fittings, and other construction for control of conditions at the Site. Remove temporary controls at the end of the Project.

1.02 DOCUMENTATION

A. Provide Shop Drawings in accordance with Section 01 33 02 “Shop Drawings.”

B. Provide copies of notices, records, and reports required by the Contract Documents or Laws and Regulations as Product Data in accordance with Section 01 31 13 “Project Coordination.”

1.03 QUALITY ASSURANCE

A. Construct and maintain temporary controls with adequate workmanship using durable materials to provide effective environmental management systems meeting the requirements of the Contract Documents and Laws and Regulations. Use materials that require minimal maintenance to prevent disruption of construction activities while providing adequate protection of the environment.

B. Periodically inspect systems to determine that they are meeting the requirements of the Contract Documents.

1.04 POLLUTION CONTROL

A. Prevent the contamination of soil, water, or atmosphere by the discharge of noxious substances from construction operations. Provide adequate measures to prevent the creation of noxious air-borne pollutants. Prevent dispersal of pollutants into the atmosphere. Do not dump or otherwise discharge noxious or harmful fluids into drains or sewers, nor allow noxious liquids to contaminate public waterways in any manner.

B. Provide equipment and personnel and perform emergency measures necessary to contain any spillage.

1. Contain chemicals in protective areas and do not dump on soil. Dispose of such materials at off-site locations in an acceptable manner.

2. Excavate contaminated soil and dispose at an off-site location if contamination of the soil does occur. Fill resulting excavations with suitable backfill and compact to the density of the surrounding undisturbed soil.

3. Provide documentation to the Owner which states the nature and strength of the contaminant, method of disposal, and the location of the disposal site.

4. Comply with Laws and Regulations regarding the disposal of pollutants.

C. Groundwater or run-off water which has come into contact with noxious chemicals, sludge, or contaminated soil is considered contaminated. Do not allow contaminated water to enter streams or water courses, leave the Site in a non-contained form, or enter non-contaminated areas of the Site.

1. Construct temporary holding ponds or take other precautions and measures as required to contain the contaminated water and pump to a designated storage area.

2. Wash any equipment used for handling contaminated water or soil within contaminated areas three times with uncontaminated water prior to using such equipment in an uncontaminated area. Dispose of wash water used to wash such equipment as contaminated water.

1.05 EARTH CONTROL

A. Remove excess soil, spoil materials, and other earth not required for backfill. Control stockpiled materials to eliminate interference with Contractor and Owner's operations.

B. Dispose of excess earth off the Site. Provide written approval from the property owner for soils deposited on private property as Product Data per Section 01 31 13 "Project Coordination." Obtain approval of the OPT if this disposal impacts the use of Site or other easements.

1.06 AIR POLLUTION CONTROL

A. Air Pollution Watch Days:

1. Air Pollution Watch Days (APWD) may occur in the following times:

a. Typical Ozone Season: May 1 through October 31.

b. Critical Emission Time: 6:00 a.m. to 10:00 a.m.

2. Watch Days:

a. State or local environmental regulatory agencies, in coordination with the National Weather Service, may designate the following day as an APWD by 3:00 p.m. on the prior afternoon.

b. Begin work after 10:00 a.m. on designated APWD if work requires the use of heavy construction equipment for run times in excess of 1 hour prior to 10:00 a.m. Heavy construction equipment may be used prior to 10:00 a.m. if equipment is certified by EPA as "Low Emitting" or equipment burns Ultra Low Sulfur Diesel (ULSD), diesel emulsions, or alternative fuels such as CNG.

B. Obtain air permit for construction activities per requirements of Laws and Regulations.

1.07 TEMPORARY STORMWATER POLLUTION CONTROL

A. Provide temporary stormwater pollution control per Section 01 57 23 "Temporary Stormwater Pollution Control."

1.08 MANAGEMENT OF WATER

A. Manage water resulting from rains or ground water at the Site. Maintain trenches and excavations free of water at all times.

B. Lower the water table in the construction area by acceptable means if necessary to maintain a dry and workable condition at all times. Provide drains, sumps, casings, well points, and other water control devices as necessary to remove excess water.

C. Provide continuous operation of water management actions. Maintain standby equipment to provide proper and continuous operation for water management.

D. Ensure that water drainage does not damage adjacent property. Divert water into the same natural watercourse in which its headwaters are located, or other natural stream or waterway as approved by the Owner. Assume responsibility for the discharge of water from the Site.

E. Remove the temporary construction and restore the Site in a manner acceptable to the Construction Manager and to match surrounding material at the conclusion of the Work.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Provide materials that comply with Laws and Regulations.

PART 3 - EXECUTION

3.01 CONSTRUCTING, MAINTAINING, AND REMOVING TEMPORARY CONTROLS

A. Construct temporary controls in accordance with Laws and Regulations.

B. Maintain controls in accordance with regulatory requirements where applicable or in accordance with the requirements of the Contract Documents.

C. Remove temporary control when no longer required, but before the Project is complete. Correct any damage or pollution that occurs as the result of removing controls while they are still required.

END OF SECTION

01 57 23 TEMPORARY STORMWATER POLLUTION CONTROL

PART 1 - GENERAL

1.01 SUMMARY

A. Furnish labor, materials, equipment, and incidentals necessary to provide stormwater pollution prevention for the duration of the construction period including furnishing, installing, and maintaining erosion and sediment control structures and procedures and properly removing the features when no longer required.

B. Develop, implement, and maintain a stormwater pollution prevention plan (SWPPP) in compliance with local, state, and federal Laws and Regulations. Provide preventive measures to keep sediment and other pollutants from the construction activity from entering any stormwater system, including open channels.

C. Comply with the Texas Commission on Environmental Quality General Permit, TXR150000, (General Permit) for storm water discharges from construction activities under the Texas Pollutant Discharge Elimination System (TPDES) program

D. File all required legal notices and obtain required permits prior to beginning any construction activity.

E. This Section provides guidelines and Best Management Practices information for the Contractor to use in adhering to all local, state, and federal environmental Laws and Regulations with respect to stormwater pollution prevention during construction activities.

1.02 DOCUMENTATION

A. Documentation must be provided in accordance with Section 01 33 00 “Document Management.”

B. Submit copies of required notices and reports to the Construction Manager as Product Data in accordance with Section 01 33 03 “Product Data.” Retain copies of these documents at the Site for review and inspection by the OPT or regulatory agencies at all times.

C. Submit copies of required notices to local, state, and federal authorities and any other entity as required by the General Permit and applicable Laws and Regulations.

D. Post a copy of required notices at the Site in a location where it is readily available for viewing by the general public and local, state, and federal authorities prior to starting construction activities and maintain the posting until completion of the construction activities.

E. Maintain copies of a schedule of major construction activities, inspection reports, and revision documentation with the SWPPP required under the General Permit.

F. Provide schedules in accordance with Paragraph 3.05.

1.03 QUALITY ASSURANCE

A. Comply with applicable requirements of all governing authorities having jurisdiction. The Specifications and the Drawings are not intended to be prescriptive but rather to convey

the intent to provide complete slope protection, erosion control, and stormwater pollution prevention for both the Owner's property and adjacent properties.

B. Contractor must develop and implement a SWPPP in accordance with the General Permit prior to the beginning of construction activity.

C. Contractor assumes solely responsible for implementing, updating, and modifying the General Permit per Laws and Regulations for the SWPPP and Best Management Practices.

D. Stormwater pollution prevention measures must be established prior to the beginning of construction and maintained during the entire length of construction until final stabilization has been achieved for the area protected.

E. All land-disturbing activities must be planned and conducted to minimize the area to be exposed at any one time as well as time of exposure, off-site erosion, sedimentation, and adverse water quality impacts.

F. Surface water runoff originating upgrade of an exposed area must be managed to minimize erosion and sediment loss during the period of exposure.

G. Install measures to control both the velocity and rate of release so as to minimize erosion and sedimentation of the receiving water body (i.e. , ditch, channel, stream) in accordance with regulatory requirements and as directed by the OPT.

H. Periodically clean out and dispose of all sediment and other pollutants as necessary to maintain adequate treatment capacity of each pollution control feature. Clean out and properly dispose of all sediment and other stormwater pollutants at the time of completion of the Work.

1.04 JOB CONDITIONS, CODES AND ORDINANCES

A. Comply with the local codes and ordinances. If local codes and ordinances require more stringent or additional stormwater pollution prevention measures during construction beyond those required by state and federal Laws and Regulations, the Contractor must provide such measures at no additional cost.

PART 2 - PRODUCTS

2.01 MATERIALS

A. All materials used for stormwater pollution prevention must meet the minimum design and specification requirements identified below for commonly used sediment loss prevention. The Contractor must use appropriate control devices to protect against stormwater pollution from construction site activities.

B. Erosion control blankets (ECBs) to hold seed and soil in place until vegetation is established on disturbed areas are subject to the following design criteria:

1. The type and class of erosion control mat must be specified as appropriate for the slope of the area to be protected, the flow rate (sheet flow on cut/fill slopes) or velocity (concentrated flow in swales) of stormwater runoff in contact with the ECB, and the anticipated length of service.

2. Erosion control blankets must meet the applicable. Texas Department of Transportation (TxDOT) Minimum Performance Standards for TxDOT as provided in its Erosion Control Report and/or be listed on the most current annual Approved Products List for TxDOT applicable to TxDOT Item 169 Soil Retention Blanket and its Special Provisions.

C. Silt fences for perimeter controls located downstream of disturbed areas are subject to the following design criteria:

1. If 50 percent or less soil by weight passes the U.S. Standard sieve No. 200, select the apparent opening size (A.O.S.) to retain 85 percent of the soil.

2. If 85 percent or more of soil by weight passes the U.S. Standard sieve No. 200, silt fences must not be used unless the soil mass is evaluated and deemed suitable by a soil scientist or geotechnical engineer concerning the erodibility of the soil mass, dispersive characteristics, and the potential grain-size characteristics of the material that is likely to be eroded.

3. Silt fence fabric must meet the following minimum criteria:

   a. Tensile Strength, ASTM D4632 Test Method for Grab Breaking Load and Elongation of Geotextiles, 90 pounds.

   b. Puncture Rating, ASTM D4833 Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products, 60 pounds.

   c. Mullen Burst Rating, ASTM D3786 Standard Test Method for Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method, 280 psi.

   d. Apparent Opening Size, ASTM D4751 Test Method for Determining Apparent Opening Size of a Geotextile, U.S. Sieve No. 70 (max) to No. 100 (min).

   e. Ultraviolet Resistance, ASTM D4355. Minimum 70 percent.

4. Filter stone for an overflow structure must be 1-1/2-inch washed stone containing no fine material. Angular shaped stone is preferable to rounded shaped stone.

5. Fence posts must be galvanized steel or equivalent and may be T-section or L-section, 1.3 pounds per linear foot minimum, and 4 feet in length minimum. Wood posts may be used depending on anticipated length of service and provided they are 4 feet in length minimum and have a nominal cross-section of 2 inches by 4 inches for pine or 2 inches by 2 inches for hardwoods.

6. Silt fence must be supported by galvanized steel wire fence fabric as follows:

   a. 4-inch by 4-inch mesh size, W1.4/1.4, minimum 14-gauge wire fence fabric;

   b. Hog wire, 12-gauge wire, small openings installed at bottom of silt fence;

   c. Standard 2-inch by 2-inch chain link fence fabric; or

   d. Other welded or woven steel fabrics consisting of equal or smaller spacing as that listed herein and appropriate gauge wire to provide support.

D. Inlet protection used in new developments that include new inlets or roads with new curb inlets or during repairs to existing roadways are subject to the following design criteria:

1. Filter fabric protection must be designed and maintained in a manner similar to a silt fence.

2. Where applicable, filter fabric, posts, and wire backing must meet the material requirements specified in Paragraph 2.01.C.

3. Filter gravel must be 3/4-inch washed stone containing no fines. Angular shaped stone is preferable to rounded shapes.

4. Concrete blocks must be standard 8-inch by 8-inch by 16-inch concrete masonry units.

5. When organic filter tubes are used, the designer must specify the type of material to be used (or excluded) on a particular site:

   a. Straw filter material must be Certified Weed Free Forage. The straw must be in good condition, air-dried, and not rotten or moldy.

   b. Compost must conform to the requirements for Erosion Control Compost in TxDOT Special Specification 1001 Compost (2004). Compost may provide some oil and grease removal; however, the large percentage of fines in compost will result in less filtering and more ponding of stormwater.

   c. Wood chips must be 100 percent untreated chips and free of inorganic debris, such as plastic, glass, metal, etc. Wood chip size must not be smaller than 1 inch and must not exceed 3 inches in diameter. Shavings must not be more than 5 percent of the total mass.

6. Bags used to secure inlet protection devices on pavement must be filled with aggregate, filter stone, or crushed rock that is less likely than sand to be washed into an inlet if the bag is broken. Filled bags must be 24 to 30 inches long, 16 to 18 inches wide, and 6 to 8 inches thick. Bags must be polypropylene, polyethylene, or polyamide woven fabric with a minimum unit weight of 4 ounces per square yard and meet the following criteria:

   a. Greater than 300 psi Mullen Burst Strength using ASTM D3786 Standard Test Method for Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method.

   b. Greater than 70 percent UV Stability using ASTM D4355 Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture, and Heat in a Xenon Arc Type Apparatus.

E. Stone outlet sediment traps (bermed or excavated) used in situations where flows are concentrated in a drainage swale or channel are subject to the following design criteria:

1. The embankment must be placed on geotextile fabric meeting the following minimum criteria:

   a. Tensile Strength, ASTM D4632 Text Method for Grab Breaking Load and Elongation of Geotextiles, 250 pounds.

   b. Puncture Rating, ASTM D4833 Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products, 135 pounds.

c. Mullen Burst Rating, ASTM D3786 Standard Test Method for Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method, 420 psi.

d. Apparent Opening Size, ASTM D4751 Test Method for Determining Apparent Opening Size of a Geotextile, U.S. Sieve No. 20 (max).

2. Fill placed to constrict the swale for construction of the excavated stone outlet sediment trap and fill placed for the berm in the bermed stone outlet sediment trap must consist of clay material, minimum Plasticity Index of 30, using ASTM D4318 Standard Test for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

3. The embankment must be comprised of well graded stone riprap with a size range of 6 to 12 inches in diameter.

a.

F. Stabilized construction exits used for sites in which significant truck traffic occurs on a daily basis are subject to the following design criteria:

1. The construction exit material must be a minimum thickness of 6 inches. The stone or recycled concrete used must be 3 to 5 inches in size with little or no fines.

2. The geotextile fabric must meet the following minimum criteria:

a. Tensile Strength, ASTM D4632 Test Method for Grab Breaking Load and Elongation of Geotextiles, 300 pounds.

b. Puncture Strength, ASTM D4833 Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products, 120 pounds.

c. Mullen Burst Rating, ASTM D3786 Standard Test Method for Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method, 600 psi.

d. Apparent Opening Size, ASTM D4751 Test Method for Determining Apparent Opening Size of a Geotextile, U.S. Sieve No. 40 (max).

G. Alternative pollution prevention measures selected by the Contractor must be identified from one or more of the following reference sources, as appropriate for the region of the construction activity:

1. City of Austin Environmental Criteria Manual.

2. North Central Texas Council of Governments (NCTCOG) integrated Stormwater Management (iSWM) Design Manual for Construction.

3. Harris County/Harris County Flood Control District/City of Houston Stormwater Management Handbook for Construction Activities.

PART 3 - EXECUTION

3.01 PREPARATION

A. Prepare a SWPPP in accordance with applicable permit requirements for construction activity. Develop the SWPPP in conformance with the General Permit and any applicable local requirements.

B. Prepare and implement the SWPPP prior to the beginning of construction activity in accordance with local, state, and federal Laws and Regulations.

C. OPT may require Contractor to install stormwater pollution prevention devices and/or practices during construction in addition to those required under the approved SWPPP. Contractor must remain solely responsible for complying with all local, state, and federal Laws and Regulations.

3.02 INSTALLATION

A. Erosion control blankets to hold seed and soil in place until vegetation is established on disturbed areas are subject to the following installation criteria:

1. Prior to the installation of any erosion control matting, all rocks, dirt clods, stumps, roots, trash, and any other obstructions that would prevent the mat from lying in direct contact with the soil must be removed.

2. Anchor trenching must be located along the entire perimeter of the installation area, except for small areas with less than 2 percent slope.

3. Installation and anchoring must conform to the recommendations shown within the manufacturer's published literature for the erosion control blanket.

4. Anchors (staples) must be a minimum of 6 inches in length and 1 inch wide. They must be made of 11-gauge wire, or equivalent, unless the ECB is intended to remain in place with final stabilization and biodegrade.

5. Particular attention must be paid to joints and overlapping material. Overlap along the sides and at the ends of ECBs should be per the manufacturer’s recommendations for site conditions and the type of ECB being installed. At a minimum, the end of each roll of ECB must overlap the next roll by 3 feet and the sides of rolls must overlap 4 inches.

6. After installation, check blankets for uniform contact with the soil, security of the lap joints, and flushness of the staples with the ground.

B. Silt fences for perimeter controls located downstream of disturbed areas are subject to the following installation criteria:

1. Construct fences along a line of constant elevation (along a contour line if possible).

2. Maximum drainage area must be 0.25 acres per 100 linear feet of silt fence.

3. Maximum flow to any 20-foot section of silt fence must be 1 cfs.

4. Maximum distance of flow to silt fence must be 200 feet or less. If the slope exceeds 10 percent, the flow distance must be less than 50 feet.

5. Maximum slope adjacent to the fence must be 2:1.

6. Stone overflow structures or other outlet control devices must be installed at all low points along the fence or spaced at approximately 300 feet if there is no apparent low point.

7. A 6-inch wide trench is to be cut 6 inches deep at the toe of the fence to allow the fabric to be laid below the surface and backfilled with compacted earth or gravel to prevent bypass of runoff under the fence. Fabric must overlap at abutting ends a minimum of 3 feet and must be joined such that no leakage or bypass occurs. If soil

conditions prevent a minimum toe-in depth of 6 inches or installation of support post to depth of 12 inches, silt fences must not be used.

8. Sufficient room for the operation of sediment removal equipment must be provided between the silt fence and other obstructions in order to properly maintain the fence.

9. The last 10 feet (or more) at the ends of a line of silt fence must be turned upslope to prevent bypass of stormwater. Additional upslope runs of silt fence may be needed every 200 to 400 linear feet, depending on the traverse slope along the line of silt fence.

C. Inlet protection for new developments that include new inlets or roads with new curb inlets or during repairs to existing roadways are subject to the following installation criteria:

1. Maintain barricades, signs, and safety features around the Work in accordance with all provisions of the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD), when installing inlet protection on publicly traveled streets or in developed areas. Ensure that inlet protection is properly designed, installed, and maintained to avoid flooding of the roadway or adjacent properties and structures.

2. Maximum depth of flow must be 8 inches or less.

3. A 2-inch overflow gap or weir is required on all curb inlet protection devices.

4. Positive drainage is critical in the design of inlet protection. If overflow is not provided for at the inlet, excess flows must be routed through established swales, streets, or other watercourses to minimize damage due to flooding.

5. Filter Fabric Protection:

   a. Filter fabric protection is appropriate where the drainage area is less than 1 acre and the basin slope is less than 5 percent.

   b. Filter fabric, posts, and wire mesh must meet the material requirements specified in Paragraph 2.01.C.

   c. A 6-inch wide trench is to be cut 6 inches deep at the toe of the fence to allow the fabric to be laid below the surface and backfilled with compacted earth or gravel. This entrenchment prevents any bypass of runoff under the fence.

   d. Stone overflow structures must be installed where flow to the inlet is concentrated and more than 1 cfs according to the criteria in Paragraph 2.01.

6. Block and Gravel Protection (Curb and Drop Inlets):

   a. Concrete blocks are to be placed on their sides in a single row around the perimeter of the inlet, with ends abutting.

   b. Openings in the blocks should face outward, not upward. 1/2-inch by 1/2-inch wire mesh must then be placed over the outside face of the blocks covering the holes.

   c. Filter stone must then be piled against the wire mesh to the top of the blocks with the base of the stone being a minimum of 18 inches from the blocks.

   d. Alternatively, where loose stone is a concern (streets, etc.), the filter stone may be placed in appropriately sized geotextile fabric bags.

7. Excavated Impoundment Protection:

    a. Excavated impoundment protection is only applicable to drop inlets.

    b. It should not be applied to Y inlets because it will undermine the concrete pad surrounding the inlet opening. Nor can it be used for inlets on pavement.

    c. With this protection method, it is necessary to install weep holes to allow the impoundment to drain completely.

    d. The impoundment must be sized such that the volume of excavation is equal to or exceeds the runoff volume from the temporary control design storm (2-year, 24-hour) for the inlet's drainage area.

    e. The trap must have a minimum depth of 1 foot and a maximum depth of 2 feet as measured from the top of the inlet and must have side slopes of 2:1 or flatter.

8. Organic Filter Tube Protection (Curb and Drop Inlets):

    a. Organic filter tubes may be used on paved or unpaved surfaces. On paved surfaces, tubes must be secured in place by rock bags. On unpaved surfaces, the tubes must be embedded in the ground a minimum of 3 inches and staked at 4-foot spacing.

    b. Designer must provide calculations and specify the diameter of tube to be used based on the inlet's drainage area and the flow rate of runoff to the inlet.

    c. The minimum allowable diameter is 12 inches.

    d. For curb protection, the diameter of the tube must be at least 2 inches less than the height of the inlet opening. The tube should not be allowed to block the entire opening, since it will clog.

    e. The tube must be placed on 4-inch by 4-inch or 2-inch by 4-inch wire mesh to prevent the tube from sagging into the inlet. The tube should be long enough to extend a minimum of 12 inches past the curb opening on each side of the inlet.

D. Stone outlet sediment traps (excavated or bermed) for situations where flows are concentrated in a drainage swale or channel are subject to the following installation criteria:

1. The maximum drainage area contributing to the trap must be less than 10 acres for the excavated trap, and 5 acres or less for the bermed trap. For larger drainage areas a sediment basin must be used.

2. The minimum storage volume must be the volume of runoff from the temporary control design storm (2-year, 24-hour) for the sediment trap's drainage area.

3. The surface area of the design storage must be 1 percent of the area draining to the device.

4. The maximum embankment height must be 6 feet as measured from the toe of the slope on the downstream side.

5. Minimum width of the embankment at the top must be 2 feet.

6. Embankment slope must be 1:5:1 or flatter.

7. The embankment must have a depressed area to serve as the outlet with a minimum width of 4 feet.
8. A 6-inch minimum thickness layer of 1-1/2-inch filter stone must be placed on the upstream face of the embankment when stormwater runoff contains fine silt and clay particles.
9. The embankment must consist of stone riprap or a combination of compacted fill with stone riprap. The stone may be enclosed in wire mesh or a gabion basket and anchored to the channel bottom to prevent washing away.
10. Fill must be placed in 8-inch loose lifts (maximum) and compacted to 95 percent Standard Proctor Density at optimum moisture content using ASTM D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort.
11. Geotextile fabric, covered with a layer of stone, must extend past the base of the embankment on the downstream side a minimum of 2 feet.
12. The outlet must be designed to have a minimum freeboard of 6 inches at design flow.

    a.

E. Stabilized construction exits for sites in which significant truck traffic occurs on a daily basis are subject to the following installation criteria:
    1. Limit site access to one route during construction, if possible; two routes for linear and larger projects.
    2. Prevent traffic from avoiding or shortcutting the full length of the construction exit by installing barriers. Barriers may consist of silt fence, construction safety fencing, or similar barriers.
    3. Design the access point(s) to be at the upslope side of the construction site. Do not place construction access at the lowest point on the construction site.
    4. Stabilized Construction Exits are to be constructed such that drainage across the entrance is directed to a controlled, stabilized outlet on-site with provisions for storage, proper filtration, and removal of wash water.
    5. The exit must be sloped away from the paved surface so that stormwater is not allowed to leave the Site onto roadways.
    6. Minimum width of exit must be 15 feet.
    7. Vehicles must not be permitted to track or drop sediment onto paved roads, streets, or parking lots. When necessary, vehicles must be cleaned to remove sediment prior to exit onto paved areas. When washing is required, it must be done on a constructed wheel wash facility that drains into an approved sediment trap or sediment basin or other sedimentation/filtration device.
    8. Minimum dimensions for the exit must be as follows:

Tract Area	Min. Width of Exit	Min. Length of Exit
<1 Acre	15 feet	20 feet
≥ 1 acre but <5 Acres	25 feet	50 feet
≥5 Acres	30 feet	50 feet

F. Install pollution control devices in a manner consistent with their designed intent.

3.03 MAINTENANCE

A. Maintain pollution prevention control structures and procedures in full working order at all times during construction. This must include any necessary repair or replacement of items which have become damaged or ineffective. Remove sediment and other pollutants which accumulate in pollution control devices as necessary to maintain the intended design efficiency for the pollution prevention measure.

B. Dispose properly of trash, debris, and other pollutants.

C. Place sediment material in approved earth spoil areas or return the sediment material to the area from which it eroded.

D. Maintain pollution prevention structures and procedures until construction is complete for the area protected and until the Site achieves final stabilization. Unless more stringently defined by local, state, or federal requirements, final stabilization is defined as achieving 70 percent of background vegetative cover or placement of permanent cover, such as concrete or asphalt.

E. Upon completion of construction and achievement of final stabilization, properly remove the temporary pollutant control structures and complete the area as indicated. Pollution control devices made of organic materials designed to degrade naturally in place will not require removal, unless specifically required by the OPT.

F. Erosion control blankets must be inspected regularly (at least as often as required by the General Permit) for bare spots caused by weather related events. Missing or loosened blankets must be replaced or re-anchored. Also check for excess sediment deposited from runoff. Remove sediment and/or replace blanket as necessary. In addition, determine the source of excess sediment and implement appropriate Best Management Practices to control the erosion.

G. Silt fences must be inspected regularly (at least as often as required by the General Permit) for buildup of excess sediment, undercutting, sags, and other failures. Sediment should be removed when it reaches approximately one-half the height of the fence. In addition, determine the source of excess sediment and implement appropriate Best Management Practices to control the erosion. If the fabric becomes damaged or clogged, it must be repaired or replaced as necessary.

H. Inlet protection must be inspected regularly (at least as often as required by the General Permit). Floatable debris and other trash caught by the inlet protection should be removed after each storm event. Sediment should also be removed from curb inlet protection after each storm event because of the limited storage area associated with curb inlets. Sediment collected at inlet protection should be removed before it reaches half the height of the protection device. Sediment should be removed from inlets with excavated impoundment protection before the volume of the excavation is reduced by 50 percent. In addition, the weep holes should be checked and kept clear of blockage. Concrete blocks, 2-inch by 4-inch boards, stakes, and other materials used to construct inlet protection should be checked for damaged and repaired or replaced if damaged. When filter fabric or organic filter tubes are used, they should be cleaned or replaced when the material becomes clogged. For systems using filter stone, when the filter stone becomes clogged with sediment, the

stones must be pulled away from the inlet and cleaned or replaced. Because of the potential for inlet protection to divert runoff or cause localized flooding, remove inlet protection as soon as the drainage area contributing runoff to the inlet is stabilized. Ensure that all inlet protection devices are removed at the end of the construction.

I. The stone outlet sediment trap should be inspected regularly (at least as often as required by the General Permit) to check for clogging of the void spaces between stones. If the filter stone appears to be clogged, such that the basin will not completely drain, then the filter stone will require maintenance. If the filter stone is not completely clogged it may be raked with a garden rake to allow the water to release from the basin. If filter stone is completely clogged with mud and sediment, then the filter stone will have to be removed and replaced. Failure to keep the filter stone material properly maintained will lead to clogging of the stone riprap embankment. When this occurs, the entire stone rip-rap structure will need to be replaced. If the aggregate appears to be silted in such that efficiency is diminished, the stone should be replaced. Trash and debris should be removed from the trap after each storm event to prevent it from plugging the rock. Deposited sediment must be removed before the storage capacity is decreased by one-third, or sediment has reached a depth of 1 foot, whichever is less. The removed sediment must be stockpiled or redistributed in areas that are protected with erosion and sediment controls.

J. Sediment basins should be inspected regularly (at least as often as required by the General Permit) to check for damage and to ensure that obstructions are not diminishing the effectiveness of the structure. Sediment must be removed and the basin must be re-graded to its original dimensions when the sediment storage capacity of the impoundment has been reduced by 20 percent. The removed sediment may be stockpiled or redistributed on-site in areas that are protected by erosion and sediment controls. Inspect temporary stabilization of the embankment and graded basin and the velocity dissipaters at the outlet and spillway for signs of erosion. Repair any eroded areas that are found. Install additional erosion controls if erosion is frequently evident.

K. Check dams should be inspected regularly (at least as often as required by the General Permit). Silt must be removed when it reaches approximately one-third the height of the dam or 12 inches, whichever is less. Inspectors should monitor the edges of the dam where it meets the sides of the drainage ditch, swale, or channel for evidence of erosion due to bypass or high flows. Eroded areas must be repaired. If erosion continues to be a problem, modifications to the check dam or additional controls are needed. Care must be used when taking out rock check dams in order to remove as much rock as possible. Loose rock can create an extreme hazard during mowing operations once the area has been stabilized.

L. Stabilized construction exits should be inspected regularly (at least as often as required by the General Permit). The stabilized construction exit must be maintained in a condition that prevents tracking or flow of sediment onto paved surfaces. Periodic re-grading and top dressing with additional stone must be done to keep the efficiency of the exit from diminishing. The rock must be re-graded when ruts appear. Additional rock must be added when soil is showing through the rock surface. Additional controls are needed if inspections reveal a properly installed and maintained exit, but tracking of soil outside the construction area is still evident. Additional controls may be daily sweeping of all soil spilled, dropped, or tracked onto public rights-of-way or the installation of a wheel cleaning system.

3.04 FIELD QUALITY CONTROL

A. In the event of conflict between the specified requirements and stormwater pollution control laws, rules, or regulations or other local, state, or federal agencies, the more restrictive laws, rules, or regulations will apply.

3.05 SCHEDULES

A. Prior to start of construction, submit schedules to the OPT for accomplishment of temporary and permanent erosion control work in connection with required clearing and grubbing, grading, construction, and paving. Include a proposed method of erosion and dust control on haul roads and borrow pits and a plan for disposal of waste materials in the submittal.

END OF SECTION

01 60 00 PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. Provide products for this Project that comply with the requirements of this Section. Specific requirements of the detailed equipment specifications govern in the case of a conflict with the requirements of this Section.

B. Comply with applicable specifications and standards.

1.02 DOCUMENTATION

A. Provide documents in accordance with the Contract Documents.

1.03 QUALITY ASSURANCE

A. Design Criteria:

1. Provide products designed for structural stability and operational capability.

2. Provide members designed to withstand all loads imposed by installation, erection, and operation of the product without deformation, failure, or adversely affecting the operational requirements of the product. Size and strength of materials for structural members are specified as minimums only.

3. Design mechanical and electrical components for all loads, currents, stresses, and wear imposed by startup and normal operations of the equipment without deformation, failure, or adversely affecting the operation of the unit. Mechanical and electrical components specified for equipment are specified as the minimum acceptable for the equipment.

B. Coordination:

1. Provide coordination of the entire Project, including verification that structures, piping, and equipment components to be furnished and installed for this Project are compatible.

2. Determine that the equipment furnished for this Project is compatible with the requirements of the Contract Documents and with the equipment and materials furnished by others.

3. Provide electrical components for equipment that comply with all provisions of the Contract Documents.

4. Apply protective coatings and paints to equipment in the shop that are fully compatible with the final coatings to be field applied in accordance with the Contract Documents.

C. Adapting Substitute Products:

1. The Drawings and Specifications are prepared for the specified products. Make modifications to incorporate the products into the Project if a substitution is requested

for a product is and approved in accordance with Section 01 26 00 “Change Management.”

2. Do not provide a product with a physical size that exceeds the available space. Consideration may be given to the acceptance of these products or equipment if the Contractor assumes all costs necessary to incorporate the item and the OPT approves such revisions.

3. Coordinate electrical requirements for the products to be installed in the Project, including revisions in electrical equipment components wiring and other elements necessary to incorporate the component.

1.04 STANDARDS

A. The applicable industry standards referenced in the Specifications apply as if written here in their entirety.

B. Provide equipment manufactured using structural and miscellaneous fabricated steel conforming to the standards of the American Institute of Steel Construction, except where indicated otherwise.

1.05 WARRANTIES AND GUARANTEES

A. Normal warranty provisions are as stated in the General Conditions and Section 01 78 36 “Warranties and Service Agreements.”

B. Correct Defective Work under the provisions of the General Conditions.

C. Provide warranties and guarantees for periods as defined in the Contract Documents. Individual Sections of the Specifications may have more stringent warranty requirements than stated in the General Conditions. The most stringent warranty will apply in the event of conflicts within the Contract Documents.

D. The Contract Documents may require special warranties that guarantee performance at a specified capacity, power consumption, efficiency, or other operating parameter. Correct defects that prevent products from meeting the specified performance parameters. The requirements of the special warranty that guarantee performance will be satisfied when the specified performance parameters have been met for a period of 1 calendar year of operation, unless Owner elects to accept Defective Work under the provisions of the General Conditions.

E. The Contract Documents may require special warranties for periods extending beyond the one-year correction period specified in the General Conditions. The full warranty provisions and requirements for correction of Defective Work stated in the General Conditions apply throughout the extended warranty period.

F. Provide a warranty bond to provide the same protection as the Contractor's performance bond for extended special warranties. The warranty bond will become effective on the day the performance bond expires which is 1 year after the date of final payment per the General Conditions. The warranty bond will remain in effect until the extended warranty period has expired.

G. In the event that products are repaired, modified, or replaced under the warranty bond, then the warranty period will continue on the date of completion of these repairs for a

period of 6 months or until the end of the original warranty period, whichever is later. In no event will the warranty period extend more than 6 months beyond the end of the original warranty period.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Provide products according to normally accepted engineering and shop practices, except where a higher standard of quality is required by the Contract Documents.

B. Manufacture like parts of duplicate units to standard sizes and gages that are interchangeable.

C. Two or more items of the same kind are to be identical and made by the same Supplier.

D. Provide products suitable for the intended service.

E. Adhere to the equipment capacities, sizes, and dimensions indicated in the Contract Documents.

F. Do not use products for any purpose other than that for which they were designed.

G. Provide new products. Do not provide equipment that has been in service at any time prior to delivery except for testing in accordance with the Contract Documents.

H. Provide materials suitable for service conditions.

I. Provide iron castings that are tough, close grained gray iron free from blowholes, flaws, or excessive shrinkage and that conform to ASTM A48.

J. Design structural members for shock or vibratory loads.

K. Provide steel that is at least 1/4 inch thick for all elements that will be submerged or subject to splashing all or part of the time during normal operation of the equipment. Chamfer or grind all edges to eliminate sharp exposed edges.

2.02 EQUIPMENT APPURTENANCES

A. Provide a safety guard covering all sides on belt or chain drives, fan blades, couplings, and other moving or rotating parts:

1. Fabricate safety guards from 16 US gauge or heavier galvanized or aluminum clad sheet steel or 1/2-inch mesh galvanized expanded metal;

2. Design guards for easy installation and removal;

3. Provide galvanized supports and accessories for each guard;

4. Provide stainless steel bolts and hardware; and

5. Provide safety guards designed to prevent the entrance of rain and dripping water in outdoor locations.

2.03 ANCHOR BOLTS

A. Provide suitable anchor bolts for each product.

B. Provide anchor bolts with templates or setting drawings in time to permit casting the anchor bolts in the concrete when concrete is placed.

C. Provide two nuts for each bolt.

D. Provide anchor bolts for products mounted on baseplates that are long enough to permit 1-1/2 inches of grout beneath the baseplate and to provide adequate anchorage into structural concrete. Bolts must be long enough to provide full nut engagement and leave three threads exposed. Housekeeping pads are not structural concrete.

E. Provide stainless steel anchor bolts, nuts, and washers.

2.04 SPECIAL TOOLS AND ACCESSORIES

A. Furnish tools, instruments, lifting and handling devices, and accessories necessary for proper maintenance and adjustment that are available only from the manufacturer or are not commonly available.

2.05 EQUIPMENT IDENTIFICATION PLAQUES

A. Provide a plaque for each piece of equipment which includes the equipment name and equipment ID. Plaque will be engraved and high-contrast between plaque background and engraving. Plaque material must be UV resistant and affixed using stainless steel hardware or epoxy, depending on the location of the plaque. Owner will approve locations of equipment tags proposed by the Contractor.

2.06 LUBRICATION SYSTEMS FOR EQUIPMENT

A. Provide equipment lubricated by systems which:

1. Require attention no more frequently than weekly during continuous operation.

2. Do not require attention during startup or shut down.

3. Do not waste lubricants.

B. Provide lubricants to fill lubricant reservoirs and to replace lubricant consumed during testing, startup, and operation prior to acceptance of equipment by the Owner.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install equipment including equipment pre-selected or furnished by the Owner. Assume responsibility for proper installation, startup, and making the necessary adjustments so that the equipment is placed in proper operating condition per Section 01 75 00 “Starting and Adjusting.”

3.02 LUBRICATION

A. Lubricate all products provided or installed for this Project, including products furnished by the Owner, per the manufacturer’s written recommendations until the product is accepted by the Owner.

END OF SECTION

01 70 00 EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. Comply with requirements of the General Conditions and specified administrative procedures in closing out the Contract.

1.02 DOCUMENTATION

A. Submit affidavits and releases on forms provided by the Construction Manager through the PMIS.

1.03 SUBSTANTIAL COMPLETION

A. The following requirements must be met for the Project or a designated portion of the Work to be Substantially Complete per the General Conditions:

1. Work must be fully functional and able to operate in accordance with the Contract Documents without special or extraordinary efforts on the part of the Owner.

2. The following items of Work must be fully functional and able to operate in accordance with the Contract Documents:

a. Existing gates removed, structural repairs completed, new gates and actuators installed and fully functional.

3. The following items may remain incomplete in accordance with the Contract Documents:

a. Modifications to grating, surface finishes, and site cleanup.

4. Performance Acceptance Testing (PAT) must be complete and indicated compliance with the requirements of the Contract Documents.

5. Operation and maintenance manuals must be approved and operator training conducted to allow the Owner to assume responsibility for operations.

B. Conduct inspections with superintendent, Subcontractors, and Suppliers for the Work or a designated portion of the Work prior to calling for a Substantial Completion inspection by the OPT. Create a list of deficiencies in the Work that must be completed for the Project to qualify for Substantial Completion. Review the list with the Construction Manager or the designated member of the OPT. The Construction Manager or the designated member of the OPT may assist the Contractor with this effort; however, it is the Contractor's responsibility to create and manage this list of deficiencies until corrections are made.

C. Correct the identified deficiencies prior to calling for a Substantial Completion inspection.

D. Notify the Construction Manager that the Work or a designated portion of the Work is Substantially Complete per the General Conditions. Include a list of the items remaining to be completed or corrected before the Project will be considered for Final Completion.

E. OPT will visit the Site to observe the Work within a reasonable time after notification is received to determine the status of the Project.

F. Construction Manager will notify the Contractor that the Work is either Substantially Complete or that additional Work must be performed before the Project will be considered Substantially Complete.

1. Construction Manager will notify the Contractor of items that must be completed before the Project will be considered Substantially Complete.
2. Correct the noted deficiencies in the Work.
3. Notify the Construction Manager when the items of Work in the Construction Manager's notice have been completed.
4. OPT will revisit the Site and repeat the process.
5. Construction Manager will issue a Certificate of Substantial Completion to the Contractor when the OPT considers the Project to be Substantially Complete. The certificate will include a tentative list of items to be corrected before Final Payment will be recommended.
6. Review the list and notify the Construction Manager of any objections to items on the list within 10 days after receiving the Certificate of Substantial Completion.

1.04 TRANSFER OF UTILITIES

A. Transfer utilities to the Owner when the Certificate of Substantial Completion has been issued.

B. Submit final meter readings for utilities and similar data as of the date the Owner occupied the Work.

1.05 CLOSEOUT REQUIREMENTS

A. Provide the following before Final Completion:

1. Record Documents per Section 01 31 13 "Project Coordination";
2. Keys and keying schedule;
3. Warranties, bonds, and service agreements;
4. Equipment Installation Reports;
5. Shop Drawings, Product Data, operation and maintenance manuals, and other documentation required by the Contract Documents;
6. Specified spare parts and special tools;
7. Certificates of occupancy, operating certificates, or other similar releases required to allow the Owner unrestricted use of the Work and access to services and utilities;
8. Evidence of continuing insurance and bond coverage as required by the Contract Documents; and

1.06 WARRANTIES, BONDS, AND SERVICES AGREEMENTS

A. Provide warranties, bonds, and service agreements required by Section 01 33 00 "Document Management" or by the individual Sections of the Specifications.

B. The date for the start of warranties, bonds, and service agreements is established per the General Conditions.

C. Compile warranties, bonds, and service agreements and review these documents for compliance with the Contract Documents.

1. Each document is to be signed by the respective Supplier or Subcontractor.

2. Each document is to include:

a. The product or Work item description;

b. The firm name, with the name of the principal, address, and telephone number;

c. Scope of warranty, bond, or services agreement;

d. Date, duration, and expiration date for each warranty bond and service agreement;

e. Procedures to be followed in the event of a failure; and

f. Specific instances that might invalidate the warranty or bond.

D. Submit digital copies of the documents to the Construction Manager for review.

E. Submit warranties, bonds, and services agreements within 10 days after equipment or components placed in service.

1.07 FINAL COMPLETION

A. Conduct inspections with Superintendent, Subcontractors, and Suppliers prior to calling for a Final Completion inspection by the OPT. Create a list of deficiencies in the Work that must be completed for the Project to qualify for the Final Completion inspection. Review the list with the Construction Manager or the designated member of the OPT. The Construction Manager or the designated member of the OPT may assist the Contractor with this effort; however, it is the Contractor's responsibility to create and manage this list of deficiencies until corrections are made.

B. Identify, list, and correct deficiencies prior to calling for a Final Completion inspection. The Project at the call for Final Completion represents the Contractor's interpretation of a project completed in conformance with the Contract Documents and reflects the Contractor's representation of a quality project meeting the Owner's expectations.

C. Notify the Construction Manager when:

1. Work has been completed and complies with the Contract Documents;

2. Equipment and systems have been tested per the Contract Documents and are fully operational;

3. Final operation and maintenance manuals have been provided to the Owner and all operator training has been completed;

4. Specified spare parts and special tools have been provided;

5. Work is complete and ready for final inspection;

6. Final documentation for all outstanding Modifications and Claims (other than those listed on the Certificate of Final Completion) have been processed and are ready for incorporation into the final Application for Payment; and

7. Closeout requirements in Paragraph 1.05 have been completed.

D. OPT will visit the Site to determine if the Project is complete and ready for final payment within a reasonable time after the notice is received.

E. Construction Manager will notify the Contractor that the Project is complete or will notify the Contractor that Work is Defective.

F. Take immediate steps to correct Defective Work. Notify the Construction Manager when Defective Work has corrected. OPT will visit the Site to determine if the Project is complete and the Work is acceptable. Construction Manager will issue a Certificate of Final Completion to the Contractor when the Project is complete or will notify the Contractor that Work is Defective.

G. Submit the request for final payment with closeout documentation described in Paragraph 1.06 if notified that the Project is complete and the Work is acceptable.

1.08 REINSPECTION FEES

A. Owner may impose a set-off against the Application for Payment in accordance with the General Conditions to compensate the OPT for additional visits to the Project if additional Work is required.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01 74 23 FINAL CLEANING

PART 1 - GENERAL

1.01 SUMMARY

A. Perform a thorough cleaning of the Site, buildings, or other structures prior to Owner occupancy of the buildings, and prior to Final Completion. Leave the Project clean and ready for occupancy.

1.02 DOCUMENTATION

A. Provide data for maintenance per Section 01 33 04 “Operation and Maintenance Data.”

1.03 QUALITY CONTROL

A. Use experienced workmen or professional cleaners for final cleaning.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Furnish the labor and products needed for cleaning and finishing as recommended by the manufacturer of the surface material being cleaned.

B. Use cleaning products only on the surfaces recommended by the Supplier.

C. Use only those cleaning products which will not create hazards to health or property and which will not damage surfaces.

PART 3 - EXECUTION

3.01 FINAL CLEANING

A. Thoroughly clean the entire Site and make ready for occupancy.

1. Remove construction debris, boxes, and trash from the Site.
2. Remove construction storage sheds and field offices.
3. Restore grade to match surrounding condition and remove excess dirt.
4. Sweep all drives and parking lots clean of dirt and debris. Use water trucks or hose down paved site to like new appearance.

B. Clean floors and inspect for damage.

1. Remove oil, grease, paint drippings, and other contaminants from floors, then mop repeatedly until thoroughly clean. Replace damaged flooring.
2. Clean resilient flooring with an approved cleaner and provide one coat of liquid floor polish as recommended by the flooring manufacturer. Polish to a buffed appearance with powered floor buffer.
3. Vacuum all carpets with powered floor sweeper to remove dirt and dust. Remove glue or other substances from nap of carpet.

C. Clean and polish inside and outside glass surfaces. Wash with window cleaner and water, apply a coat of high quality glass polish, and wipe clean. Do not scratch or otherwise mar glass surfaces.

D. Clean wall surfaces to remove dirt or scuff marks. Remove excess adhesive along top edges of wall base. Remove adhesive from surfaces of vinyl wall coverings.

E. Align ceiling tile to fit properly in grid and replace cracked or damaged tile. Remove smear marks and other dirt from tile and clean surface of grid system.

F. Spot paint nicks and other damage. Repaint the wall from inside corner to inside corner if spot-painting does not blend into the existing color and texture of the surrounding surfaces. Touch up damaged surfaces on factory finished equipment using special paint furnished by the manufacturer.

G. Clean plumbing fixtures, valves, and trim. Clean toilet seats and covers. Remove labels and adhesive from fixtures. Remove floor drains and clean baskets or buckets. Polish strainers and exposed chrome or brass.

H. Remove dirt, oil, grease, dust, and other contaminants from floors, equipment, and apparatus in mechanical and electrical rooms.

I. Clean and polish ceramic tile floors and wall surfaces to remove mildew or other stains. Tuck point defective joints.

J. Inspect exterior painted surfaces. Spot paint any damaged surfaces.

K. Clean permanent filters and replace disposable filters on heating, ventilating, and air conditioning systems. Clean ducts, blowers, and coils if units were operated without filters during construction.

L. Clean roof areas of debris; flush roof drainage systems with water until clear.

M. Broom clean exterior paved surfaces and rake clean other surfaces of the grounds.

N. Clean and polish all electrical equipment and exposed conduits. Remove paint overspray. Provide a blemish free appearance on all exposed equipment and conduits.

END OF SECTION

01 75 00 STARTING AND ADJUSTING

PART 1 - GENERAL

1.01 SUMMARY

A. Provide step-by-step procedures for starting provided systems, including equipment, pumps, and processes.

B. Provide pre-startup inspections by equipment manufacturers.

C. Place each system in service and operate the system to prove performance and to provide for initial correction of defects in workmanship, calibration, and operation.

D. Provide for initial maintenance and operation.

E. Include costs for starting and adjusting provided by manufacturer's representative in the Cost of Work for the equipment package.

F. Owner will provide chemicals, if any, required for continued operations.

1.02 STANDARDS

A. Comply with the specified standards associated with the testing or startup of equipment.

1.03 DOCUMENTATION

A. Provide the following documents in accordance with Section 01 33 00 "Document Management":

1. A Plan of Action for testing, checking, and starting equipment as Product Data per Section 01 31 13 "Project Coordination."

2. Equipment Installation Reports on the form provided by the Construction Manager certifying that the equipment and related appurtenances have been thoroughly examined and approved for startup and operation.

3. Operation and maintenance manuals per Section 01 33 04 "Operation and Maintenance Data." Preliminary operation and maintenance data must be approved before installation, testing, and initial operation of equipment or providing training required by Section 01 79 00 "Training of Operation and Maintenance Personnel."

1.04 SPECIAL JOB CONDITIONS

A. Do not start or test any equipment until the complete unit has been installed and thoroughly checked.

B. Provide the services of a qualified representative of the manufacturer to attend the tests and startup procedures as required by this Section.

C. Do not start or test any equipment until the preliminary operation and maintenance manual per Section 01 33 04 "Operation and Maintenance Data" has been approved.

PART 2 - PRODUCTS

2.01 TESTING INSTRUMENTATION

A. Provide new instrumentation and testing devices needed to conduct tests for maintenance and operation as recommended in the operation and maintenance manuals. This equipment is to become the property of the Owner and transferred in good working order as a spare part at Substantial Completion. This equipment is to be calibrated and ready for use during the startup procedure and for training provided in accordance with Section 01 79 00 “Training of Operation and Maintenance Personnel.”

PART 3 - EXECUTION

3.01 SERVICES OF MANUFACTURER’S REPRESENTATIVES

A. Provide the services of experienced and technically competent representatives of the manufacturer for inspections, tests, supervision of installation, training, and assistance with placing equipment in operation.

B. Perform installation, adjustment, and testing of the equipment under the direct supervision of the manufacturer’s representative where specified. Certify that the equipment and related appurtenances have been thoroughly examined and approved for startup and operation in the Equipment Installation Reports.

C. Provide on-site services as necessary for proper and trouble free operation of the equipment.

D. Provide training in adequate detail to ensure that the trainees who complete the program will be qualified and capable of operating and maintaining the equipment, products, and systems provided. Training shall be conducted for a minimum of 4 hours by the manufacturer’s representative. The Contractor shall submit the training schedule to the Owner for approval a minimum 2 weeks from the proposed training.

3.02 INSPECTION AND STARTUP

A. Inspect equipment prior to placing any equipment or system into operation. Make adjustments as necessary for proper operation. Do not start or test any apparatus until the complete unit has been installed and thoroughly checked.

1. Check for adequate and proper lubrication.
2. Determine that parts or components are free from undue stress from structural members, piping, or anchorage.
3. Adjust equipment for proper balance and operations.
4. Determine that vibrations are within acceptable limits.
5. Determine that equipment operates properly under full load conditions.
6. Determine that the equipment is in true alignment.
7. Ensure that the proper procedure is employed in startup of systems.

3.03 STARTING REQUIREMENTS

A. Refer to the individual Specification Sections for specific startup procedures or other requirements.

3.04 INITIAL OPERATION

A. Start, test, and place equipment and systems into operation for 30 days to allow the OPT to observe the operation and overall performance of the equipment and to determine that controls function as intended.

B. Operate equipment which is used on a limited or part-time basis in the presence of the OPT for a period long enough to demonstrate that controls function as specified.

C. Perform acceptance test as specified in individual Specification Sections. Demonstrate that equipment and systems meet the specified performance criteria.

D. Equipment and systems may be considered as substantially complete at the end of this initial operation period if the equipment is placed in continuous beneficial use by the Owner, unless specifically stated otherwise in the individual equipment Specifications.

3.05 INITIAL MAINTENANCE

A. Maintain equipment in accordance with the operation and maintenance manuals until Project is substantially complete and provisions have been made by the Owner for accepting responsibility for equipment operation in accordance with the General Conditions.

B. Service equipment in accordance with the operation and maintenance manuals immediately before releasing the equipment to the Owner.

END OF SECTION

01 78 36 WARRANTIES AND SERVICE AGREEMENTS

PART 1 - GENERAL

1.01 WARRANTY REQUIREMENTS

A. Provide products for this Project that comply with the requirements of this Section.

1.02 WARRANTIES AND GUARANTEES

A. Guarantee and warrant products furnished by the Contractor against:

1. Faulty or inadequate design;
2. Improper assembly or erection;
3. Defective workmanship or materials; and
4. Leakage, breakage, or other failure.

B. Guarantee and warrant the products installed under this Contract, including Goods furnished by the Owner, against leakage, breakage, or other failure due to improper assembly or erection and against improper installation of the equipment. The correction period is as defined in the General Conditions. Individual Specification Sections may have more stringent warranty requirements than those stated in the General Conditions. The most stringent warranty will be provided in the event of conflicts.

C. Provide all required warranties, guarantees, and related documents with the Shop Drawing. The effective date of warranties and guarantees will be the date of Substantial Completion.

D. Include an additional copy of equipment warranties in operation and maintenance manuals.

E. Provide a copy of all warranties in a separate document in accordance with Section 01 70 00 “Execution and Closeout Requirements.”

1.03 EXTENDED WARRANTIES

A. Extended Warranties are defined as any guarantee of performance for the product or system beyond the one-year correction period described in the General Conditions.

B. Issue the warranty certificate in the name of the Owner.

C. Provide a warranty bond for Extended Warranties as required by the individual Specification Sections.

1.04 SERVICE AGREEMENTS

A. Provide Extended Service Agreements (ESA) and related documents with the Shop Drawing. An Extended Service Agreement is a contract between the Owner and an approved Subcontractor or Supplier to provide service and or maintenance beyond that required to fulfill requirements for warranty repairs or to perform routine maintenance for a definite period beyond the one-year correction period specified in the General Conditions.

B. Requirements for the Extended Service Agreement are described in the Specification Sections for each piece of equipment or system requiring an Extended Service Agreement.

C. Enter into a contract with the service provider and assign the service contract to the Owner on the date of Substantial Completion. Once assigned to the Owner, Contract requirements for the Extended Service Agreement will be complete and will not extend the Contract between the Owner and Contractor.

D. Owner may require that a performance bond be provided for the Extended Service Agreement. Provide a separate bond meeting the same requirements as those for the Contractor's performance bond if required. The bond will be in the amount of the Extended Service Agreement.

E. Include an additional copy of Extended Service Agreements in operation and maintenance manuals.

F. Provide a copy of Extended Service Agreements in a separate document in accordance with Section 01 70 00 "Execution and Closeout Requirements."

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

01 79 00 TRAINING OF OPERATION AND MAINTENANCE PERSONNEL

PART 1 - GENERAL

1.01 SUMMARY

A. Provide services of Supplier's operation and maintenance training specialists to instruct Owner's personnel in recommended operation and maintenance procedures for equipment furnished. Details for training may be established in the specifications for that equipment.

B. Provide a combination of classroom and hands on training.

C. Training may be conducted at Contractor's or Supplier's facilities provided Contractor pays for travel, lodging, and per diem costs of the Owner.

D. Record training sessions on video and submit to the Owner on DVD disk in MPEG-4 format for Owner's later use in instructing Owner's personnel. Include this recording as part of the final operation and maintenance manual. Provide legal releases or pay additional fees required to allow training by the manufacturer to be recorded.

E. Include the cost for training and startup in the Cost of the Work for each equipment package.

1.02 DOCUMENTATION

A. Provide documentation in accordance with Section 01 33 00 "Document Management" and include:

1. Equipment Installation Reports in accordance with Section 01 75 00 "Starting and Adjusting" on forms provided by the Construction Manager;

2. A lesson plan for training in accordance with Paragraph 3.01.C;

3. Credentials of Supplier's proposed operation and maintenance instructors demonstrating compliance with requirements of Paragraph 1.04; and

4. Operation and maintenance manuals per Section 01 33 04 "Operation and Maintenance Data." Preliminary operation and maintenance data must be approved before installation, testing, and initial operation of equipment or providing training required by the Section.

1.03 SCHEDULING OF TRAINING

A. Coordinate training services with startup and initial operation of equipment on days and times Owner is available.

B. Training may be required outside of normal business hours to accommodate schedules of operation and maintenance personnel.

C. Provide training of Owner's personnel after acceptable preliminary operation and maintenance manuals have been approved.

D. Coordinate training with equipment startup and testing and availability of Owner's personnel.

E. Provide a proposed training schedule for review and acceptance by OPT showing all training required in the Contract Documents. Demonstrate compliance with specified training requirements relative to number of hours of training, number of training sessions, and scheduling.

F. Submit initial training schedule at least 60 days before scheduled start of first training session. Submit final training schedule, incorporating revisions in accordance with OPT's comments, no later than 30 days prior to starting the first training session.

G. Owner reserves the right to modify personnel availability for training in accordance with process or emergency needs.

H. Schedule for training is to be approved by Owner.

1. Schedule training and startup operations for no more than one piece of equipment or system at a time.

2. Owner may require re-scheduling of training if operations personnel are not available for training on a scheduled date.

3. Provide a minimum of 2 weeks' notice if training must be rescheduled.

4. Training is to be limited to 24 hours per week.

5. Time required for training is to be included in the development of the Project schedule.

I. Schedule and coordinate training for equipment or systems which depend upon other equipment or systems for proper operation so that trainees can be made familiar with the operation and maintenance of the entire operating system.

1.04 SERVICES OF SUPPLIER'S REPRESENTATIVE

A. Supplier's instructors must be factory-trained by the equipment manufacturer.

B. Instructors must have knowledge of the theory of operation and practical experience with the equipment or system.

C. Instructors must be proficient and experienced in conducting training of the type required and must have successfully conducted similar training courses.

D. Qualifications of instructors are subject to acceptance by OPT. Provide services of replacement instructor with acceptable qualifications if OPT does not accept qualifications of proposed instructor. Include each instructor's résumé and specific details of instructor's operating, maintenance, and training experience relative to the specific equipment for which instructor will provide training to demonstrate their qualifications.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 OPERATOR TRAINING

A. Provide classroom and hands-on training of the care and operation of the equipment to the Owner's personnel.

B. Provide training in adequate detail to ensure that the trainees who complete the program will be qualified and capable of operating and maintaining the equipment, products, and systems provided.

C. Provide a training plan that indicates the schedule and sequence of the training programs. The training plan is to include for each course:

1. Number of hours for the course;
2. Agenda and narrative description, including the defined objectives for each lesson;
3. Draft copy of training handbooks;
4. A descriptive listing of suggested reference publications;
5. Audio-visual equipment required for training; and
6. Type and number of tools or test equipment required for each training session.

D. Provide and use training aids to complement the instruction and enhance learning.

1. Provide training handbooks for use in both the classroom and the hands-on phases of training for each course.
2. Instructional materials must include references to the operation and maintenance manuals and identify and explain the use of the manual.
3. Provide a copy of all audio/visual training materials used in the presentations to the Owner.

E. Operations training is to include:

1. Orientation to provide an overview of system/subsystem configuration and operation;
2. Terminology, nomenclature, and display symbols;
3. Operations theory;
4. Equipment appearance, functions, concepts, and operation;
5. Operating modes, practices, and procedures under normal, diminished, and emergency conditions;
6. Startup and shutdown procedures;
7. Safety precautions;
8. On-the-job operating experience for monitoring functions, supervisory, or command activities. Include functions and activities associated with diminished operating modes, failure recognition, and responses to system/subsystem and recovery procedures; and
9. Content and use of operation and maintenance manuals and related reference materials.

F. Provide training for performing on-site routine, preventive, and remedial maintenance of the equipment or system. Maintenance training is to include:

1. Orientation to provide an overview of system/subsystem concept, configuration, and operation;
2. Operations theory and interfaces;

3. Instructions necessary to ensure a basic theoretical and practical understanding of equipment appearance, layout, and functions;
4. Safety precautions;
5. Use of standard and special tools and test equipment;
6. Adjustment, calibration, and use of related test equipment;
7. Detailed preventive maintenance activities;
8. Troubleshooting, diagnostics, and testing;
9. Equipment assembly and disassembly;
10. Repair and parts replacement;
11. Parts ordering practices and storage;
12. Failure and recovery procedures;
13. Cabling and/or interface connectors;
14. Content and use of operation and maintenance manuals and related reference materials;
15. Procedures for warranty repairs;
16. Lubrication; and
17. Procedures, practices, documentation, and materials required to commence system maintenance.

G. Provide training for the equipment listed in the table below. The table indicates the minimum acceptable training time. Provide additional hours of training if required to meet the training objectives described in this Section.

Specification Section	Equipment/System Description	Min. Hours
40 05 50	Fabricated Gates	4

END OF SECTION

DIVISION 02

EXISTING CONDITIONS

02 41 00 DEMOLITION

1.00 GENERAL

1.01 WORK INCLUDED

A. Furnish labor, materials, equipment and incidentals necessary for every type of required demolition.

B. Furnish equipment of every type required to demolish and transport construction debris away from the Site.

C. Coordinate all demolition work with Section 01 35 00 “Special Procedures” if required.

1.02 STANDARDS

A. Work shall be performed in accordance with the codes and ordinances of the agency having authority over the Place of Record.

B. Resilient Floor Covering Institute (RFCI) publication “Recommended Work Practices for the Removal of Resilient Floor Coverings”

C. Occupational Safety and Health Association (OSHA), 29 CFR Parts 1010 and 1926, “Occupational Exposure to Asbestos, Tremolite, Anthophyllite, and Actinolite”, 40 CPR Part 61 - “National Emission Standard for Hazardous Air Pollutants”

1.03 DELIVERY AND STORAGE

A. Stockpile construction debris at the Site only as long as necessary to haul to a disposal site. Stack materials neatly and handle in an orderly manner until removed from the Site.

1.04 JOB CONDITIONS

A. Contractor shall visit the Site and determine the extent of demolition required and the Site conditions that might affect its proposal. Include costs of covering all aspects of the demolition as part of the proposal.

B. The Drawings shall be carefully reviewed to determine the extent of necessary demolition and to identify elements of the existing construction which are to remain in place. Report any discrepancies to Owner and Engineer before disturbing existing conditions. Property lines and limits of demolition shall be accurately located prior to beginning site demolition. Start of demolition activities shall represent confirmation by Contractor that existing conditions are as presented in the Contract Documents. Demolition outside the limits indicated on the Drawings, or outside the property lines shall not be performed.

1. For electrical demolition, verify field measurements and circuiting arrangements are as shown on the Drawings. Verify that existing wiring and equipment designated to be abandoned or demolished serve only abandoned facilities.

2. For process piping demolition confirm with the Owner that current operations will not be impacted and provide temporary equipment with Owner to keep systems functional during demolition process if required.

C. Material removed during demolition, and any equipment not otherwise designated to remain the property of the Owner, shall become the property of the Contractor, and shall be promptly removed from the Site.

D. Equipment and material designated as remaining the property of the Owner shall be removed from the structure and transported to a designated location on the Site and stored for the Owner's use. Store on wood runners raised above the surrounding grade and cover with weather resistant covering that is tied securely in place.

E. Take necessary precautions in removing Owner designated property to prevent damage during the demolition process. Equipment shall be removed in one piece. Loose components may be removed separately. Controls and electrical equipment may be removed from the equipment and handled separately. Large units, such as motor driven pumps, may be dismantled and motors handled separately. Do not use a cutting torch to separate the Owner's equipment or material. Salvaged piping shall be taken apart at flanges or fittings and removed in sections.

2.00 PRODUCTS

2.01 MATERIALS

A. New materials and equipment for patching and extending work shall meet the requirements of the individual Sections in these Contract Documents. For materials not addressed in these documents, materials used shall meet or exceed the dimensions and quality of the existing work.

3.00 EXECUTION

3.01 SITE CLEARING

A. Perform site clearing to the limits indicated on the Drawings. Scrape the Site, removing brush, trees, weeds and trash. Haul debris away from the Site to an approved site as it accumulates.

B. Grub out tree and brush roots within the limits of buildings, parking lots, driveways and other structures. Remove rock out-croppings and boulders from any area within the limits of grading or structures. Remove roots and backfill any excavation resulting from tree removal with suitable soil for final grading plan.

C. Trees not located within the construction limits, or otherwise indicated for removal, shall remain in place. Visit the Site with the Engineer or Owner and identify those trees that are to remain. Mark all other trees with yellow paint to indicate removal. Protect remaining trees during construction. Wrap the tree trunks with 2 x 4 timbers if construction equipment must operate in close proximity to them.

D. Only designated trees shall be removed. In the event that trees other than those designated are erroneously removed or damaged to the point of distress, install replacement trees of equal size and number to compensate for those destroyed, at no additional cost to the Owner.

3.02 BUILDING DEMOLITION

A. Where conduit, piping, or other utilities are presently installed under concrete slabs and the underground portion of the component is to be abandoned in place, remove conduit or piping to a point 2 inches below level of concrete slab surface and cap off. Abandon under floor conduit and piping. Patch concrete as required to match surrounding area.

3.03 REMOVAL OF EXISTING SITE STRUCTURES

A. Remove concrete or masonry structures located below the ground line where indicated or where such structures will interfere with new construction. Where structures are a part of an active underground utility system, repair piping to prevent blockage in the flow.

B. Remove abandoned manholes, basins, or similar structures. With the Engineer's approval, and if structures will not interfere with any other proposed construction, they may be abandoned in place. Remove the top part of the structure so that it is a minimum of 2 feet below the new finish grade. Fill remaining cavities with approved backfill material.

3.04 UNDERGROUND PIPING

A. Contractor shall be responsible for obtaining location of underground utilities at the Site. Arrange for all applicable utility companies to accurately locate underground piping and set color-coded flags along the pipe route. Investigate utility company's records to ascertain depths and sizes of piping and other ancillary features.

B. In the event that exact location of piping cannot be obtained, dig test holes as necessary to establish location of piping. Contractor shall not use mechanical digging machines within 6 feet of any active buried piping. For a distance of 4 feet on either side of buried piping, all digging shall be by hand excavation. If the piping is not active, or is to be abandoned or removed, any form of excavation may be used. Any existing active piping that is damaged during demolition will be repaired to new condition by the Contractor at no additional cost to the Owner.

3.05 BACKFILLING

A. Backfill cavities resulting from demolition. Fill cavities occurring within the limits of buildings, structures, or pavements in accordance with the requirements of other Sections of the Specifications. Backfill and compact cavities outside the construction limits to the same density as the surrounding earth. No testing is required for backfill outside the limits of new construction.

3.06 CLEANING AND REPAIR

A. Clean and repair existing materials and equipment which remain or are to be reused.

B. Lights: Use mild detergent to clean all exterior and interior surfaces. Rinse with clean water and wipe dry. Replace lamps and broken electrical parts impacted by the demolition processes.

END OF SECTION

DIVISION 03

CONCRETE

03 30 00.01 CAST-IN-PLACE CONCRETE (LIMITED APPLICATIONS)

1.00 GENERAL

1.01 SUMMARY

A. This Section specifies normal weight, cast-in-place concrete, including reinforcement, concrete materials, mixture design, placement procedures, and finishes.

1.02 SUBMITTALS

A. Product Data and Material Certifications: For each product or material indicated in Part 2.00 "Products," excluding formwork.

B. Design Mixture: For each concrete mixture submit:

1. Mix design proportions and characteristics.
2. Certifications indicating conformance of aggregate and cementitious materials.
3. Admixture data sheets.
4. Field test data or trial batch mixture data to validate specified compressive strength in accordance with ACI 301, latest edition.

C. Reinforcing bar layout drawing with bar lists clearly marked and referenced to the Drawings.

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.

B. Source Limitations: Obtain each type of cement of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.

C. Comply with ACI 301, "Specification for Structural Concrete," including the following sections, unless modified by requirements in the Contract Documents:

1. "General Requirements."
2. "Formwork and Formwork Accessories."
3. "Reinforcement and Reinforcement Supports."
4. "Concrete Mixtures."
5. "Handling, Placing, and Constructing."

D. Comply with ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

2.00 PRODUCTS

2.01 FORMWORK

A. Furnish formwork and formwork accessories according to ACI 301.

1. Form ties shall leave no material within 1-1/2 inches of concrete surface.

2. For fluid bearing and below grade walls, provide single tie rods with midpoint washer to prevent water seepage. Systems that result in a through wall hole are not permitted.

2.02 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A615/A615M, Grade 60, deformed.

B. Plain-Steel Welded Wire Reinforcement: ASTM A1064, fabricated from as-drawn steel wire into flat sheets.

C. Supports:

1. Unexposed Surface: CRSI Class 3 – No Protection.

2. Exposed Surface: CRSI Class 1 – Maximum Protection – uniform high density polyethylene (plastic) or fiberglass reinforced plastic (FRP). Plastic protected wire bar supports are not allowed.

2.03 CONCRETE MATERIALS

A. Cementitious Material:

1. Portland Cement: ASTM C150, Type I/II or II.

2. Fly Ash: ASTM C618, Class F. No more than 25 percent of the cement may be replaced with fly ash.

B. Coarse Aggregate: In conformance with ASTM C33, uniformly graded, with a maximum size as indicated in “Concrete Mixtures.”

1. Class: Moderate weathering region, but not less than 1N.

C. Fine Aggregate: Washed and screened natural sands or sands manufactured by crushing stones; conforming to ASTM C33.

D. Water: Potable and complying with ASTM C1602 and ASTM C1602 Table 2.

2.04 ADMIXTURES

A. Air-Entraining Admixture: ASTM C260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C494/C494M, Type A.

2. Retarding Admixture: ASTM C494/C494M, Type B.

3. Water-Reducing and Retarding Admixture: ASTM C494/C494M, Type D.

4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.

5. High-Range, Water-Reducing and Retarding Admixture: ASTM C494/C494M, Type G.

6. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II.

2.05 RELATED MATERIALS

A. Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber, or ASTM D1752, cork or self-expanding cork.

B. Repair Materials: Pre-packaged, low-shrink, non-slump, non-metallic, quick setting patching mortar, as approved by the manufacturer for each application.

1. Sikatop 123 by Sika Corporation.

2. Five Start Structural Concrete by Five Star Products, Inc.

3. Approved equal.

C. Non-Shrink Grout: Pre-packaged, non-metallic, precision, non-shrink grout conforming to ASTM C1107/C1107M.

D. Normal Shrinkage Grout: One part Portland cement to three parts of ASTM C33 fine aggregate; proportioning on a volumetric basis. Install for grouted areas not required to be non-shrink grout.

E. Waterstops: Place in joints where indicated and any intersecting construction joints to provide a continuous barrier to prevent passage of fluids through joints.

1. Flexible PVC Waterstops: 6 inches, ribbed, with a minimum thickness of 3/8 inch, USACE CRD-C-572 compliant.

2. Self-Expanding Strip Waterstops, Low Expansion (Hydrophilic):

a. KBA-1510FP; Adeka Ultra Seal; Mitsubishi International Corporation.

1). P-201 swelling sealant adhesive.

F. Bonding Agent: ASTM C1059, Type II, non-redispersible, acrylic emulsion.

G. Zinc Richer Primer: Coat aluminum surfaces embedded or in contact with concrete. Primer shall be Tneme-Zinc or approved equal.

H. Vapor Barriers: ASTM E1745, Class A. Include manufacturer's recommended pressure-sensitive tape.

1. Stego Wrap Vapor Barrier (15-mil), Stego Tape, and Stego Crete Claw; Stego Industries, LLC.

2. Approved equal.

2.06 CONCRETE MIXTURES

A. Comply with ACI 301 requirements for concrete mixtures.

B. Normal-Weight Concrete: Prepare design mixes, proportioned according to ACI 301, as follows:

Use	Min. 28-Day Compressive Strength (psi)	Max. Size of Coarse Aggregate	Max. Water/ Cement Ratio	Max Slump (in.)
General	4000	1-1/2”	0.45	5* (+/-1”)
Pipe blocking, lean concrete	1500	1-1/2”	0.70	---

*Slump may be increased to 8 inches with the addition of a HRWR.

2.07 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C94/C94M, and furnish batch ticket information.

3.00 EXECUTION

3.01 FORMWORK

A. Design, construct, erect, brace, and maintain formwork according to ACI 301.

3.02 STEEL REINFORCEMENT

A. Comply with CRSI’s “Manual of Standard Practice” for fabricating, placing, and supporting reinforcement.

1. Fabricate reinforcement steel to provide lapped connections, bends, and transitions in reinforcement as required for continuity of the typical reinforcement specified on the Drawings.

2. Unless otherwise detailed, intersecting wall and/or beam reinforcement shall extend to the far face and terminate in a standard hook. Reinforcement at the outside face of corners shall be continuous or provide tension lap splices at each side of the corner.

B. Do not weld reinforcement.

3.03 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete. Purposefully roughen joints to a 1/4-inch amplitude and clean.

B. Construction Joints: Locate joints as indicated or as approved by Owner’s Representative.

C. Isolation Joints: Install joint-filler strips at junctions with slabs-on-grade and vertical surfaces, and as indicated.

1. Extend joint fillers full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.

3.04 WATERSTOPS

A. Install in construction joints as indicated to form a continuous obstruction to prevent fluids passing through the joint.

B. Secure waterstops to concrete or reinforcing as recommended by the manufacturer.

C. Install and protect waterstops as recommended by the manufacturer and as indicated here.

D. PVC Waterstops:

1. All fittings and changes in direction shall be factory fabricated.

2. Only straight, butt splices shall be made in the field. Field splices shall be in accordance with manufacturer's instructions.

3. Secure waterstop in place using hog rings or grommets at the outermost rib. Except as recommended by the manufacturer, do not pierce, notch, or cut waterstop.

E. Self-Expanding Strip Waterstops:

1. Bond waterstop to substrate using continuous bead of swelling sealant or adhesive as recommended by the manufacturer.

2. Install in longest lengths practical. Splice as required; lap in accordance with manufacturer's recommendations.

3. Protect from moisture, oil, dirt, and sunlight.

3.05 CONCRETE PLACEMENT

A. Comply with ACI 301 for measuring, batching, mixing, transporting, and placing concrete.

B. Additional water may only be added to concrete prior to placement and only at Project Site. Slump shall be evaluated prior to and after the addition of all water. Do not take strength cylinders until after addition of all water.

1. Quantity of water shall not exceed the amount withheld at the batch plant. Quantity withheld shall be indicated on the batch ticket. Addition of water shall not result in a slump or water-cement ratio greater than that specified.

C. Do not allow concrete to free fall more than 5 feet. With HRWR concrete may free fall a maximum of 10 feet.

D. Consolidate concrete with mechanical vibrating equipment.

3.06 FINISHING UNFORMED SURFACES

A. General: Comply with ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Screed surfaces with a straightedge and strike off. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane before excess moisture or bleedwater appears on surface. Do not further disturb surfaces before starting finishing operations.

C. Float Finish: Apply float finish to surfaces to receive trowel finish or nonslip broom finish. Except as indicated below, apply a final "light float" finish to the surface as the concrete hardens. Surface shall have a uniform granular texture and shall meet the straightness requirements.

D. Trowel Finish: Apply a normal steel trowel finish to interior surfaces exposed to view and grouted surfaces in junction boxes.

E. Nonslip Broom Finish: Apply a nonslip broom finish to exterior concrete sidewalk and ramp surfaces. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.

3.07 FINISHING FORMED SURFACES

A. No Finish: After forms are removed, repair or patch tie-holes and defects. Otherwise, no additional finish is required. Apply to surfaces which are not visible from the inside or outside of the completed structure or less than 12 inches below finish grade (i.e. back of retaining walls below embankment, etc.).

B. Smooth-Formed Finish: As-cast surface texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch. Apply to surfaces exposed to view and 12 inches below finish grade.

C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.08 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 301. Additionally, comply with ACI 306.1 for cold-weather protection and with ACI 305.1 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb./sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

D. Curing Methods: Cure formed and unformed concrete for at least 7 days by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than 7 days with the following materials:

   a. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

3.09 MISCELLANEOUS CONCRETE ITEMS

A. Non-Shrink Grout: Install and cure as recommended by manufacturer, and as required here:

1. Clean and roughen exposed concrete surface; remove laitance. Saturate the foundation 24 hours before installation. Surface shall be clear of standing water. Baseplates shall be free of oil, grease, and other objectionable substances.

2. Steel trowel exposed edges.

3. Moist cure as specified by manufacturer, but not less than 3 days.

B. Normal Shrinkage Grout:

1. Clean and roughen exposed concrete surface, remove laitance. Saturate the foundation 24 hours before installation. Surface shall be clear of standing water. Apply scrub coat of grout immediately prior to grout placement. While scrub coat is still moist install grout.

2. Wet cure as specified for concrete.

C. Bonding Agent: Install according to the manufacturer's recommendations and written instructions.

1. Bonding agent shall be Sika Armatec 110 EpoCem by Sika Corporation.

3.10 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement according to requirements specified in this Article.

B. Tests: Perform according to ACI 301.

1. Testing Frequency: One composite sample shall be obtained for each day's pour of each concrete mix exceeding 5 cu. yd. but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.

3.11 REPAIRS

A. Remove and replace concrete that does not comply with requirements in this Section.

B. Repair materials and surface preparation shall be completed in accordance with manufacturer recommendations. Coordinate with Owner's Representative prior to beginning any demolition of defective area.

END OF SECTION

DIVISION 05

METALS

05 50 00 METAL FABRICATIONS

1.00 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Aluminum framing and supports for mechanical and electrical equipment.
2. Aluminum framing and supports for applications where framing and supports are not specified in other Sections.
3. Metal floor plate and supports.
4. Metal bollards.

B. Products furnished, but not installed, under this Section:

1. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete.
2. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

C. Related Sections:

1. Section 03 30 00 “Cast-In-Place Concrete” for installing anchor bolts, steel pipe sleeves, slotted-channel inserts, wedge-type inserts, and other items cast into concrete.

1.03 ACTION SUBMITTALS

A. Product Data: For the following:

1. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts.

B. Shop Drawings: Show fabrication and installation details for metal fabrications.

1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

1.04 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified professional engineer.

B. Mill Certificates: Signed by manufacturers of stainless-steel certifying that products furnished comply with requirements.

C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

1.05 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.06 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

1.07 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorages and steel weld plates and angles for casting into concrete. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete. Deliver such items to Project site in time for installation.

2.00 PRODUCTS

2.01 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.02 FERROUS METALS

A. Steel Pipe: ASTM A53/A53M, standard weight (Schedule 40) unless otherwise indicated.

2.03 NONFERROUS METALS

A. Aluminum Plate and Sheet: ASTM B209 (ASTM B209M), Alloy 6061-T6.

B. Aluminum Extrusions: ASTM B221 (ASTM B221M), Alloy 6063-T6.

C. Aluminum-Alloy Rolled Tread Plate: ASTM B632/B632M, Alloy 6061-T6.

D. Aluminum Castings: ASTM B26/B26M, Alloy 443.0-F.

2.04 FASTENERS AND ANCHORS

A. General: Unless otherwise indicated, provide Type 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941 (ASTM F1941M), Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.

1. Provide stainless-steel fasteners for fastening aluminum.

B. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F593 (ASTM F738M); with hex nuts, ASTM F594 (ASTM F836M); and, where indicated, flat washers; Alloy Group 2 (A4).

2.05 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

2.06 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Form exposed work with accurate angles and surfaces and straight edges.

E. Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

2. Obtain fusion without undercut or overlap.

3. Remove welding flux immediately.

4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing.

F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.

G. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

2.07 METAL FLOOR PLATE

A. Fabricate from rolled-aluminum-alloy treadplate of thickness indicated below:

1. Thickness: As indicated.

B. Provide grating sections where indicated.

C. Provide aluminum supports as indicated.

2.08 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

3.00 EXECUTION

3.01 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

2. Obtain fusion without undercut or overlap.

3. Remove welding flux immediately.

4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:

1. Cast Aluminum: Heavy coat of bituminous paint.

2. Extruded Aluminum: Two coats of clear lacquer.

G. Anti-Seize Lubricant: Where stainless steel nuts and bolts will be installed, apply anti-seize lubricant to threads as recommended by lubricant manufacturer to prevent seizure of nut and bolt during installation or upon removal at a future date.

3.02 FIELD QUALITY CONTROL

A. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

1. Corrective measures shall be taken when welding is unsatisfactory or indicates inferior workmanship. Chip and grind if the removal of part of the weld or a portion of the base metal is required. Where deposition of additional weld material is necessary, the sides of the area to be welded shall have no less than one to one (1:1) slope to allow room for

depositing new material. Correct defective or unsound welds by the removal and replacement of the entire weld using the following procedures:

a. Excessive Convexity: Reduce to size by removal of excess weld metal by grinding.

b. Shrinkage Cracks, Cracks in Base Metal, Craters and Excessive Porosity: Remove defective portions of base and weld material down to sound metal, and deposit additional sound material.

c. Undercutting, Undersize, and Excessive Concavity: Clean and deposit additional weld metal.

d. Overlapping and Incomplete Fusion: Remove and replace the defective portion of the weld.

e. Slag Inclusion: Remove those parts of the welds containing slag. Fill with sound weld metal.

f. Removal of Adjacent Base Metal during Welding: Clean and form full size by depositing weld material.

2. Remove cracked welds throughout their length.

3. Where work performed subsequently to the making of the deficient weld has rendered the weld inaccessible, or has caused new conditions which make connection of the deficiency dangerous or ineffectual, restore the original conditions by removing welds or members, or both before making the necessary corrections. Another option is to compensate for the deficiency with additional work according to the revised design, approved by the Engineer.

4. Cut apart and reweld improperly fitted and misaligned parts.

5. Straighten members distorted by heat of welding using mechanical means or by carefully supervised application of a limited amount of localized heat. Heated areas shall not exceed 1200 degrees Fahrenheit as measured by Tempilsticks. Parts to be heated for straightening shall be free from external stress forces, except when mechanical means are used in conjunction with heat application.

6. If faulty welding or its removal for rewelding damages the base metal so that, in the Engineer's judgment, it is not in accordance with the intent of the Contract Documents, remove and replace the damaged material and compensate for the deficiency in a manner acceptable to the Engineer.

7. Maximum space between pieces or members for fillet welds shall be 1/16 inch. Only effective portion shall be considered in measuring fillet welds.

END OF SECTION

DIVISION 26

ELECTRICAL

26 01 26 TESTING OF ELECTRICAL SYSTEMS

1.00 GENERAL

1.01 WORK INCLUDED

A. Furnish labor, material, equipment, and incidentals of an independent testing agency.

B. These specifications cover the suggested field tests and inspections that are available to assess the suitability for initial energization and final acceptance of electrical power equipment and systems.

C. The purpose of these specifications is to assure that electrical equipment and systems are operational, are within applicable standards and manufacturer's tolerances, and are installed in accordance with design specifications.

D. The Work specified in these specifications may involve hazardous voltages, materials, operations, and equipment. These specifications do not purport to address all of the safety issues associated with their use. It is the responsibility of the user to review all applicable regulatory limitations prior to the use of these specifications.

E. Testing shall be inclusive of all low voltage equipment including conductors that are provided under this Contract.

F. Testing shall include all relay protective schemes and operation of the low voltage equipment.

1.02 QUALITY ASSURANCE

A. Testing Organization:

1. The testing organization shall be an independent, third party entity which can function as an unbiased testing authority, professionally independent of the manufacturers, suppliers, and installers of equipment or systems being evaluated.

2. Testing organization shall be regularly engaged in the testing of electrical equipment devices, installations, and systems.

3. The Testing organization shall use technicians who are regularly employed for testing services.

4. An organization having a designation of NETA Accredited Company issued by the International Electrical Testing Association meets the above criteria.

5. Testing Organization performing the Work shall submit appropriate documentation to demonstrate that it satisfactorily complies with these requirements.

6. Acceptable Testing Agencies:

a. National Field Services.

b. Real Power Technologies.

c. Shermco Industries.

d. Electrical Power Systems.

e. Absolute Testing

f. Power Engineering Services (PES)

7. Testing Personnel:

a. Technicians performing these electrical tests and inspections shall be trained and experienced concerning the apparatus and systems being evaluated. These individuals shall be capable of conducting the tests in a safe manner and with complete knowledge of the hazards involved. They must evaluate the test data and make a judgment on the serviceability of the specific equipment.

b. Technicians shall be certified in accordance with ANSI/NETA ETT, Standard for Certification of Electrical Testing Technicians. Each on-site crew leader shall hold a current certification, Level 3 or higher, in electrical testing.

1.03 SUBMITTALS

A. Submittals shall be in accordance with Section 01 33 00 “Document Management” and shall include:

1. Electrical Qualifications & List of Test Submittals: 60 days prior to any testing taking place, Contractor shall submit to the Owner/Engineer the name of the testing agency; a list of all tests to be conducted shall also be submitted at this same time. No testing shall take place until this has been submitted and approved by the Engineer.

2. Electrical Testing Plan: A minimum of 2 weeks before testing is to take place, Contractor shall submit a detailed testing plan of the different configurations to be tested for the Owner’s and Engineer’s approval.

3. Electrical Testing Report:

a. A written report shall be submitted by the testing agency performing installation checks, operation, and testing of the low voltage equipment. This report shall certify that:

1). The equipment has been properly installed.

2). Is in accurate alignment.

3). Meets the acceptance testing specifications of NETA and the equipment manufacturer.

b. Provide a detailed list of all tests that were performed and the test results as part of the Electrical Testing Report.

c. Electrical Testing Report(s) shall be submitted to the Engineer for approval no later than 1 week after testing has been conducted.

1.04 STANDARDS

A. The applicable provisions of the following standards shall apply as if written here in their entirety:

1. American National Standards Institute (ANSI).

2. Association of Edison Illuminating Companies (AEIC).

3. ASTM International (ASTM).
4. Electrical Apparatus Service Association (EASA).
5. Institute of Electrical and Electronic Engineers (IEEE).
6. Insulated Cable Engineers Association (ICEA).
7. International Electrical Testing Association (NETA).
8. National Electrical Manufacturers Association (NEMA).
9. National Fire Protection Association (NFPA).
10. Occupational Safety and Health Administration (OSHA).
11. State and local codes and ordinances.
12. Underwriters Laboratories, Inc. (UL).

2.00 PRODUCTS (NOT APPLICABLE)

3.00 EXECUTION

3.01 GENERAL

A. All testing shall be witnessed by the Owner's representative. Types of equipment required to be tested by these specifications shall include but not be limited to the following:
   1. Low Voltage Cables.
   2. Grounding.
B. At a minimum, unless indicated otherwise, all testing shall be in accordance with the manufacturer's recommendations for energization and startup of the equipment.
C. Testing shall include a complete functionality testing of electrical equipment under all the different operating parameters identified by the Owner and Engineer.
D. Electrical testing instrument calibration shall be as indicated in ANSI/NEMA ATS-2017.

3.02 TEST REPORT

A. The test report shall include the following:
   1. Summary of the Project.
   2. Description of equipment tested.
   3. Description of tests.
   4. Test data.
   5. Analysis and recommendations.
B. Test data records shall include the following minimum requirements:
   1. Identification of the testing organization.
   2. Equipment identification.
   3. Nameplate data.

4. Humidity, temperature, and other conditions that may affect the results of the tests and/or calibrations.
5. Date of inspections, test, maintenance, and/or calibrations.
6. Identification of the testing technician.
7. Identification of inspections, tests, maintenance, and/or calibrations to be performed and recorded.
8. Identification of expected results when calibrations are to be performed.
9. Identification of as-found and as-left results, as applicable.
10. Identification of all test results outside of specified tolerances.
11. Sufficient spaces to allow all results and comments to be indicated.

C. The testing organization shall furnish a copy or copies of the complete test report as specified.

3.03 TEST DECAL

A. The testing organization shall affix a test decal on the exterior of equipment or equipment enclosure of protective devices after performing electrical tests.

B. The test decal shall be color-coded to communicate the condition of maintenance for the protective device. Color scheme for condition of maintenance of overcurrent protective device shall be:

1. White: Electrically and mechanically acceptable.
2. Yellow: Minor deficiency not affecting fault detection and operation, but minor electrical or mechanical condition exists.
3. Red: Deficiency exists affecting performance, not suitable for service.

C. The decal shall include:

1. Testing organization.
2. Project identifier.
3. Test date.
4. Technician identifier.

3.04 POWER SYSTEM TESTING

A. Contractor shall test the operation of the power distribution system, i.e. transformers, automatic throw over, double throw disconnect switches, 480V MCC, etc., for the various possible system configurations under load conditions.

B. Testing shall include, but not be limited to the following:

1. Normal power from Utility Source 1.

C. Contractor shall submit a detailed testing plan of the different configurations to be tested for the Owner's and Engineer's approval.

END OF SECTION

26 05 00 COMMON WORK RESULTS FOR ELECTRICAL

1.00 GENERAL

1.01 WORK INCLUDED

A. Furnish labor, materials, equipment, and incidentals necessary for complete and operational electrical systems, as specified herein.

B. This Section, as well as Division 1, concerns all other Sections in Division 26 shall be considered a part of each of those Sections as if written in their entirety.

C. Contractor shall be responsible to coordinate labor and materials required to install and test all control panels, electrical equipment and instrumentation furnished by process equipment suppliers identified under this Contract.

D. Temporary utilities:

1. Contractor may need to include generator power for outages, depending on the Contractors' means and methods of connecting to existing power equipment.

2. Contractor shall provide electrical testing and inspection services for temporary connections to existing equipment.

3. Fusing for temporary equipment shall be coordinated with upstream devices to ensure the fuses will terminate before interrupting electrical service to plant process equipment.

E. Electrical outages must be coordinated with operations, as well as the electrical, instrumentation, and inspections divisions and be at least two weeks in advance of planned outage.

1. Known possible electrical outages include:

a. Breaker installation into MCC.

2. Shut down sequencing shall be coordinated by the Contractor and if a generator is required to power equipment to maintain service, Contractor shall be responsible to provide the generator, fuel, and conductors required to keep the plant operational.

1.02 QUALITY ASSURANCE

A. Electrical Contractors' Qualifications:

1. Use adequate numbers of skilled workmen, trained, and experienced in their crafts, and who are familiar with the Specifications and methods of performing the Work in this Division. A licensed Journeyman shall be on-site at all times when electrical Work is being performed. Electrical Work shall be performed under the direct supervision of a Master Electrician who holds a valid license in Texas. Contractor shall provide a monthly report to the Owner/Engineer for review stating that the Master Electrician has been to the Site and thoroughly reviewed the Work. The report shall be signed by the Master Electrician and include the data and time the Master Electrician was on the Site.

2. Contractor's company must have 10 years of experience with performing electrical Work within wastewater treatment plants.

B. Workmanship: Work shall be performed in accordance with quality, commercial practices. The appearance of finished Work shall be of equal importance with its operation. Materials and equipment shall be installed based upon the actual dimensions and conditions at the Site. Locations for materials or equipment requiring an exact fit shall be field measured.

1.03 SUBMITTALS

A. Submittals shall include the corresponding section and sub section(s) at the top left or right of each sheet.

B. Submittals shall include the entire corresponding specification at the front of the document with markings of C, D, E, or N/A beside each section and sub section(s). C, D, E, or N/A will be noted as comply, deviate, exception, or not applicable.

C. Submittals shall be in accordance with Section 01 33 00 “Document Management” and shall include:

1. Submittals shall be submitted separated by specification section. Combined submittals will not be reviewed. Submittal will be marked not approved, revise and resubmit.
2. Incomplete submittals will not be reviewed and will be marked revise and resubmit.
3. Resubmittals shall be marked with a red strike-through for the items removed from the submittal and clouded with the items added to the submittal. Submittals shall be marked to track changes between resubmittals.
4. Component catalog number and manufacturing data sheet, indicating pertinent data and identifying each component by the item number and nomenclature as specified.
5. Component drawings showing dimensions, mounting, and external connection details in AutoCAD format.
6. Operation and maintenance manuals shall contain the Shop Drawings, submittals, spare part lists, schematics, project-specific final wiring diagrams with any changes made during startup and maintenance procedures.
7. Unless other additional information is required by the detailed equipment specifications, the following information shall be included for motors:
    a. Motor identification number and nomenclature as specified.
    b. Make and motor type.
    c. Brake horsepower of the motor.
    d. Locked rotor current at full load.
    e. Motor efficiency at full load (3-phase motors only).
    f. Starting torque.
    g. Method of insulating and impregnating motor coils (3-phase only).
    h. Speed of the motor at full torque.
    i. Full load current.
    j. Service factor.

k. Motor temperature rise measured by resistance over 40 degrees C ambient.

D. Delays during submittals due to the Contractor not following the format mentioned above shall not be the fault of the Owner or Engineer.

E. Contractor shall:

1. Prepare, and keep up to date, the Record Drawings and detailed construction drawings.

2. Record the exact locations of each of these differences, sizes and details of the Construction Work as executed, with cross-references to and other requirements on the Record Drawings.

3. Keep the Record Drawings on the Work Site.

4. Upon completion of the Work, or at such other time as may be determined by the Engineer, submit the Record Drawings and copies to the Owner's representative in accordance with the Owner's Requirements.

5. Underground Interference drawing showing all underground duct banks, ground rods, ground conductors, pipes, piers, vaults, manholes, pull boxes, etc. that clearly identifies the location and routing of these systems. All interferences shall be brought to the Engineer's attention.

6. Provide revised drawings in AutoCAD noting any changes made to equipment during startup.

1.04 STANDARDS

A. Electrical Work shall be executed in accordance with local, state, and national codes, ordinances and regulations which have jurisdiction or authority over the Work. If the standards and codes conflict with each other, the most stringent shall apply. The applicable provisions of the following standard shall apply as if written here in their entirety:

1. American National Standards Institute (ANSI).

2. Association Edison Illuminating Companies (AEIC).

3. ASTM International (ASTM).

4. Environmental Protection Agency (EPA).

5. Institute of Electrical and Electronic Engineers (IEEE).

6. Insulated Power Cable Engineers Association (IPCEA).

7. International Electrical Testing Association (NETA).

8. International Electrotechnical Commission (IEC).

9. Local electrical ordinance.

10. Local utility companies.

11. National Electrical Code (NEC).

12. National Electrical Contractors Association (NECA).

13. National Electrical Manufacturers Association (NEMA).

14. National Electrical Safety Code (NESC).
15. National Fire Protection Association (NFPA).
16. Occupational Safety and Health Administration (OSHA).
17. Rural Electrification Association (REA).
18. Texas Commission on Environmental Quality (TCEQ).
19. Underwriters Laboratories (UL).
20. Uniform Building Code (UBC).

1.05 DELIVERY AND STORAGE

A. Follow the manufacturer's directions for the delivery, storage and handling of equipment and materials. Tightly cover equipment and materials and protect it from dirt, water, chemical or mechanical injury and theft. Major electrical equipment shall be stored indoors and space heaters energized where applicable. Equipment that will be stored indoors for an extended period of time and that do not have space heaters shall have a 100-watt incandescent light placed in it and energized to eliminate the build-up of condensation in the equipment. Coordinate with equipment manufacturer for storage requirements. Damaged equipment shall not be acceptable. Upon installation, protect the materials until the Work is completed and accepted by the Owner.

1.06 JOB CONDITIONS

A. Permits, licenses and inspections shall be secured and paid for as required by law for the completion of the Work. Certificates of approval shall be secured, paid for, and delivered to the Owner before receiving the final acceptance of the Work.

B. The location of materials, equipment, devices, and appliances indicated are approximate and subject to revisions at the time the Work is installed. Final location shall be as proposed by the Contractor and approved by the Engineer.

C. Should project conditions require any rearrangement of Work, or if equipment or accessories can be installed better than the general arrangement of Work on the Drawings, the Contractor shall prepare and submit plans of the proposed rearrangement for the Engineer's review and approval.

D. Motor horsepower ratings identified are anticipated ratings. If the actual equipment is a different size, the Contractor shall provide the appropriate wiring, conduit, over current protection, starters, and accessories for a complete and working system at no cost to the Owner.

E. Contractor is required to abide by the Owner’s construction safety and health program where applicable.

F. Clearances indicated in the National Electrical Code must be maintained around equipment.

2.00 PRODUCTS

2.01 MATERIALS

A. Supplemental or alternative materials supplied and installed by the Contractor shall be approved prior to installation. Materials installed without pre-approval, through the submittals process, shall be removed from the Site and replaced at no additional cost to the Owner. No exceptions.

B. Discrepancies between the Drawings and Specifications shall be addressed prior to bidding the Project, otherwise the most expensive of the two options shall be assumed.

3.00 EXECUTION

3.01 INSTALLATION

A. All enclosures for equipment unless specifically identified otherwise shall be:

1. NEMA 12 for indoor air-conditioned areas.
2. NEMA 12 enclosures for indoor ventilated areas.
3. NEMA 4X, 316 stainless steel for exterior applications and all other locations.

B. Maintain waterproof integrity of conduit penetrations through enclosures, the roof, exterior walls, and floors.

C. Route all conduits parallel to building lines, columns, or steel route conduits near to columns and roof beams.

D. Do not penetrate the top of enclosures in exterior applications.

3.02 CUTTING AND PATCHING

A. Provide adequate support during cutting operations to prevent any damage to the affected masonry. Where openings are cut through masonry walls, provide lintels or structural supports to protect the remaining masonry. The cutting of structural members shall not be permitted without the specific written approval of the Engineer.

3.03 PAINTING

A. Painting shall be in accordance with Division 09. Maintain the original factory finish on material and equipment installed, unless specifically indicated on the Drawings or Specifications. If the finish is marred in transit or during installation, re-finish to a neat, workmanlike appearance. Leave equipment and raceway systems clean and free of grease, dirt, rust, and in a suitable condition for painting.

3.04 EXCAVATION, TRENCHING, BACKFILLING AND GRADING

A. Prior to any excavation or trenching, notify the Owner's representative, utility companies and Owner's facilities department. Allow sufficient time for utilities to be located prior to excavation to avoid disruption of services. Provide a minimum of 72 hours written notice to the Owner prior to trenching or excavation. Do not proceed with trenching or excavation until authorized by the Owner. Utilities or services which are damaged, which are identified prior to excavation or trenching, or where confirmation by utility companies has not been

obtained verifying that utilities are marked, shall be repaired to operable condition immediately, at no cost to the Owner.

B. Barricade open trenches and excavations for the entire duration of the Project. Barricades for excavations shall have warning lights maintained during hours of darkness. Trenches shall be marked with warning tape, or access to trenches shall be prohibited with readily identifiable sawhorses, warning tape or other acceptable means. Barriers shall be illuminated or recognizable during hours of darkness. Barriers and tape shall be properly maintained at all times.

C. Protect all adjacent Work, structures, and properties. Damage to adjacent Work, structures or properties shall be repaired, or the cost of repair reimbursed in full.

D. All construction areas shall be finally graded as indicated on the Contract Documents, or to the conditions of the Site prior to construction. Grading shall bring the Site back to the existing conditions as close as practical. Turfed areas shall be sodded, or hydro-mulched with matching turf. Landscaping shall be replaced with identical shrubbery, ground cover, or plants as existed. Contractor shall be responsible for maintaining water on new turf and landscaping until established. If new turf and landscaping is impractical due to weather conditions, Contractor shall provide satisfactory arrangements to have turf and landscaping furnished and installed at the earliest opportunity thereafter. Provide a 90-day warranty on new turf and landscaping.

E. Determine if irrigation systems exist prior to trenching and excavation. Obtain record or as-built drawings and locate control wiring and pressure main branches and devices. Determine by actual operation that systems are functional and repair or replace damaged systems to their original condition prior to beginning construction.

F. In cases where high voltage ductbanks may exist, Contractor shall employ safe drilling/excavating techniques such as vacuum excavation, etc.

3.05 LOCKING OF ELECTRICAL FACILITIES

A. Install locks immediately upon the installation of the electrical facility. Provide padlocks for exterior electrical facilities subject to unauthorized entry. Furnish the Owner with two keys per lock up to a quantity of 10 keys. Furnish locks to match the Owner's locking system.

3.06 CLEANING AND ADJUSTING

A. Remove shipping labels, dirt, paint, grease, and stains from equipment. Remove debris as it accumulates. Clean electrical equipment and the entire electrical installation upon completion of the Work.

END OF SECTION

26 05 19 LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

1.00 GENERAL

1.01 WORK INCLUDED

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Furnish labor, materials, equipment, and incidentals necessary to install 2000 volt and below single conductors, cables, wiring connections and terminations. Electrical work shall be in accordance with Section 26 05 50 “Common Work Results for Electrical”.

1.02 SUMMARY

A. Section Includes:

1. Building wires and cables rated 2000 V and less.

2. Connectors, splices, and terminations rated 2000 V and less.

1.03 SUBMITTALS

A. Submittals shall include the corresponding section and sub section(s) at the top left or right of each sheet.

B. Submittals shall include the entire corresponding specification at the front of the document with markings of C, D, E, or N/A beside each section and sub section(s). C, D, E, or N/A will be noted as comply, deviate, exception, or not applicable.

C. Product Data: For each type of product.

D. Product Schedule: Indicate type, use, location, and termination locations.

1.04 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Field quality-control reports.

1.05 QUALITY ASSURANCE

A. Testing Agency Qualifications: Member company of NETA.

1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

1.06 DELIVERY AND STORAGE

A. Deliver cable and wire to the project site in the original packages. Conductors with damaged insulation or exposed nylon jacketing shall not be permitted.

B. Where cut lengths are specified, mark reel footage accordingly. Each reel shall contain one continuous length of cable.

C. Check for reels not completely restrained, reels with interlocking flanges or broken flanges, damaged reel covering or any other indication of damage. Provide impact protection by wood lagging or suitable barrier across the traverse of the reel.

D. Do not drop reels from any height.

E. Unload reels using a sling and spreader bar. Roll reels in the direction of the arrows shown on the reel and on surfaces free of obstructions that could damage the wire and cable.

F. Store cable on a solid, well drained location. Cover cable reels with plastic sheeting or tarpaulin. Do not lay reels flat.

G. Provide moisture protection by using manufacturer's standard procedure or heat shrinkable self-healing end caps applied to both ends of cable. Do not remove end caps until cables are ready to be terminated.

2.00 PRODUCTS

2.01 CONDUCTORS AND CABLES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Alpha Wire Company
2. Belden Inc
3. Encore Wire Corporation.
4. General Cable Technologies Corporation.
5. Southwire Company.
6. Okonite
7. Houston Wire & Cable

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

D. Comply with UL 1277, UL 1685, and NFPA 70 for Type TC-ER cable used in VFD circuits.

E. Conductors: Copper, complying with NEMA WC 70/ICEA S-95-658.

1. Conductor Insulation: Conductor with thermoplastic insulation rated at 600 volts. Wire shall be water tank tested and approved as machine tool wire, in accordance with National Machine Tool Builders Association. Comply with NEMA WC 70/ICEA S-95-658 for Type THHN/THWN-2.

2.02 CONNECTORS AND SPLICES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. 3M Electrical Products.

2. Ideal Industries, Inc.
3. ILSCO.
4. O-Z/Gedney; a brand of Emerson Industrial Automation.
5. AFC Cable Systems, Inc.
6. Hubbel Power systems, Inc.
7. Thomas & Betts Corporation, A Member of the ABB Group.
8. Tyco Electronics Corp.

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. CONNECTORS, COMPRESSION, COPPER, 600 VOLT: The appropriate hole sizes and spacing which are in accordance with NEMA standards; two (2) holes in the tongue for use on conductor sizes 250 kcmil or larger; not required for connections to the circuit breakers in the lighting and/or receptacle panels. All compression connectors shall be long-barrel type, no exceptions.

D. SPLIT BOLTS: Shall be usable for connecting conductors which are both copper, both aluminum or one copper and one aluminum. Split bolts shall have a spacer between the two conductors, which it connects.

E. MECHANICAL SET SCREW CONNECTOR: Consisting of an aluminum body which has openings on opposite ends for insertion of the conductors. Conductors inserted into these holes shall each be clamped by two set screws. Connectors shall be suitable for use with copper conductors.

F. POWER DISTRIBUTION BLOCKS: Rated for 600 VAC at 90C for termination of copper conductors. Individual poles shall be constructed of tin plated aluminum and mounted on an insulating base.

G. WIRENUTS: Silicone-based pre-filled spring wire connecting devices with plastic covering; UL listed for damp and wet locations. Wirenut shall meet requirements of UL 486D for Sealed Wire Connector Systems. Wirenut shall be spring insulated, properly sized and resistant to vibration may be used for No.12 through No.10 solid gauge conductor for lighting and branch circuits only.

H. 600 VOLT VINYL TAPE (PHASE IDENTIFICATION): Scotch Vinyl Electrical Tape 35.

I. 600 VOLT VINYL TAPE: Scotch Vinyl Electrical Tape Super 88.

J. RUBBER TAPE: Scotch Linerless Rubber Splicing Tape 2242 or Scotch Linerless Rubber Splicing Tape 130C.

K. ARC PROOFING TAPE: Scotch Fire and Electric Arc Proof Professional Grade Tape 77. Fireproofing shall be done with a half-lapped layer of arc proofing tape, anchored at each end with a double wrap of Scotch Glass Cloth Electrical Tape 89.

L. INSULATING RESIN: Scotchcast Electrical Insulating Resin 2104.

3.00 EXECUTION

3.01 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper; solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.02 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway.

B. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway .

3.03 INSTALLATION OF CONDUCTORS AND CABLES

A. General Installation

1. Installed unapproved conductors and cables shall be removed and replaced at the Contractor's expense.

2. Properly support cables in accordance with the NEC and manufacturer's recommendations in all raceways. Provide strain relief for vertical runs as required.

a. Where single conductors and cables are in manholes, hand holes, vaults, cable trays, and other indicated locations are not wrapped together by some other means such as arc and fireproofing tapes, bundle throughout their exposed length all conductors entering from each conduit with nylon, self-locking, releasable, cable ties placed at intervals not exceeding 4 inches on center.

b. Arrange wiring in cabinets and panels neatly cut to proper length, remove surplus wire, and bundle and secure in an acceptable manner. Identify all circuits entering motor control centers or other control cabinets in accordance with the conductor identification system specified herein and in specification section 26 05 53, "Identification for Electrical Systems."

c. Cap and label each side of spare conductors not terminated with the UL listed end caps.

d. Where conductors pass through holes or over edges in sheet metal, remove all burrs, chamfer all edges, and install bushings and protective strips of insulating material to protect the conductors.

e. For conductors that will be connected by others, provide at least 6 feet spare conductors in free standing panels and at least 2 feet spare in other assemblies. Provide additional spare conductor in any particular assembly where it is obvious that more conductor will be needed to reach the termination point.

a). Each circuit shall include a ground wire. Sharing grounds or neutrals is not allowed.

f. Neatly train wiring inside boxes, equipment and panelboards.

B. Conductors and Cables Installed In Conduit

1. Grouping conductors together into one conduit shall not be allowed where the plans indicate the conductors to be placed in separate conduits. Each home run shown on the plans shall be in its own conduit.
2. Prior to pulling conductors and cables
    a. Complete raceway installation between conductor and cable termination points according to Section 26 05 33 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.
    b. Do not install pull wires and conductors until the raceway system is in place in accordance with the NEC and these specifications. Exception: Only flexible connections to motors shall be permitted to be installed after the installation of the remainder of the raceway system. The installation of these conductors shall be limited to exposure to damage for a maximum of one (1) week prior to installing flexible connection and making final terminations. Any conductors exposed to damage (i.e. not installed in raceway) longer than one (1) week shall be subject to rejection by the Owner and/or Engineer. If rejected, the cables shall be removed, discarded, replaced, reinstalled, and re-terminated at the Contractor's expense.
    c. Completely swab raceway system before installing conductors. Do not use cleaning agents and lubricants which have a deleterious effect on the conductors or their insulation.
3. Process for pulling conductors and cables
    a. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor, insulation, or cable outer jacket. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
    b. Do not exceed cable manufacturer's recommendations for maximum pulling tensions and minimum bending radii.
    c. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage usable portions of cables or raceway.
    d. Except for hand-pulled conductors into raceways, all wire and cable installation shall be installed with tension-monitoring equipment. Where conductors are found to have been installed without tension-monitoring, the conductors and cables shall be immediately removed from the raceways, permanently identified as rejected material, and removed from the jobsite. New conductors and cables shall be reinstalled, tagged and raceways resealed, all at the Contractor's expense.
    e. Pull conductors into a raceway at the same time and use U.L. listed, wire pulling lubricant for pulling No. 4 AWG and larger wire.

3.04 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

B. Make splices, terminations, and taps compatible with conductor material and that possess equivalent or better mechanical strength, continuous temperature and insulation ratings than unspliced conductors.

C. Power Conductors: Splicing of existing power conductors shall be permitted where specifically indicated on the plans. Splices for all other circuits shall be disallowed. Splice in junction boxes or at outlets only for lighting and receptacle branch circuits. Splices for all other circuits shall be disallowed. All splices are subject to the Engineer's approval. Obtain approval from Engineer before installing any splices.

D. For existing installations, splices of 120V circuits shall use twist-on wire nuts.

E. Where pre-approved by Engineer, 480V splices shall terminate conductors using power distribution blocks mounted on a junction box backplane.

F. No splicing of conductors shall be performed in any below ground structure.

G. Condulet type fittings shall not contain splices.

H. Under no condition shall conductors of a different color be spliced together.

I. For No. 10 and smaller, connect conductors with a silicone filled twist-on spring wirenut. If a splice or tap is below 3' above the final grade, fill the spring connectors with an electrical insulating resin so that the resin encapsulates conductor and spring materials. Conductor splices and taps inside the MCC, VFDs, panels, etc. shall be on the terminal strips or power distribution blocks.

J. For No. 8 and larger, connect conductors with a split bolt type of connector or a mechanical, set screw type connector. Wrap splices and taps with a single half-lapped layer of rubber tape followed by successive layers of vinyl tape until a vinyl tape layer thickness of twice the original conductor insulation thickness is achieved. If splice or tap is below 3' above the finished grade, the tape or splice shall have a final outer coating or insulating resin. Splices must be pre-approved by the Engineer.

K. Furnish and install power distribution blocks as required for terminating conductors at their load connection point with conductors of smaller size. Install power distribution blocks with the number of poles and sizes needed for connecting the phase, neutral, and ground conductors.

L. Tighten all screws and terminal bolts using torque type wrenches and/or drivers to tighten to the inch-pound requirements of the NEC and UL.

M. Use crimp connectors on all stranded conductors.

N. Soldered mechanical joints insulated with tape will not be acceptable.

3.05 IDENTIFICATION

A. Identify and color-code conductors and cables according to Section 26 05 53 "Identification for Electrical Systems."

B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

3.06 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Section 07 84 13 "Penetration Firestopping."

3.07 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Perform the following tests and inspections:

1. After installing conductors and cables and before electrical circuitry has been energized, test for compliance with requirements.

2. Perform each of the following visual and electrical tests:

a. Inspect exposed sections of conductor and cable for physical damage and correct connection according to the single-line diagram.

b. Test bolted connections for high resistance using one of the following:

1). A low-resistance ohmmeter.

2). Calibrated torque wrench.

3). Thermographic survey.

c. Inspect compression applied connectors for correct cable match and indentation.

d. Inspect for correct identification.

e. Inspect cable jacket and condition.

f. Insulation-resistance test on each conductor with respect to ground and adjacent conductors. Apply a potential of 500-V dc for 300-V rated cable and 1000-V dc for 600-V rated cable for a one-minute duration.

g. Continuity test on each conductor and cable.

h. Uniform resistance of parallel conductors.

C. Cables will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports to record the following:

1. Procedures used.

2. Results that comply with requirements.

3. Results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

E. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION

26 05 23 CONTROL-VOLTAGE ELECTRICAL POWER CABLES

1.00 GENERAL

1.01 WORK INCLUDED

A. Furnish labor, materials, equipment and incidentals necessary to install 600-volt wires and cables. Electrical Work shall be in accordance with Section 26 05 00 “Common Work Results for Electrical.”

B. Work shall include building wire, cable, wiring connections and terminations, and modular wiring systems.

1.02 SUMMARY

A. Section Includes:

1. Low-voltage control cabling.

2. Identification products.

1.03 DEFINITIONS

A. EMI: Electromagnetic interference.

B. Low-Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 volts or for remote-control and signaling power-limited circuits.

C. Plenum: A space forming part of the air distribution system to which one or more air ducts are connected. An air duct is a passageway, other than a plenum, for transporting air to or from heating, ventilating, or air-conditioning equipment.

1.04 SUBMITTALS

A. Submittals shall include the corresponding section and sub section(s) at the top left or right of each sheet.

B. Submittals shall include the entire corresponding specification at the front of the document with markings of C, D, E, or N/A beside each section and sub section(s). C, D, E, or N/A will be noted as comply, deviate, exception, or not applicable.

C. Submittals shall be in accordance with Section 01 33 00 “Document Management” and shall include:

1. Shop Drawings: For each type of product.

2. Qualification Data: For qualified layout technician, installation supervisor, and field inspector.

3. Source quality-control reports.

4. Field quality-control reports.

1.05 QUALITY ASSURANCE

A. Testing Agency Qualifications: Member company of NETA or an NRTL.

2.00 PRODUCTS

2.01 SYSTEM DESCRIPTION

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.02 CONTROL-CIRCUIT CONDUCTORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. General Cable; General Cable Corporation.
2. Southwire Company.
3. Alpha
4. Okonite
5. Belden
6. Houston Wire and Cable

B. General

1. Wires and cables shall be soft-drawn, annealed copper with a conductivity of not less than that of 98% pure copper, UL83 and UL1063 listed, rated 600 volts and certified for continuous operation at maximum conductor temperature of 90 Celsius in dry locations and in wet locations.
2. Control, signal and instrumentation circuits and as specifically indicated on the plans the minimum conductor permitted is #14.

C. SINGLE CONDUCTOR CABLES: Tinned conductor with thermoplastic insulation rated at 600 volts and insulated with type XHHW-2 insulation. Wire shall be water tank tested and approved as machine tool wire, in accordance with National Machine Tool Builders Association.

D. Class 2 Control Circuits: Stranded copper, Type XHHW-2, in raceway, complying with UL 44.

E. Class 3 Remote-Control and Signal Circuits: Stranded copper, Type XHHW-2, in raceway, complying with UL 44.

2.03 SOURCE QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to evaluate cables.

B. Cable will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

3.00 EXECUTION

3.01 INSTALLATION OF RACEWAYS AND BOXES

A. Comply with requirements in Section 26 05 33 “Raceways and Boxes for Electrical Systems” for raceway selection and installation requirements for boxes, conduits, and wireways as supplemented or modified in this Section.

1. Outlet boxes shall be no smaller than 2 inches wide, 3 inches high, and 2-1/2 inches deep.

2. Flexible metal conduit shall not be used.

B. Comply with TIA-569-B for pull-box sizing and length of conduit and number of bends between pull points.

C. Install manufactured conduit sweeps and long-radius as required elsewhere in specifications and drawings or as required to meet cable bend radius requirements.

3.02 INSTALLATION OF CONDUCTORS AND CABLES

A. Comply with NECA 1 and NFPA 70.

B. General Requirements for Cabling:

1. Terminate all conductors and optical fibers; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, and cross-connect and patch panels.

2. Cables may not be spliced.

3. Secure and support cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.

4. Bundle, lace, and train conductors to terminal points without exceeding manufacturer’s limitations on bending radii, but not less than radii specified in BICSI ITSIMM, Ch. 5, “Copper Structured Cabling Systems” and Ch. 6, “Optical Fiber Structured Cabling Systems.” Install lacing bars and distribution spools.

5. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.

6. Cold-Weather Installation: Bring cable to room temperature before de-reeling. Do not use heat lamps for heating.

7. Pulling Cable: Comply with BICSI ITSIMM, Ch. 5, “Copper Structured Cabling Systems” and Ch. 6, “Optical Fiber Structured Cabling Systems.” Monitor cable pull tensions.

8. Support: Do not allow cables to lay on removable ceiling tiles.

9. Secure: Fasten securely in place with hardware specifically designed and installed so as to not damage cables.

C. Installation of Control-Circuit Conductors: Install wiring in raceways. Comply with requirements specified in Section 26 05 33 “Raceways and Boxes for Electrical Systems.”

3.03 REMOVAL OF CONDUCTORS AND CABLES

A. Remove abandoned conductors and cables. Abandoned conductors and cables are those installed that are not terminated at equipment and are not identified for future use with a tag.

3.04 GROUNDING

A. For low-voltage control wiring and cabling, comply with requirements in Section 26 05 26 "Grounding and Bonding for Electrical Systems."

3.05 IDENTIFICATION

A. Comply with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."

B. Identify data and communications system components, wiring, and cabling according to TIA-606-A; label printers shall use label stocks, laminating adhesives, and inks complying with UL 969.

3.06 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Document data for each measurement. Print data for submittals in a summary report that is formatted using Table 10.1 in BICSI TDMM as a guide, or transfer the data from the instrument to the computer, save as text files, print, and submit.

C. End-to-end cabling will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

3.07 PREPARATION

A. Completely swab raceway system before installing conductors. Do not use cleaning agents and lubricants which have a deleterious effect on the conductors or their insulation.

3.08 INSTALLATION

A. General:

1. Conductors shall be continuous from terminal block to terminal block without splice. Condulet type fittings shall not contain splices. No splicing of conductors shall be performed in any below ground structure.

2. If rejected, the cables shall be removed, discarded, replaced, reinstalled and re-terminated at the Contractor's expense.

3. Grouping conductors together into one conduit shall not be allowed where the Drawings indicate the conductors to be placed in separate conduits. Each home run shown on the Drawings shall be in its own conduit.

4. Properly support cables in accordance with the NEC and manufacturer's recommendations in all raceways. Provide strain relief as required.

5. The cable shall not be bent to a radius no smaller than the manufacturer cable's minimum bending radius.

6. All terminated conductors shall be labeled as specified prior to testing and final terminations being done. Any conductor that is de-terminated for any reason shall be re-tested. All associated controls, if tested before, shall be re-tested following final re-termination.

B. Ground Conductors: Conduits and other raceway shall contain an insulated equipment grounding conductor whether the raceway is metallic or not. Conduits, cabinets, and other equipment shall be properly grounded in accordance with National Electrical Code requirements. Where ground wire is exposed to mechanical damage, install wire in rigid aluminum conduit. Bond each end of each of the conduit to the ground system. Make connections to equipment with solderless connections.

END OF SECTION

26 05 26 GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

1.00 GENERAL

1.01 WORK INCLUDED

A. Furnish labor, materials, equipment, and incidentals necessary to install a complete grounding system in strict accordance with Article 250 of the National Electrical Code (NEC) as shown on the drawings or as specified herein. Electrical work shall be in accordance with Section 26 05 00, COMMON WORK RESULTS FOR ELECTRICAL.

1.02 SUMMARY

A. Submittals shall include the corresponding section and sub section(s) at the top left or right of each sheet.

B. Submittals shall include the entire corresponding specification at the front of the document with markings of C, D, E, or N/A beside each section and sub section(s). C, D, E, or N/A will be noted as comply, deviate, exception, or not applicable.

C. Submittal shall be in accordance with Section 01 33 00, “Document Management” and shall include:

1. Product Data: For each type of product indicated.
2. Ground Conductors
3. Connectors
4. Field quality-control reports in accordance with Section 26 01 26, “Testing of Electrical Systems”.

1.03 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association to supervise on-site testing specified in Part 3.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Comply with UL 467 for grounding and bonding materials and equipment.

2.00 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Burndy; Part of Hubbell Electrical Systems.

2. ERICO International Corporation.
3. Harger Lightning & Grounding.
4. ILSCO.
5. O-Z/Gedney; a brand of Emerson Industrial Automation.
6. Thomas & Betts Corporation, A Member of the ABB Group.

2.02 CONDUCTORS

A. Insulated Conductors: tinned copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

2.03 CONNECTORS

A. Listed and labeled by a Nationally Recognized Testing Laboratory (NRTL) acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.

C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

D. Bus-Bar Connectors: Mechanical type, cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

2.04 MISCELLANEOUS

A. CONDUIT GROUND FITTINGS: Fittings for bonding ground cable to the conduit shall be FCI Burndy Corp., type NE or Thomas & Betts No. 3951 series.

B. EXOTHERMIC WELDING PROCESS: CADWELD MATERIALS – as manufactured by ERICO products or approved equal.

2.05 PROCESSES

A. All grounding system connections to building steel and ground rods shall be exothermically welded including all cable connections, and cable steel terminations. The use of mechanical type connections is not acceptable.

B. Any concealed connection (buried, encased in concrete, or otherwise sealed) shall be done only with exothermic welds.

C. All materials involved must be from the same sources to insure compatibility. Connections made from this process shall meet the requirements of IEEE Standards 80 and 837 and as listed in MIL 419 and other standards, National Electrical Code, etc.

2.06 GROUNDING SYSTEM

A. Provide a complete grounding system that includes all connections and the testing of ground cables, ground buses, conduits, fittings, anchor supports, and other materials

required for a complete installation. Grounding system shall be installed and sized in accordance with the National Electrical Code.

3.00 EXECUTION

3.01 APPLICATIONS

A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.

B. Underground Grounding Conductors: Install bare tin-plated copper conductor, No. 2/0 AWG minimum.

1. Bury at least 30 inches below grade.

C. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.

D. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted/clamp type connectors.
2. Underground Connections: Exothermically welded connectors.
3. Connections to Equipment: NEMA ground pads and insulated jumpers.
4. Connections to Ground Pad: Exothermic.
5. The use of “pig tails” for connections to ground loops or equipment shall not be allowed.

3.02 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:

1. Feeders and branch circuits.
2. Three-phase motor and appliance branch circuits.
3. Busway Supply Circuits: Install insulated equipment grounding conductor from grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.

C. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.

3.03 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Ground Bonding Common with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system

ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor and install in conduit.

C. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.

   1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.

   2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.

   3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.

D. Ground electrical work in accordance with the National Electrical Code Article 250 and local codes.

E. Install ground cables continuously between connections. Splices shall not be permitted, except where indicated on the plans. Where ground cables pass through floor slabs. buildings, etc., and when not in metallic enclosures, provide a sleeve of approved, non-metallic materials.

F. Install a green-colored, equipment grounding conductor in raceways. Size conductors in accordance with NEC Article 250.

G. Where ground wire is directly buried in earth or concrete, use standard bare tinned copper cable, in all other cases install a green-colored insulation, equipment grounding conductor in accordance with Section 26 05 19, “Low Voltage Electrical Power Conductors and Cables”. Size conductors in accordance with NEC Article 250. Provide grounding conductors as required per the NEC.

H. Metal conduits stubbed up into switchgear, motor control center or other electrical equipment shall be terminated with insulated grounding bushings and connected to the equipment ground bus. Size the grounding wire in accordance with applicable sections of the National Electrical Code.

I. Provide exothermic weld connection for extension to existing stub-up ground conductors.

J. Liquid tight flexible metal conduit in sizes 1-1/2” or larger shall have bonding jumpers. Bonding jumpers shall be external, run in parallel (not spiraled) and fastened with plastic tie wraps. Contractor shall provide bonding jumpers sized in accordance with the National Electrical Code.

K. All equipment enclosures, motor and transformer frames, conduit systems, cable armor, exposed structural steel and all other equipment and materials required by the NEC to be grounded, shall be grounded and bonded in accordance with the NEC. Provide grounding and bonding jumpers as required per the NEC.

L. Where exothermic bonding is used, molds shall be of the appropriate size for the wire and rod used. All bonds shall remain exposed for inspection of the Owner’s Representative.

M. Ground pad shall be installed in concrete foundations or pad for connections to equipment and grounding system. Flat plate all copper alloy Erico CADWELD B164-2Q or equal Ground pad shall be exothermic weld connection for connection to ground cable.

1. Transformer Pads: Provide a ground pad in the concrete pad. Provide a #4/0 bare copper to the grounding system. Provide two-hole spade terminals connected to a #4/0 bare copper conductor at each end and connect to the transformer enclosure and to the ground pad.
2. Motor Grounding: Provide a ground pad in the concrete slab. Provide a #4/0 bare copper to the grounding system. Provide two-hole spade terminals connected to a #4/0 bare copper conductor at each end and connect to the motor enclosure and to the ground pad and to the pump frame.
3. The use of “pig tails” for connections to ground loops or equipment shall not be allowed.

3.04 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections. Testing shall be in accordance with Section 26 01 26, “Testing of Electrical Systems” and the latest version of NETA Acceptance Testing Specification

B. Tests and Inspections:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
2. Inspect the grounding and bonding system conductors and connections for tightness and proper installation.
3. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
4. Use Biddle Direct Reading Earth Resistance Tester or equivalent to measure resistance to ground of the system. Perform testing in accordance with the test instrument manufacturer’s recommendation using the fall of potential method.
5. All test equipment provided under this section shall be approved by the ENGINEER.
6. Resistance to ground testing shall be performed during dry season when the ground is dry. Submit test results in the form of a graph showing the number of points measured (12 minimum) and the numerical resistance to ground. The contractor shall test the grounding system at each ground rod shown on plans.
7. Testing shall be performed before energizing the distribution system.
8. A separate test shall be conducted for each building or system.
9. Notify the ENGINEER immediately if the resistance to ground for any building or system is greater than five ohms. Provide additional ground rods and conductors as required to bring the resistance to five ohms
10. Prepare dimensioned Drawings locating each test well, ground rod and ground-rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

C. Grounding system will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

E. Report measured ground resistances that exceed the following values:

   1. Power and Lighting Equipment or System with Capacity of 1000 kVA and Less: 10 ohms.

F. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Owner/Engineer promptly and include recommendations to reduce ground resistance.

END OF SECTION

26 05 29 HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

1.00 GENERAL

1.01 WORK INCLUDED

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Hangers and supports for electrical equipment and systems.
2. Construction requirements for concrete bases.

1.03 SUBMITTALS

A. Submittals shall include the corresponding section and sub section(s) at the top left or right of each sheet.

B. Submittals shall include the entire corresponding specification at the front of the document with markings of C, D, E, or N/A beside each section and sub section(s). C, D, E, or N/A will be noted as comply, deviate, exception, or not applicable.

C. Submittals shall be in accordance with Section 01 33 00, “Document Management” and shall include:

1. Product Data: For each type of product.
    a. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
        1). Hangers.
        2). Steel slotted support systems.
        3). Nonmetallic support systems.
        4). Trapeze hangers.
        5). Clamps.
        6). Turnbuckles.
        7). Sockets.
        8). Eye nuts.
        9). Saddles.
        10). Brackets.
    b. Include rated capacities and furnished specialties and accessories.

2.00 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a Professional Engineer licensed in Texas to design hanger and support system.

2.02 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4 factory-fabricated components for field assembly.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Allied Tube & Conduit; a part of Atkore International.

b. B-line, an Eaton business.

c. ERICO International Corporation.

d. Flex-Strut Inc.

e. GS Metals Corp.

f. G-Strut.

g. Thomas & Betts Corporation, A Member of the ABB Group.

h. Unistrut; Part of Atkore International.

2. Material: Stainless Steel, Type 316.

3. Channel Dimensions: Selected for applicable load criteria.

B. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for nonarmored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be made of malleable iron.

C. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Mechanical-Expansion Anchors: Insert-wedge-type, stainless steel, for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1). B-line, an Eaton business.

2). Empire Tool and Manufacturing Co., Inc.

3). Hilti, Inc.

4). ITW Ramset/Red Head; Illinois Tool Works, Inc.

5). MKT Fastening, LLC.

2. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
3. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
4. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A325.
5. Toggle Bolts: Stainless-steel springhead type.
6. Hanger Rods: Threaded stainless steel.

2.03 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

3.00 EXECUTION

3.01 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems unless requirements in this Section are stricter.

B. Comply with requirements for raceways and boxes specified in Section 26 05 33, “Raceways and Boxes for Electrical Systems.”

C. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMTs, IMCs, and RMCs as required by NFPA 70. Minimum rod size shall be 3/8 inch in diameter.

D. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports with single-bolt conduit clamps using spring friction action for retention in support channel.

3.02 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this article.

B. Raceway Support Methods: In addition to methods described in NECA 1, RMCs may be supported by openings through structure members, according to NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 pounds.

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.

2. To New Concrete: Bolt to concrete inserts.
3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
4. To Existing Concrete: Expansion anchor fasteners.
5. To Steel: Beam clamps (MSS SP-58, Type 19, 21, 23, 25, or 27), complying with MSS SP-69.
6. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

END OF SECTION

26 05 33 RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

1.00 GENERAL

1.01 WORK INCLUDED

A. Furnish labor, materials, equipment and incidentals necessary to install a complete conduit system for each type of electrical system. Electrical Work shall be in accordance with Division 26.

B. Furnish labor, materials, equipment and incidentals necessary to install pull boxes, as specified and indicated on the Drawings

C. Contractor shall be responsible for sizing all pull boxes and junction boxes per the NEC Article 314 and all other relevant sections of the NEC. Electrical Work shall be in accordance with Section 26 05 00 “Common Work Results for Electrical”.

1.02 SUMMARY

A. Section Includes:

1. Metal conduits, tubing, and fittings.
2. Nonmetal conduits, tubing, and fittings.
3. Metal wireways and auxiliary gutters.
4. Handholes and boxes for exterior underground cabling.

1.03 DEFINITIONS

A. ARC: Aluminum rigid conduit.

B. LFMC: Liquidtight flexible metallic conduit.

C. RNC: Rigid nonmetallic conduit.

1.04 SUBMITTALS

A. Submittals shall include the corresponding section and sub section(s) at the top left or right of each sheet.

B. Submittals shall include the entire corresponding specification at the front of the document with markings of C, D, E, or N/A beside each section and sub section(s). C, D, E, or N/A will be noted as comply, deviate, exception, or not applicable.

C. Submittals shall be in accordance with Section 01 33 00, “Document Management” and shall include:

1. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

2.00 PRODUCTS

2.01 METAL CONDUITS, TUBING, AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AFC Cable Systems; a part of Atkore International.
2. Allied Tube & Conduit; a part of Atkore International.
3. Anamet Electrical, Inc.
4. Electri-Flex Company.
5. FSR Inc.
6. O-Z/Gedney; a brand of Emerson Industrial Automation.
7. Picoma Industries, Inc.
8. Republic Conduit.
9. Robroy Industries.
10. Calbond.
11. Southwire Company.
12. Thomas & Betts Corporation, A Member of the ABB Group.
13. Western Tube and Conduit Corporation.
14. Wheatland Tube Company.

B. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. ARC: Comply with ANSI C80.5 and UL 6A.

D. LFMC: Flexible aluminum conduit with PVC jacket.

E. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.

1. Fittings for Rigid Aluminum:
    a. Material: Aluminum.
        1). Type: Form 7.

F. Expansion Fittings: PVC, or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper, Crouse Hinds XJG 8inches or equal with bonding jumper for aluminum or steel. Where expansion/deflection fitting is specified on the Drawings, provide Crouse Hinds XJGD or equal.

G. Insulated Grounding Bushings: Threaded bushings, O-Z Type ABLG with lay-in means of grounding conduit.

H. Fittings for LFMC:

1. Fittings for aluminum LFMC shall be aluminum with reinforced sealing gaskets with Thomas and Betts stainless steel retaining ring, external grounding lugs, and insulated throat. Fittings shall be Emerson STB-L or equal.

I. Joint Compound for ARC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

1. Aluminum Conduit: Penetrox A-13 or approved equal.

a. UL Listed.

b. Compatible with insulating materials such as rubber, or polyethylene.

c. Rated for all voltages.

2.02 NONMETALLIC CONDUITS, TUBING, AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AFC Cable Systems; a part of Atkore International.
2. Anamet Electrical, Inc.
3. Arnco Corporation.
4. CANTEX INC.
5. CertainTeed Corporation.
6. Condux International, Inc.
7. Electri-Flex Company.
8. Kraloy.
9. Lamson & Sessions.
10. Niedax Inc.
11. RACO; Hubbell.
12. Thomas & Betts Corporation, A Member of the ABB Group.

B. Listing and Labeling: Nonmetallic conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. RNC: Type EPC-40-PVC complying with NEMA TC 2 and UL 651 unless otherwise indicated.

D. Fittings for RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.

2.03 METAL WIREWAYS AND AUXILIARY GUTTERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. B-line, an Eaton business.

2. Hoffman; a brand of Pentair Equipment Protection.
3. MonoSystems, Inc.
4. Square D.

B. Description:

1. Indoors:
    a. Sheet metal, complying with UL 870 and NEMA 250, Type 3R unless otherwise indicated, and sized according to NFPA 70.
2. Outdoors:
    a. Sheet metal, complying with UL 870 and NEMA 250, Type 4x 316 stainless steel unless otherwise indicated, and sized according to NFPA 70.

C. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

D. Wireway Covers: Screw-cover type or Flanged-and-gasketed type unless otherwise indicated.

E. Finish:

1. Indoors:
    a. Manufacturer's standard enamel finish.
2. Outdoors:
    a. 316 stainless steel

F. Wireways shall come with a threaded grounding post welded to the enclosure used for grounding.

2.04 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING

A. General Requirements for Handholes and Boxes:

1. Boxes and handholes for use in underground systems shall be designed and identified as defined in NFPA 70, for intended location and application.
2. Boxes installed in wet areas shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Polymer-Concrete Handholes and Boxes with Polymer-Concrete Cover: Molded of sand and aggregate, bound together with polymer resin, and reinforced with steel, fiberglass, or a combination of the two.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. Armorcast Products Company.
    b. Carson Industries LLC.
    c. NewBasis.

d. Oldcastle Precast, Inc.

e. Quazite: Hubbell Power Systems, Inc.

f. Synertech Moulded Products.

2. Standard: Comply with SCTE 77.

3. Configuration: Designed for flush burial with open bottom unless otherwise indicated.

4. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure and handhole location.

5. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.

6. Cover Legend: Molded lettering, "ELECTRIC".

2.05 SOURCE QUALITY CONTROL FOR UNDERGROUND ENCLOSURES

A. Handhole and Pull-Box Prototype Test: Test prototypes of handholes and boxes for compliance with SCTE 77. Strength tests shall be for specified tier ratings of products supplied.

1. Strength tests of complete boxes and covers shall be by either an independent testing agency or manufacturer. A qualified registered professional engineer shall certify tests by manufacturer.

2. Testing machine pressure gages shall have current calibration certification complying with ISO 9000 and ISO 10012 and traceable to NIST standards.

3.00 EXECUTION

3.01 CONDUIT INSTALLATION SCHEDULE

A. Conduit types shall be installed in accordance with the following schedule:

1. Buried or Concrete Encased Conduit: Schedule 40 PVC, Type EPC-40-PVC, unless noted otherwise. Conduit below grade shall not be smaller than 2 inches.

2. Above Grade Non Concealed Conduit: ARC unless noted otherwise.

3. Liquid Tight Flexible Metallic Conduit: Shall only be used to equipment in non-hazardous locations not subject to physical damage or excessive temperatures, requiring vibration isolation unless otherwise indicated, 6 feet maximum length. The bending radius shall be in accordance with Chapter 9, Table 2 of the NEC and shall not deform or alter the flex jacket.

4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.

B. Indoors: Apply raceway products as specified below unless otherwise indicated:

1. Exposed and Subject to Severe Physical Damage: ARC.

C. Minimum Raceway Size:

1. Underground: 2 inches in duct banks.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.

2. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.

E. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.

F. Install surface raceways only where indicated on the Drawings.

G. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg. F.

3.02 CONDUIT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on the Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.

B. Use the conduit route where shown on the Drawings. Route conduits that do not have a specified route in the most direct path between the two points, i.e. home runs shown with an arrow symbol. Route conduits parallel to building lines. Concealed conduits on the Drawings shall be below grade, within walls, or above ceilings.

C. Install conduit at elevations which maintain headroom, and at locations which avoid interference with other Work requiring grading of pipe, the structure, finished walls, etc. Avoid crossing other Work. Conduits shall not be placed in close proximity to equipment, systems, and service lines. Maintain a minimum of 3 inches of separation, except in crossing which shall be a minimum of 1 inch. Conduits shall not be installed/concealed in water bearing walls.

D. Conduits in buildings shall be exposed on unfinished ceilings and basements, as shown on the Drawings. Rigidly support conduits to the building structures using hardware bolted or screwed to the structure. The mounting hardware shall not mount the conduit directly on concrete walls and ceilings, but shall space the conduit away from the surfaces using mineralac-type hardware, strut channel clamps, or one hole straps with clamp backs.

E. Group conduit in parallel runs where practical. Use a conduit rack constructed of channels with conduit straps or clamps. Provide space for an additional 25 percent conduit.

F. Parallel runs of conduit shall have bends and offsets made at the same point such that the angle of bend is the same in each conduit and the conduits remain parallel throughout the run. Conduits not installed in this manner shall be removed and reinstalled at the Contractor's expense. Conductors that are installed shall be removed and replaced at the Contractor's expense.

G. Conduits installed in parallel shall be arranged such that crossings are eliminated.

H. Nuts, bolts, concrete anchor bolts and other metallic fasteners shall be 316 stainless steel.

I. Install conduit with threaded couplings and other threaded fittings. Threadless, or clamp type fittings shall not be used on metallic conduit.

J. Use suitable conduit caps to protect installed conduit against entry of dirt and moisture. The use of duct tape or any other tape shall be prohibited.

K. Use watertight hubs to fasten conduit to metal boxes, etc. in wet or damp locations per the National Electrical Code.

L. Provide at least 1/4 inch air space between the back of boxes, equipment and the wall.

M. Conduits terminating inside an air conditioned space from outside shall be sealed to prevent moisture/condensation from entering the enclosure.

N. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

O. Conduit system shall be swabbed clean prior to installation of conductors.

P. Ground conduits in accordance with the National Electrical Code and Section 26 05 26, "Grounding and Bonding for Electrical Systems."

Q. Complete raceway installation before starting conductor installation.

R. Cut conduit perpendicular to the length. For conduits 2 inches trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.

S. Comply with requirements in Section 26 05 29, "Hangers and Supports for Electrical Systems" for hangers and supports.

T. Arrange stub-ups so curved portions of bends are not visible above finished slab.

U. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 36 inches of changes in direction or where conduit penetrates through a floor, wall, or transitions from underground. Conduits transitioning from underground to be supported by a structure shall include an expansion fitting before the conduit is strapped at its first conduit support.

V. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

W. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-pound tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.

X. Install conduit drain assemblies in outside or underground conduits to provide for draining.

3.03 SURFACE RACEWAY INSTALLATION

A. Install surface raceway with a minimum 2 inches radius control at bend points.

B. Secure surface raceway with screws or other anchor-type devices at intervals not exceeding 48 inches and with no less than two supports per straight raceway section. Support surface raceway according to manufacturer's written instructions. Tape and glue are not acceptable support methods.

3.04 EXPANSION FITTING INSTALLATION

A. Expansion Fittings:

1. Expansion fittings used with aluminum conduit shall be installed in the following locations:

a. At construction joints.

b. In conduit runs longer than 100 feet.

c. Transitions from underground to above elevation (exposed).

2. Install expansion fittings at all locations where conduits, concealed or surface mount, cross building, structure, construction and seismic expansion joints.

3. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.

4. Acceptable expansion/deflation fittings made of neoprene in outdoor applications shall have aluminum lagging over the neoprene held in place with stainless steel tie-wraps.

3.05 LIQUID TIGHT FLEXIBLE CONDUIT INSTALLATION

A. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

1. Use LFMC in damp or wet locations subject to severe physical damage.

2. Use LFMC in damp or wet locations not subject to severe physical damage.

3.06 JUNCTION BOX AND PULL BOX INSTALLATION

A. Mount boxes at heights indicated on the Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.

3.07 INSTALLATION OF UNDERGROUND CONDUIT

A. Concrete Encased Conduit:

1. Excavate trench bottom to provide firm and uniform support for conduit.

2. After installing conduit and concrete, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction.

3. At the transition from underground and or from concrete, protect conduit from mechanical damage by extending rigid aluminum conduit a maximum of 24inches and a minimum of 4 inches into the earth or concrete at the transition.

4. Underground Warning Tape: Comply with requirements in Section 26 05 53, “Identification for Electrical Systems.”
5. Conduit which is below the finished grade shall be PVC Schedule 40, except where indicated on the Drawings or noted otherwise.
6. Bury underground conduit a minimum of 18 inches deep to the top of the concrete encasement for 600-volt duct banks.
7. Install underground conduit with the conduit duct bank dimensions shown on the Drawings. Adhere to conduit spacing by using spacers at intervals to ensure that proper spacings are maintained.
8. The concrete shall be red in color. Apply dye in concrete truck, sprinkling dye on top of the duct bank after concrete placement is prohibited. Place 3-inch CMU blocks under rebar cage to suspend rebar off of the bottom of the trench so that it does not contact the soil and is completely encased in the concrete envelope when concrete is placed.
9. Underground 2 inches and larger conduit bends shall have a long sweep bend radius.
10. Contractor shall install duct bank spacers a minimum of every 5 feet.

3.08 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.

B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.

C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch above finished grade.

D. Install handholes with bottom below frost line below grade.

E. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables but short enough to preserve adequate working clearances in enclosure.

3.09 SIZING AND INSTALLATION OF WIREWAYS, PULL BOXES AND JUNCTION BOXES

A. Contractor shall be responsible for providing and sizing all wireways, pull boxes and junction boxes per the National Electrical Code (NEC) Article 314 and all other relevant sections of the NEC.

B. Install Products in accordance with manufacturer’s instructions.

C. Use screws, clips, and straps to fasten raceway channel to surfaces. Mount plumb and level.

D. Use suitable insulating bushings and inserts at connections to outlets and corner fittings.

E. Wireway Supports: Per manufacturer’s recommendations. Contractor shall support the wireway rigidly to the building structures using hardware bolted or screwed to the structure. Supporting wireways from corrugated metal structures shall not be allowed.

F. Close ends of wireway and unused conduit openings.

G. Use separate pull boxes and junction boxes for electric power, control and communication systems.

H. Install pull boxes in interior conduit at not more than 100 feet apart when conduit runs are not broken by junction or outlet boxes.

I. Pull and junction boxes shall be accessible and not buried.

J. Do not install boxes back to back in walls and provide a minimum of 6 inches separation, except in acoustic-rated walls, provide 24 inches separation.

K. Support boxes independently of conduit except for cast boxes that is connected to two rigid metal conduits, both supported within 12 inches of box.

L. Box shall be mounted using mounting lugs. Drilling through the box to mount is prohibited. Any box drilled to mount will be rejected and shall be removed and replaced at the Contractor's expense.

3.10 PROTECTION

A. Protect coatings, finishes, and cabinets from damage and deterioration.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.

3.11 CONDUIT TERMINATIONS

A. Conduit terminations at enclosures shall maintain the NEMA rating of the enclosure. Conduit terminations damaging enclosures shall not be permitted. Damaged enclosures will not be accepted and shall be replaced at the Contractor's expense.

B. Use grounding myers hubs for termination of conduits into enclosures.

C. Locknut termination of conduits shall not be used on this Project except were liquid tight fittings require locknuts to maintain UL listings. Locations utilizing liquid tight fittings shall include a stainless steel banded sealing gasket. Damaged bands or gaskets due to overtightening shall be replaced by the Contractor.

D. For exterior, wet locations, and where conduit enters from exterior or wet locations, conduit terminations shall not penetrate the top of enclosures. Enclosures with top penetrations shall be removed and replaced with conduits re-routed for side or bottom penetration at the Contractor's expense. If conductors have been installed and are too short to accommodate the re-routed conduit, then they shall be removed and replaced at the Contractor's expense.

E. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.

F. Use suitable conduit caps to protect installed conduit against entry of dirt and moisture. The use of duct tape or any other tape shall be prohibited.

G. Conduits terminating inside an air conditioned space from outside shall be sealed to prevent moisture/condensation from entering the enclosure.

H. Where locknuts are allowed, do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to ensure a continuous ground path.

I. Install raceways square to the enclosure and terminate at enclosures with Myers hubs. Install Myers hub hand tight plus 1/4 turn more.

3.12 JUNCTION BOX INSTALLATION

A. Junction boxes shall be installed so they are accessible from the front.

B. Junction boxes shall have terminal strips/distribution blocks for splicing conductors where approved by the Engineer or as shown/specified on the Drawings. Terminal strips shall be manufactured by Allen-Bradley, Phoenix Contact or approved equal.

C. Use watertight hubs to fasten conduit to metal boxes, etc. in wet or damp locations per the National Electrical Code.

D. Metallic Junction boxes shall be grounded with NEC approved grounding fasteners and by means allowed by the enclosure manufacturer. Enclosures drilled for grounding fasteners that do not meet code shall be replaced at the cost of the Contractor.

END OF SECTION

26 05 53 IDENTIFICATION FOR ELECTRICAL SYSTEMS

1.00 GENERAL

1.01 WORK INCLUDED

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Identification for raceways.
2. Identification of power and control cables.
3. Identification for conductors.
4. Underground-line warning tape.
5. Warning labels and signs.
6. Instruction signs.
7. Equipment identification labels, including arc-flash warning labels.
8. Miscellaneous identification products.

1.03 SUBMITTALS

A. Submittals shall include the corresponding section and sub section(s) at the top left or right of each sheet.

B. Submittals shall include the entire corresponding specification at the front of the document with markings of C, D, E, or N/A beside each section and sub section(s). C, D, E, or N/A will be noted as comply, deviate, exception, or not applicable.

C. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for electrical identification products.

D. Identification Schedule: For each piece of electrical equipment and electrical system components to be an index of nomenclature for electrical equipment and system components used in identification signs and labels. Use same designations indicated on Drawings.

E. Delegated-Design Submittal: For arc-flash hazard study.

2.00 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Comply with ASME A13.1 and IEEE C2.

B. Comply with NFPA 70.

C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.

D. Comply with ANSI Z535.4 for safety signs and labels.

E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

F. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

2.02 LABELS

A. Self-Adhesive Labels:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. AnD Cable Products.

b. Brady Corporation.

c. Brother International Corporation.

d. Emedco.

e. Grafoplast Wire Markers.

f. Ideal Industries, Inc.

g. LEM Products Inc.

h. Marking Services, Inc.

i. Panduit Corp.

j. Seton Identification Products.

2. Polyester, thermal, transfer-printed, 3-mil-thick, multicolor, weather- and UV-resistant, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.

a. Nominal Size: 3.5-by-5-inch.

3. Marker for Tags: Machine-printed, permanent, waterproof, black ink recommended by printer manufacturer.

2.03 SIGNS

A. Laminated Acrylic or Melamine Plastic Signs:

1. Engraved legend.

2. Thickness:

a. For signs up to 20 sq. inches, minimum 1/16-inch-.

b. Engraved legend with black letters on white face.

c. Self-adhesive.

d. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

3. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. Brady Corporation.
    b. Carlton Industries, LP.
    c. Emedco.
    d. Marking Services, Inc.

3.00 EXECUTION

3.01 PREPARATION

A. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.

3.02 INSTALLATION

A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.

B. Verify identity of each item before installing identification products.

C. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.

D. During backfilling of trenches, install continuous underground-line warning tape directly above cable or raceway at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches overall.

3.03 IDENTIFICATION SCHEDULE

A. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.

1. Color-Coding for Phase- and Voltage-Level Identification, 600 V or Less: Use colors listed below for ungrounded feeder and branch-circuit conductors.
    a. Color shall be factory applied.
    b. Colors for 480/277-V Circuits:
        1). Phase A: Brown.
        2). Phase B: Orange.
        3). Phase C: Yellow.

c. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

B. Control-Circuit Conductor Identification: For conductors and cables in pull and junction boxes, manholes, and handholes, use self-adhesive vinyl labels with the conductor or cable designation, origin, and destination.

C. Control-Circuit Conductor Termination Identification: For identification at terminations, provide heat-shrink preprinted tubes with the conductor designation.

D. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical-fiber cable.

1. Install underground-line warning tape for direct-buried cables and cables in raceways.

E. Arc Flash Warning Labeling: Self-adhesive thermal transfer vinyl labels.

1. Comply with NFPA 70E and ANSI Z535.4.

2. Comply with Section 26 05 74 "Overcurrent Protective Device Arc-Flash Study" requirements for arc-flash warning labels.

F. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and operation and maintenance manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm unless equipment is provided with its own identification.

1. Labeling Instructions:

a. Outdoor Equipment: Engraved, laminated acrylic or melamine label.

b. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.

c. Unless labels are provided with self-adhesive means of attachment, fasten them with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.

2. Equipment to be labeled:

a. Enclosures and electrical cabinets.

b. Motor-control centers.

c. Enclosed circuit breakers.

d. Push-button stations.

END OF SECTION

26 05 73.13 SHORT-CIRCUIT STUDIES

1.00 GENERAL

1.01 SUMMARY

A. Coordinate with plant staff for obtaining existing coordination studies, arc flash analysis, and short circuit studies. Studies shall be done in the same software as provided by the staff and be returned to the staff with the updates.

B. Section requires a computer-based, fault-current study to determine the minimum interrupting capacity of circuit protective devices.

1.02 DEFINITIONS

A. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed and salvaged, or removed and reinstalled. Existing to remain items shall remain functional throughout the construction period.

B. Field Adjusting Agency: An independent electrical testing agency with full-time employees and the capability to adjust devices and conduct testing indicated and that is a member company of NETA.

C. One-Line Diagram: A diagram that shows, by means of single lines and graphic symbols, the course of an electric circuit or system of circuits and the component devices or parts used therein.

D. Power System Analysis Software Developer: An entity that commercially develops, maintains, and distributes computer software used for power system studies.

E. Power Systems Analysis Specialist: Professional engineer in charge of performing the study and documenting recommendations, licensed in the state where Project is located.

F. Protective Device: A device that senses when an abnormal current flow exists and then removes the affected portion of the circuit from the system.

G. SCCR: Short-circuit current rating.

H. Service: The conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served.

I. Single-Line Diagram: See "One-Line Diagram."

1.03 SUBMITTALS

A. Product Data:

1. Submit the following after the approval of system protective devices submittals. Submittals shall be in digital form.

    a. Short-circuit study input data, including completed computer program input data sheets.

    b. Short-circuit study and equipment evaluation report; signed, dated, and sealed by a qualified professional engineer.

        1). Submit study report for action prior to receiving final approval of distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from Engineer for preliminary submittal of sufficient study data to ensure that selection of devices and associated characteristics is satisfactory.

        2). Revised one-line diagram, reflecting field investigation results and results of short-circuit study.

B. The corresponding section and sub section(s) at the top left or right of each sheet.

C. The entire corresponding specification at the front of the document with markings of C, D, E, or N/A beside each section and sub section(s). C, D, E, or N/A will be noted as comply, deviate, exception, or not applicable.

D. Operation and Maintenance Data:

1. For overcurrent protective devices to include in emergency, operation, and maintenance manuals.

2. The following are from the Short-Circuit Study Report:

    a. Final one-line diagram.

    b. Final Short-Circuit Study Report.

    c. Short-circuit study data files.

    d. Power system data.

1.04 QUALITY ASSURANCE

A. Study shall be performed using commercially developed and distributed software designed specifically for power system analysis.

B. Software algorithms shall comply with requirements of standards and guides specified in this Section.

C. Manual calculations are unacceptable.

1. Power System Analysis Software Qualifications: Computer program shall be designed to perform short-circuit studies or have a function, component, or add-on module designed to perform short-circuit studies.

2. Computer program shall be developed under the charge of a licensed professional engineer who holds IEEE Computer Society's Certified Software Development Professional certification.

D. Power Systems Analysis Specialist Qualifications: Professional engineer licensed in the state of Texas. All elements of the study shall be performed under the direct supervision and control of this professional engineer.

E. Short-Circuit Study Certification: Short-Circuit Study Report shall be signed and sealed by Power Systems Analysis Specialist.

F. Field Adjusting Agency Qualifications:

1. Employer of a NETA ETT-Certified Technician Level III or NICET Electrical Power Testing Level III certification responsible for all field adjusting of the Work.

2. A member company of NETA.

3. Acceptable to authorities having jurisdiction.

2.00 PRODUCTS

2.01 POWER SYSTEM ANALYSIS SOFTWARE DEVELOPERS

A. Manufacturers: Subject to compliance with requirements, provide products by the same manufacturer as provided from the staff. Return updates to the staff in the same program as it was provided in.

B. Comply with IEEE 399 and IEEE 551.

1. Analytical features of power systems analysis software program shall have capability to calculate "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.

C. Computer software program shall be capable of plotting and diagramming time-current-characteristic curves as part of its output.

2.02 SHORT-CIRCUIT STUDY REPORT CONTENTS

A. Executive summary of study findings.

B. Study descriptions, purpose, basis, and scope. Include case descriptions, definition of terms, and guide for interpretation of results.

C. One-line diagram of modeled power system, showing the following:

1. Protective device designations and ampere ratings.

2. Conductor types, sizes, and lengths.

3. Transformer kilovolt ampere (kVA) and voltage ratings.

4. Motor and generator designations and kVA ratings.

5. Switchgear, switchboard, motor-control center, and panelboard designations and ratings.

6. Derating factors and environmental conditions.

7. Any revisions to electrical equipment required by the study.

D. Comments and recommendations for system improvements or revisions in a written document, separate from one-line diagram.

E. Protective Device Evaluation:

1. Evaluate equipment and protective devices and compare to available short-circuit currents. Verify that equipment withstand ratings exceed available short-circuit current at equipment installation locations.

2. Tabulations of circuit breaker, fuse, and other protective device ratings versus calculated short-circuit duties.

3. For 600-V overcurrent protective devices, ensure that interrupting ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.

4. For devices and equipment rated for asymmetrical fault current, apply multiplication factors listed in standards to 1/2-cycle symmetrical fault current.

5. Verify adequacy of phase conductors at maximum three-phase bolted fault currents; verify adequacy of equipment grounding conductors and grounding electrode conductors at maximum ground-fault currents. Ensure that short-circuit withstand ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.

F. Short-Circuit Study Input Data:

1. One-line diagram of system being studied.

2. Power sources available.

3. Manufacturer, model, and interrupting rating of protective devices.

4. Conductors.

5. Transformer data.

G. Short-Circuit Study Output Reports:

1. Low-Voltage Fault Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:

    a. Voltage.

    b. Calculated fault-current magnitude and angle.

    c. Fault-point X/R ratio.

    d. Equivalent impedance.

2. Momentary Duty Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:

    a. Voltage.

    b. Calculated symmetrical fault-current magnitude and angle.

    c. Fault-point X/R ratio.

    d. Calculated asymmetrical fault currents:

        1). Based on fault-point X/R ratio.

        2). Based on calculated symmetrical value multiplied by 1.6.

        3). Based on calculated symmetrical value multiplied by 2.7.

3. Interrupting Duty Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:

    a. Voltage.

    b. Calculated symmetrical fault-current magnitude and angle.

    c. Fault-point X/R ratio.

    d. No AC Decrement (NACD) ratio.

    e. Equivalent impedance.

    f. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a symmetrical basis.

    g. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a total basis.

3.00 EXECUTION

3.01 POWER SYSTEM DATA

A. Obtain all data necessary for conduct of the study.

1. Verify completeness of data supplied on one-line diagram. Call any discrepancies to Engineer's attention.

2. For equipment included as Work of this Project, use characteristics submitted under provisions of action submittals and information submittals for this Project.

3. For equipment that is existing to remain, obtain required electrical distribution system data by field investigation and surveys, conducted by qualified technicians and engineers. Qualifications of technicians and engineers shall be as defined by NFPA 70E.

B. Gather and tabulate the required input data to support the short-circuit study. Record data on a Record Document copy of one-line diagram. Comply with recommendations in IEEE 551 as to the amount of detail that is required to be acquired in the field. Field data gathering shall be under direct supervision and control of the engineer in charge of performing the study, and shall be by the engineer or its representative who holds NETA ETT-Certified Technician Level III or NICET Electrical Power Testing Level III certification. Data include, but are not limited to, the following:

1. Product Data for Project's overcurrent protective devices involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.

2. Obtain electrical power utility impedance at the service.

3. Power sources and ties.

4. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in percent, and phase shift.

5. For reactors, provide manufacturer and model designation, voltage rating, and impedance.

6. For circuit breakers and fuses, provide manufacturer and model designation. List type of breaker, type of trip, SCCR, current rating, and breaker settings.

7. Generator short-circuit current contribution data, including short-circuit reactance, rated kVA, rated voltage, and X/R ratio.

8. Busway manufacturer and model designation, current rating, impedance, lengths, and conductor material.

9. Motor horsepower and NEMA MG 1 code letter designation.

10. Conductor sizes, lengths, number, conductor material and conduit material (magnetic or nonmagnetic).

11. Derating factors.

3.02 SHORT-CIRCUIT STUDY

A. Perform study following the general study procedures contained in IEEE 399.

B. Calculate short-circuit currents according to IEEE 551.

C. Base study on device characteristics supplied by device manufacturer.

D. Begin short-circuit current analysis at the service, extending down to system overcurrent protective devices as follows:

1. To normal system low-voltage load buses where fault current is 10 kA or less.

2. Exclude equipment rated 240 V ac or less when supplied by a single transformer rated less than 125 kVA.

E. Study electrical distribution system from normal and alternate power sources throughout electrical distribution system for Project. Study all cases of system-switching configurations and alternate operations that could result in maximum fault conditions.

F. Include the ac fault-current decay from induction motors, synchronous motors, and asynchronous generators and apply to low- and medium-voltage, three-phase ac systems. Also account for the fault-current dc decrement to address asymmetrical requirements of interrupting equipment.

G. Calculate short-circuit momentary and interrupting duties for a three-phase bolted fault and a single line-to-ground fault at each equipment indicated on one-line diagram.

1. For grounded systems, provide a bolted line-to-ground fault-current study for areas as defined for the three-phase bolted fault short-circuit study.

H. Include in the report identification of any protective device applied outside its capacity.

END OF SECTION

26 05 73.16 COORDINATION STUDIES

1.00 GENERAL

1.01 SUMMARY

A. Coordinate with plant staff for obtaining existing coordination studies, arc flash analysis, and short circuit studies. Studies shall be done in the same software as provided by the staff and be returned to the staff with the updates.

B. Section includes computer-based, overcurrent protective device coordination studies to determine overcurrent protective devices and to determine overcurrent protective device settings for selective tripping.

1.02 DEFINITIONS

A. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled. Existing to remain items shall remain functional throughout the construction period.

B. Field Adjusting Agency: An independent electrical testing agency with full-time employees and the capability to adjust devices and conduct testing indicated and that is a member company of NETA.

C. One-Line Diagram: A diagram that shows, by means of single lines and graphic symbols, the course of an electric circuit or system of circuits and the component devices or parts used therein.

D. Power System Analysis Software Developer: An entity that commercially develops, maintains, and distributes computer software used for power system studies.

E. Power System Analysis Specialist: Professional engineer in charge of performing the study and documenting recommendations, licensed in the state where Project is located.

F. Protective Device: A device that senses when an abnormal current flow exists and then removes the affected portion of the circuit from the system.

G. SCCR: Short-circuit current rating.

H. Service: The conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served.

I. Single-Line Diagram: See "One-Line Diagram."

1.03 ACTION SUBMITTALS

A. Product Data:

1. For computer software program to be used for studies.

2. Submit the following after the approval of system protective devices submittals. Submittals shall be in digital form.

a. Coordination-study input data, including completed computer program input data sheets.

b. Study and equipment evaluation reports.

3. Overcurrent protective device coordination study report; signed, dated, and sealed by a qualified professional engineer.

a. Submit study report for action prior to receiving final approval of distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from Engineer for preliminary submittal of sufficient study data to ensure that selection of devices and associated characteristics is satisfactory.

B. The corresponding section and sub section(s) at the top left or right of each sheet.

C. The entire corresponding specification at the front of the document with markings of C, D, E, or N/A beside each section and sub section(s). C, D, E, or N/A will be noted as comply, deviate, exception, or not applicable.

1.04 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For overcurrent protective devices to include in emergency, operation, and maintenance manuals.

1. The following are from the Coordination Study Report:

a. Final one-line diagram.

b. Final protective device coordination study.

c. Coordination study data files.

d. List of all protective device settings.

e. Time-current coordination curves.

f. Power system data.

1.05 QUALITY ASSURANCE

A. Studies shall be performed using commercially developed and distributed software designed specifically for power system analysis.

B. Software algorithms shall comply with requirements of standards and guides specified in this Section.

C. Manual calculations are unacceptable.

D. Power System Analysis Software Qualifications:

1. Computer program shall be designed to perform coordination studies or have a function, component, or add-on module designed to perform coordination studies.

2. Computer program shall be developed under the charge of a licensed professional engineer who holds IEEE Computer Society's Certified Software Development Professional certification.

E. Power Systems Analysis Specialist Qualifications: Professional engineer licensed in the state of Texas. All elements of the study shall be performed under the direct supervision and control of this professional engineer.

F. Field Adjusting Agency Qualifications:

1. Employer of a NETA ETT-Certified Technician Level III responsible for all field adjusting of the Work.

2. A member company of NETA.

3. Acceptable to authorities having jurisdiction.

2.00 PRODUCTS

2.01 POWER SYSTEM ANALYSIS SOFTWARE DEVELOPERS

A. Manufacturers: Subject to compliance with requirements, provide products by the same manufacturer as provided from the staff. Return updates to the staff in the same program as it was provided in.

B. Comply with IEEE 242 and IEEE 399.

C. Analytical features of device coordination study computer software program shall have the capability to calculate "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.

D. Computer software program shall be capable of plotting and diagramming time-current-characteristic curves as part of its output. Computer software program shall report device settings and ratings of all overcurrent protective devices and shall demonstrate selective coordination by computer-generated, time-current coordination plots.

1. Optional Features:

    a. Arcing faults.

    b. Simultaneous faults.

    c. Explicit negative sequence.

    d. Mutual coupling in zero sequence.

2.02 COORDINATION STUDY REPORT CONTENTS

A. Executive summary of study findings.

B. Study descriptions, purpose, basis, and scope. Include case descriptions, definition of terms, and guide for interpretation of results.

C. One-line diagram of modeled power system, showing the following:

    1. Protective device designations and ampere ratings.

    2. Conductor types, sizes, and lengths.

    3. Transformer kilovolt ampere (kVA) and voltage ratings.

    4. Motor and generator designations and kVA ratings.

    5. Switchgear, switchboard, motor-control center, and panelboard designations.

    6. Any revisions to electrical equipment required by the study.

    7. Study Input Data: As described in "Power System Data" Article.

        a. Short-Circuit Study Output: As specified in "Short-Circuit Study Output Reports" Paragraph in "Short-Circuit Study Report Contents" Article in Section 26 05 73.13 "Short-Circuit Studies."

D. Protective Device Coordination Study:

    1. Report recommended settings of protective devices, ready to be applied in the field. Use manufacturer's data sheets for recording the recommended setting of overcurrent protective devices when available.

        a. Phase and Ground Relays:

            1). Device tag.

            2). Relay current transformer ratio and tap, time dial, and instantaneous pickup value.

3). Recommendations on improved relaying systems, if applicable.

b. Circuit Breakers:

1). Adjustable pickups and time delays (long time, short time, and ground).

2). Adjustable time-current characteristic.

3). Adjustable instantaneous pickup.

4). Recommendations on improved trip systems, if applicable.

c. Fuses: Show current rating, voltage, and class.

E. Time-Current Coordination Curves: Determine settings of overcurrent protective devices to achieve selective coordination. Graphically illustrate that adequate time separation exists between devices installed, including power utility company's upstream devices. Prepare separate sets of curves for the switching schemes and for emergency periods where the power source is local generation. Show the following information:

1. Device tag and title, one-line diagram with legend identifying the portion of the system covered.

2. Terminate device characteristic curves at a point reflecting maximum symmetrical or asymmetrical fault current to which the device is exposed.

3. Identify the device associated with each curve by manufacturer type, function, and, if applicable, tap, time delay, and instantaneous settings recommended.

4. Plot the following listed characteristic curves, as applicable:

a. Power utility's overcurrent protective device.

b. Medium-voltage equipment overcurrent relays.

c. Medium- and low-voltage fuses including manufacturer's minimum melt, total clearing, tolerance, and damage bands.

d. Low-voltage equipment circuit-breaker trip devices, including manufacturer's tolerance bands.

e. Transformer full-load current, magnetizing inrush current, and ANSI through-fault protection curves.

f. Cables and conductors damage curves.

g. Ground-fault protective devices.

h. Motor-starting characteristics and motor damage points.

i. Generator short-circuit decrement curve and generator damage point.

j. The largest feeder circuit breaker in each motor-control center and panelboard.

5. Maintain selectivity for tripping currents caused by overloads.

6. Provide adequate time margins between device characteristics such that selective operation is achieved.

7. Comments and recommendations for system improvements.

3.00 EXECUTION

3.01 EXAMINATION

A. Examine Project overcurrent protective device submittals for compliance with electrical distribution system coordination requirements and other conditions affecting performance of the Work. Devices to be coordinated are indicated on Drawings.

1. Proceed with coordination study only after relevant equipment submittals have been assembled. Overcurrent protective devices that have not been submitted and approved prior to coordination study may not be used in study.

3.02 POWER SYSTEM DATA

A. Obtain all data necessary for conduct of the overcurrent protective device study.

1. Verify completeness of data supplied in one-line diagram on Drawings. Call any discrepancies to Engineer's attention.

2. For equipment included as Work of this Project, use characteristics submitted under provisions of action submittals and information submittals for this Project.

3. For equipment that is existing to remain, obtain required electrical distribution system data by field investigation and surveys, conducted by qualified technicians and engineers. Qualifications of technicians and engineers shall be as defined by NFPA 70E.

B. Gather and tabulate all required input data to support the coordination study. List below is a guide. Comply with recommendations in IEEE 551 for the amount of detail required to be acquired in the field. Field data gathering shall be under direct supervision and control of the engineer in charge of performing the study, and shall be by the engineer or its representative who holds NETA ETT-Certified Technician Level III or NICET Electrical Power Testing Level III certification. Data include, but are not limited to, the following:

1. Product Data for overcurrent protective devices specified in other Sections and involved in overcurrent protective device coordination studies. Use equipment designation tags

that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.

2. Electrical power utility impedance at the service.

3. Power sources and ties.

4. Short-circuit current at each system bus (three phase and line to ground).

5. Full-load current of all loads.

6. Voltage level at each bus.

7. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in percent, and phase shift.

8. For reactors, provide manufacturer and model designation, voltage rating, and impedance.

9. For circuit breakers and fuses, provide manufacturer and model designation. List type of breaker, type of trip and available range of settings, SCCR, current rating, and breaker settings.

10. Generator short-circuit current contribution data, including short-circuit reactance, rated kVA, rated voltage, and X/R ratio.

11. For relays, provide manufacturer and model designation, current transformer ratios, potential transformer ratios, and relay settings.

12. Maximum demands from service meters.

13. Busway manufacturer and model designation, current rating, impedance, lengths, size, and conductor material.

14. Motor horsepower and NEMA MG 1 code letter designation.

15. Low-voltage cable sizes, lengths, number, conductor material, and conduit material (magnetic or nonmagnetic).

16. Medium-voltage cable sizes, lengths, conductor material, cable construction, metallic shield performance parameters, and conduit material (magnetic or nonmagnetic).

17. Data sheets to supplement electrical distribution system one-line diagram, cross-referenced with tag numbers on diagram, showing the following:

    a. Special load considerations, including starting inrush currents and frequent starting and stopping.

    b. Transformer characteristics, including primary protective device, magnetic inrush current, and overload capability.

c. Motor full-load current, locked rotor current, service factor, starting time, type of start, and thermal-damage curve.

d. Generator thermal-damage curve.

e. Ratings, types, and settings of utility company's overcurrent protective devices.

f. Special overcurrent protective device settings or types stipulated by utility company.

g. Time-current-characteristic curves of devices indicated to be coordinated.

h. Manufacturer, frame size, interrupting rating in amperes root mean square (rms) symmetrical, ampere or current sensor rating, long-time adjustment range, short-time adjustment range, and instantaneous adjustment range for circuit breakers.

i. Manufacturer and type, ampere-tap adjustment range, time-delay adjustment range, instantaneous attachment adjustment range, and current transformer ratio for overcurrent relays.

j. Switchgear, switchboards, motor-control centers, and panelboards ampacity, and SCCR in amperes rms symmetrical.

3.03 COORDINATION STUDY

A. Comply with IEEE 242 for calculating short-circuit currents and determining coordination time intervals.

B. Comply with IEEE 399 for general study procedures.

C. Base study on device characteristics supplied by device manufacturer.

D. Begin analysis at the service, extending down to system overcurrent protective devices as follows:

1. To normal system low-voltage load buses where fault current is 10 kA or less.

2. Exclude equipment rated 240 V ac or less when supplied by a single transformer rated less than 125 kVA.

E. Study electrical distribution system from normal and alternate power sources throughout electrical distribution system for Project. Study all cases of system-switching configurations and alternate operations that could result in maximum fault conditions.

F. Transformer Primary Overcurrent Protective Devices:

1. Device shall not operate in response to the following:

2. Inrush current when first energized.

3. Self-cooled, full-load current or forced-air-cooled, full-load current, whichever is specified for that transformer.

4. Permissible transformer overloads according to IEEE C57.96 if required by unusual loading or emergency conditions.

5. Device settings shall protect transformers according to IEEE C57.12.00, for fault currents.

G. Motor Protection:

1. Select protection for low-voltage motors according to IEEE 242 and NFPA 70.

2. Select protection for motors served at voltages more than 600 V according to IEEE 620.

H. Conductor Protection: Protect cables against damage from fault currents according to ICEA P-32-382, ICEA P-45-482, and protection recommendations in IEEE 242. Demonstrate that equipment withstands the maximum short-circuit current for a time equivalent to the tripping time of the primary relay protection or total clearing time of the fuse. To determine temperatures that damage insulation, use curves from cable manufacturers or from listed standards indicating conductor size and short-circuit current.

I. Generator Protection: Select protection according to manufacturer's written instructions and to IEEE 242.

J. Include the ac fault-current decay from induction motors, synchronous motors, and asynchronous generators and apply to low- and medium-voltage, three-phase ac systems. Also account for fault-current dc decrement, to address asymmetrical requirements of interrupting equipment.

K. Calculate short-circuit momentary and interrupting duties for a three-phase bolted fault and a single line-to-ground fault at each equipment indicated on one-line diagram.

1. For grounded systems, provide a bolted line-to-ground fault-current study for areas as defined for the three-phase bolted fault short-circuit study.

L. Protective Device Evaluation:

1. Evaluate equipment and protective devices and compare to short-circuit ratings.

2. Adequacy of switchgear, motor-control centers, and panelboard bus bars to withstand short-circuit stresses.

3. Include in the report identification of any protective device applied outside its capacity.

3.04 LOAD-FLOW AND VOLTAGE-DROP STUDY

A. Perform a load-flow and voltage-drop study to determine the steady-state loading profile of the system. Analyze power system performance two times as follows:

1. Determine load flow and voltage drop based on full-load currents obtained in "Power System Data" Article.

2. Determine load flow and voltage drop based on 80 percent of the design capacity of load buses.

3. Prepare load-flow and voltage-drop analysis and report to show power system components that are overloaded or might become overloaded; show bus voltages that are less than as prescribed by NFPA 70.

3.05 FIELD ADJUSTING

A. Adjust relay and protective device settings according to recommended settings provided by the coordination study. Field adjustments shall be completed by the engineering service division of equipment manufacturer under the "Startup and Acceptance Testing" contract portion.

B. Make minor modifications to equipment as required to accomplish compliance with short-circuit and protective device coordination studies.

C. Testing and adjusting shall be by a full-time employee of the Field Adjusting Agency, who holds NETA ETT-Certified Technician Level III or NICET Electrical Power Testing Level III certification.

END OF SECTION

26 05 73.19 ARC-FLASH HAZARD ANALYSIS

1.00 GENERAL

1.01 SUMMARY

A. Coordinate with plant staff for obtaining existing coordination studies, arc flash analysis, and short circuit studies. Studies shall be done in the same software as provided by the staff and be returned to the staff with the updates.

B. Section includes a computer-based, arc-flash study to determine the arc-flash hazard distance and the incident energy to which personnel could be exposed during work on or near electrical equipment.

1.02 DEFINITIONS

A. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

B. Field Adjusting Agency: An independent electrical testing agency with full-time employees and the capability to adjust devices and conduct testing indicated and that is a member company of NETA.

C. One-Line Diagram: A diagram that shows, by means of single lines and graphic symbols, the course of an electric circuit or system of circuits and the component devices or parts used therein.

D. Power System Analysis Software Developer: An entity that commercially develops, maintains, and distributes computer software used for power system studies.

E. Power Systems Analysis Specialist: Professional engineer in charge of performing the study and documenting recommendations, licensed in the state where Project is located.

F. Protective Device: A device that senses when an abnormal current flow exists and then removes the affected portion from the system.

G. SCCR: Short-circuit current rating.

H. Service: The conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served.

I. Single-Line Diagram: See "One-Line Diagram."

1.03 ACTION SUBMITTALS

A. Product Data: For computer software program to be used for studies.

B. Study Submittals: Submit the following submittals after the approval of system protective devices submittals. Submittals shall be in digital form:

1. Arc-flash study input data, including completed computer program input data sheets.

2. Arc-flash study report; signed, dated, and sealed by Power Systems Analysis Specialist.

3. Submit study report for action prior to receiving final approval of distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from Engineer for preliminary submittal of sufficient study data to ensure that selection of devices and associated characteristics is satisfactory.

C. The corresponding section and sub section(s) at the top left or right of each sheet.

D. The entire corresponding specification at the front of the document with markings of C, D, E, or N/A beside each section and sub section(s). C, D, E, or N/A will be noted as comply, deviate, exception, or not applicable.

1.04 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data:

1. Provide maintenance procedures in equipment manuals according to requirements in NFPA 70E.

2. Operation and Maintenance Procedures: Provide maintenance procedures for use by Owner's personnel that comply with requirements in NFPA 70E.

1.05 QUALITY ASSURANCE

A. Study shall be performed using commercially developed and distributed software designed specifically for power system analysis.

B. Software algorithms shall comply with requirements of standards and guides specified in this Section.

C. Manual calculations are unacceptable.

D. Power System Analysis Software Qualifications: An entity that owns and markets computer software used for studies, having performed successful studies of similar magnitude on electrical distribution systems using similar devices.

1. Computer program shall be designed to perform arc-flash analysis or have a function, component, or add-on module designed to perform arc-flash analysis.

2. Computer program shall be developed under the charge of a licensed professional engineer who holds IEEE Computer Society's Certified Software Development Professional certification.

E. Power Systems Analysis Specialist Qualifications: Professional engineer in charge of performing the arc-flash study, analyzing the arc flash, and documenting recommendations, licensed in the state of Texas. All elements of the study shall be performed under the direct supervision and control of this professional engineer.

F. Arc-Flash Study Certification: Arc-Flash Study Report shall be signed and sealed by Power Systems Analysis Specialist.

G. Field Adjusting Agency Qualifications:

1. Employer of a NETA ETT-Certified Technician Level III or NICET Electrical Power Testing Level III certification responsible for all field adjusting of the Work.

2. A member company of NETA.

3. Acceptable to authorities having jurisdiction.

2.00 PRODUCTS

2.01 COMPUTER SOFTWARE DEVELOPERS

A. Manufacturers: Subject to compliance with requirements, provide products by the same manufacturer as provided from the staff. Return updates to the staff in the same program as it was provided in.

B. Comply with IEEE 1584 and NFPA 70E.

C. Analytical features of device coordination study computer software program shall have the capability to calculate "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.

2.02 ARC-FLASH STUDY REPORT CONTENT

A. Executive summary of study findings.

B. Study descriptions, purpose, basis, and scope. Include case descriptions, definition of terms, and guide for interpretation of results.

C. One-line diagram, showing the following:

1. Protective device designations and ampere ratings.

2. Conductor types, sizes, and lengths.

3. Transformer kilovolt ampere (kVA) and voltage ratings, including derating factors and environmental conditions.

4. Motor and generator designations and kVA ratings.

5. Switchgear, switchboard, motor-control center, panelboard designations, and ratings.

D. Study Input Data: As described in "Power System Data" Article.

E. Short-Circuit Study Output Data: As specified in "Short-Circuit Study Output Reports" Paragraph in "Short-Circuit Study Report Contents" Article in Section 26 05 73.13 "Short-Circuit Studies."

F. Protective Device Coordination Study Report Contents: As specified in "Coordination Study Report Contents" Article in Section 26 05 73.16 "Coordination Studies."

G. Arc-Flash Study Output Reports:

1. Interrupting Duty Report: Three-phase and unbalanced fault calculations, showing the following for each equipment location included in the report:

a. Voltage.

b. Calculated symmetrical fault-current magnitude and angle.

c. Fault-point X/R ratio.

d. No AC Decrement (NACD) ratio.

e. Equivalent impedance.

f. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a symmetrical basis.

g. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a total basis.

H. Incident Energy and Flash Protection Boundary Calculations:

1. Arcing fault magnitude.

2. Protective device clearing time.

3. Duration of arc.

4. Arc-flash boundary.

5. Restricted approach boundary.

6. Limited approach boundary.

7. Working distance.

8. Incident energy.

9. Hazard risk category.

10. Recommendations for arc-flash energy reduction.

I. Fault study input data, case descriptions, and fault-current calculations including a definition of terms and guide for interpretation of computer printout.

2.03 ARC-FLASH WARNING LABELS

A. Comply with requirements in Section 26 05 53 "Identification for Electrical Systems" for self-adhesive equipment labels. Produce a 3.5-by-5-inch self-adhesive equipment label for each work location included in the analysis.

B. Label shall have an orange header with the wording, "WARNING, ARC-FLASH HAZARD," and shall include the following information taken directly from the arc-flash hazard analysis:

1. Location designation.

2. Nominal voltage.

3. Protection boundaries.

a. Arc-flash boundary.

b. Restricted approach boundary.

c. Limited approach boundary.

4. Arc flash PPE category.

5. Required minimum arc rating of PPE in Cal/cm squared.

6. Available incident energy.

7. Working distance.

8. Engineering report number, revision number, and issue date.

C. Labels shall be machine printed, with no field-applied markings.

3.00 EXECUTION

3.01 EXAMINATION

A. Examine Project overcurrent protective device submittals. Proceed with arc-flash study only after relevant equipment submittals have been assembled. Overcurrent protective devices that have not been submitted and approved prior to arc-flash study may not be used in study.

3.02 ARC-FLASH HAZARD ANALYSIS

A. Comply with NFPA 70E and its Annex D for hazard analysis study.

B. Preparatory Studies: Perform the Short-Circuit and Protective Device Coordination studies prior to starting the Arc-Flash Hazard Analysis.

   1. Short-Circuit Study Output: As specified in "Short-Circuit Study Output Reports" Paragraph in "Short-Circuit Study Report Contents" Article in Section 26 05 73.13 "Short-Circuit Studies."

   2. Coordination Study Report Contents: As specified in "Coordination Study Report Contents" Article in Section 26 05 73.16 "Coordination Studies."

C. Calculate maximum and minimum contributions of fault-current size.

   1. Maximum calculation shall assume a maximum contribution from the utility and shall assume motors to be operating under full-load conditions.

   2. Calculate arc-flash energy at 38 percent of maximum short-circuit current according to NFPA 70E recommendations.

D. Calculate the arc-flash protection boundary and incident energy at locations in electrical distribution system where personnel could perform work on energized parts.

E. Include medium- and low-voltage equipment locations, except equipment rated 240 V ac or less fed from transformers less than 125 kVA.

F. Calculate the limited, restricted, and prohibited approach boundaries for each location.

G. Incident energy calculations shall consider the accumulation of energy over time when performing arc-flash calculations on buses with multiple sources. Iterative calculations shall take into account the changing current contributions, as the sources are interrupted or decremented with time. Fault contribution from motors and generators shall be decremented as follows:

   1. Fault contribution from induction motors shall not be considered beyond three to five cycles.

   2. Fault contribution from synchronous motors and generators shall be decayed to match the actual decrement of each as closely as possible (for example, contributions from permanent magnet generators will typically decay from 10 per unit to three per unit after 10 cycles).

H. Arc-flash energy shall generally be reported for the maximum of line or load side of a circuit breaker. However, arc-flash computation shall be performed and reported for both line and load side of a circuit breaker as follows:

   1. When the circuit breaker is in a separate enclosure.

   2. When the line terminals of the circuit breaker are separate from the work location.

I. Base arc-flash calculations on actual overcurrent protective device clearing time. Cap maximum clearing time at two seconds based on IEEE 1584, Section B.1.2.

3.03 POWER SYSTEM DATA

A. Obtain all data necessary for conduct of the arc-flash hazard analysis.

1. Verify completeness of data supplied on one-line diagram on Drawings and under "Preparatory Studies" Paragraph in "Arc-Flash Hazard Analysis" Article. Call discrepancies to Engineer's attention.

2. For new equipment, use characteristics from approved submittals under provisions of action submittals and information submittals for this Project.

3. For existing equipment, whether or not relocated, obtain required electrical distribution system data by field investigation and surveys conducted by qualified technicians and engineers.

B. Electrical Survey Data: Gather and tabulate the following input data to support study. Comply with recommendations in IEEE 1584 and NFPA 70E as to the amount of detail that is required to be acquired in the field. Field data gathering shall be under the direct supervision and control of the engineer in charge of performing the study, and shall be by the engineer or its representative who holds NETA ETT-Certified Technician Level III or NICET Electrical Power Testing Level III certification. Data include, but are not limited to, the following:

1. Product Data for overcurrent protective devices specified in other Sections and involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.

2. Obtain electrical power utility impedance or available short circuit current at the service.

3. Power sources and ties.

4. Short-circuit current at each system bus (three phase and line to ground).

5. Full-load current of all loads.

6. Voltage level at each bus.

7. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in percent, and phase shift.

8. For reactors, provide manufacturer and model designation, voltage rating and impedance.

9. For circuit breakers and fuses, provide manufacturer and model designation. List type of breaker, type of trip and available range of settings, SCCR, current rating, and breaker settings.

10. Generator short-circuit current contribution data, including short-circuit reactance, rated kVA, rated voltage, and X/R ratio.

11. For relays, provide manufacturer and model designation, current transformer ratios, potential transformer ratios, and relay settings.

12. Busway manufacturer and model designation, current rating, impedance, lengths, size, and conductor material.

13. Motor horsepower and NEMA MG 1 code letter designation.

14. Low-voltage conductor sizes, lengths, number, conductor material and conduit material (magnetic or nonmagnetic).

15. Medium-voltage conductor sizes, lengths, conductor material, conductor construction and metallic shield performance parameters, and conduit material (magnetic or nonmagnetic).

3.04 LABELING

A. Apply arc-flash label on the front cover of each section of the equipment for each equipment included in the study. Base arc-flash label data on highest values calculated at each location.

B. Each piece of equipment listed below shall have an arc-flash label applied to it:

1. Motor-control center.

2. Low-voltage switchboard.

3. Switchgear.

4. Medium-voltage switch.

5. Medium voltage transformers

6. Low voltage transformers. Exclude transformers with high voltage side 240 V or less and less than 125 kVA.

7. Panelboard and safety switch over 250 V.

8. Applicable panelboard and safety switch under 250 V.

9. Control panel.

C. Note on record Drawings the location of equipment where the personnel could be exposed to arc-flash hazard during their work.

1. Indicate arc-flash energy.

2. Indicate protection level required.

3.05 APPLICATION OF WARNING LABELS

A. Install arc-flash warning labels under the direct supervision and control of Power System Analysis Specialist.

END OF SECTION

DIVISION 40

PROCESS INTEGRATION

40 05 50 FABRICATED GATES

1.00 GENERAL

1.01 WORK INCLUDED

A. Furnish labor, materials, equipment and incidentals necessary to fabricate, test and install sluice gates as shown on the Drawings and indicated in gate schedule with operators, gate stems, frames, gate guides and other related appurtenances.

B. It shall be the responsibility of the Contractor to install all gates, actuators and appurtenances. Both the gate manufacturer and electric motor operator representative shall be responsible for the startup of their respective equipment and a factory certified technician should perform the start up. It is the responsibility of the Contractor to ensure proper communication between the gate manufacturer and actuator manufacturer and they shall provide a letter of conformance with submittal.

1.02 QUALITY ASSURANCE

A. Acceptable Manufacturers:

1. Whipps.
2. Fontaine.
3. Golden Harvest.
4. RW Gate Company.

B. Acceptable Multi-Turn Motor Operator Manufacturers:

1. Auma.
2. Beck.
3. EIM.
4. Limitorque.
5. Rotork.

C. Manufacturer's Representative for Startup and Testing: The services of the manufacturer's technical representative shall be provided for pre-startup installation checks, startup assistance, training of Owner's operating personnel, troubleshooting and other services as required in Section 01 75 00 "Starting and Adjusting."

D. Provide training in adequate detail to ensure that the trainees who complete the program will be qualified and capable of operating and maintaining the equipment, products, and systems provided. Training shall be conducted for a minimum of 4 hours by the manufacturer's representative. The Contractor shall submit the training schedule to the Owner for approval a minimum 2 weeks from the proposed training.

E. The fully assembled gates shall be shop inspected, tested for operation and leakage, and adjusted before shipping. Manufacturer shall provide test certificates to show that they meet the leakage rate required in this Section. Factory hydrostatic testing shall be

conducted to the maximum design head of each specific gate, per Paragraph 3.04.A. There shall be no assembling or adjusting on the Site other than for the lifting mechanism

1.03 MANUFACTURER'S QUALITY CONTROL SYSTEM

A. The gate manufacturer shall be ISO 9001 certified and compliant or have an approved Quality Assurance Policy.

1.04 SUBMITTALS

A. Submittals shall be in accordance with Section 01 33 00 "Document Management" and shall include at least the following:

1. Shop Drawings:

a. Certified shop and installation drawings showing all materials, details of construction, dimensions and anchor bolt locations. General arrangement drawings and catalog cut sheets are not acceptable for use as shop and installation drawings.

b. Maximum deflection and bending stress of the slide and frame of each sluice gate loaded under the maximum design head.

c. Submit a list of not less than 10 operating installations in the United States with similar size gates as scheduled, as evidence of meeting the experience requirement. Include project reference contact information.

d. Certification of Adequacy of Design (CAD) is required as defined in section 01 33 02.

2. Record Data:

a. Descriptive literature, bulletins and/or catalogs of the equipment.

b. Prior to shipment of gates, submit certified affidavit of compliance stating that the gates for this Contract were manufactured, inspected, and tested in accordance with all applicable AWWA and ASTM Standards.

c. Shop test reports, including test results from operation and shop leakage tests on all gates. Leakage tests shall be performed with water in the unseating head condition. Feeler gauge testing is not acceptable in lieu of testing with water.

d. ISO 9001:2015 certification or paperwork confirmation a similar QA/QA program.

3. Operation and Maintenance Manuals: O&M manual instructions are provided in Section 01 33 04 "Operation and Maintenance Data."

1.05 STANDARDS

A. The applicable provisions of the following standard shall apply as if written here in its entirety unless expressly contradicted in the text of this specification:

1. American Water Works Association (AWWA): AWWA C561-14, Fabricated Stainless Steel Slide Gates (latest revision).

2. ASTM International (ASTM).

3. American Welding Society (AWS).

1.06 EXPERIENCE REQUIREMENTS

A. The equipment Supplier for gates shall have at least **7** years of experience in the design, application and supply of stainless steel fabricated gates in wastewater service. The equipment supplier shall submit a list of not less than 10 operating installations in the United States with similar size gate as scheduled, as evidence of meeting the experience requirement. Installation list shall be submitted with the Shop Drawings.

B. The equipment Supplier for actuators shall have at least 10 years of experience in the design, application and supply of actuators in wastewater service. The equipment supplier shall submit a list of not less than 10 operating installations in the United States with similar size actuator as scheduled, as evidence of meeting the experience requirement. Installation list shall be submitted with the Shop Drawings.

1.07 GUARANTEE AND WARRANTY

A. Gate Manufacturer shall warrant the equipment furnished under this specification for a minimum period of 2 years against defects in materials and workmanship, and operational failure.

B. In the event of a defect in material or workmanship or equipment design of any part or parts of the equipment during the first 2 years of service, provided that the equipment has been operated and maintained in accordance with good practice, the Gate Manufacturer shall furnish, deliver and install a replacement for the defective part or parts at its own expense.

C. The first 2 years of service shall be interpreted as the 24-month period following the installation, adjusting, and acceptance tests of all gates, operators, motors and appurtenances.

2.00 PRODUCTS

2.01 MATERIALS

A. Materials in fabricated gates and appurtenances shall conform to the requirements of the applicable specifications listed below for the alloy, grade, type, or class of material and the condition and finish appropriate to the structural and operational requirements:

1. Carbon Steel Bars: ASTM A108 or ASTM A575.
2. Structural Steel Shapes, Plates, and Bars: ASTM A36.
3. Stainless Steel: ASTM A167, ASTM A276 or ASTM A582, Type 302, 303, 304 or 304L, 316 or 316L.
4. Bronze Bar, Rods, Shapes: ASTM B21 or ASTM B98.
5. Cast Bronze: ASTM B584.
6. Rubber for Gaskets and Seals: ASTM D2000, Grade R-62.
7. UHMW Polyethylene: ASTM D4020.

2.02 GATE DEFINITIONS

A. Sluice gates are defined as fabricated gates with top, bottom and side seals. Sluice gates are typically used at pipe ends in basins or influent and effluent boxes and fully submerged wall openings and/or orifices.

B. Slide gates are defined as fabricated gates with bottom and side seals. Slide gates are typically used for open channel isolation and diversion. The top of slide gates are typically above the maximum water surface elevation. Slide gates are not suitable for submerged orifice applications.

C. Weir gates are defined as fabricated gates with bottom and side seals. Weir gates are typically used as overflow downward opening adjustable weirs. The top of weir gates are typically submerged and set at the desired overflow elevation. Weir gates are mounted flush to the wall surface at the weir opening in the structural wall.

D. Stop gates and stop logs are defined as hydraulic control gates where their use is more permanent and requires infrequent opening and closing. Stop gates and stop logs are used to provide a permanent flow control across an opening and operate similar to an adjustable weir gate. Stop gates typically consist of a single continuous slide while stop logs consist of several smaller equal size “logs” that can be installed or removed as needed to change the height of gate.

2.03 FABRICATED GATES

A. General:

1. Gates shall be as specified herein and have the characteristics and dimensions shown on the Contract Documents and schedule. Any discrepancies shall be brought to the attention of the Engineer.

2. Leakage for fabricated gates shall not exceed 0.05 gpm/ft of wetted seal perimeter in seating and unseating head conditions.

3. The maximum allowable leakage for stop gates and stop logs shall be 0.1 gpm/lf of wetted seal perimeter in seating and unseating head conditions.

4. The gate seal design shall meet the latest applicable AWWA standards.

5. All structural components of the frame and slide shall be constructed of fabricated stainless steel having a minimum thickness of 1/4 inch and shall have adequate strength to prevent distortion during normal handling, during installation and while in service.

6. All welding shall be performed by welders with AWS or ASME Section IX certification and be completed in the manufacturing facility. No welding is allowed in the field during installation.

7. Fabricated components shall be passivated in accordance with ASTM A380 to remove weld burn and discoloration for uniform finish. If sandblasting or glass bead blasting is utilized, the entire frame and slide shall be blasted for a uniform finish.

8. Materials:

Components	Materials
Frame Assembly and Retainers	316L stainless steel. See Paragraph 3.04
Slide and Stiffeners	316L stainless steel. See Paragraph 3.04
Stem	316 stainless steel. See Paragraph 3.04
Fasteners, Nuts and Bolts	316 stainless steel
Invert Seal (Upward Opening Gates Only)	EPDM or Neoprene
Seat/Seals and Facing	UHMWPE. See Paragraph 3.04
Lift Nuts	Stainless steel / Bronze ASTM B584
Pedestal and Wall Brackets	Stainless steel
Operator Housing	Aluminum or Stainless steel

B. Frames:

1. Frame shall be of flange-back design for wall mounted gates and formed or extruded construction consisting of guides and invert members and top member where top closure is required. Suitable reinforcements will be provided to resist all operating loads. The mounting and bolting flange of the frame to the wall shall be separate and independent from the seating and sealing plane of the slide.
2. Frame shall be designed for wall-mounting with SS anchor bolts and non-shrink grout or EPDM gasket as shown on the Drawings.
3. The structural portion of the frame that incorporates the seat/seals shall be formed into a one-piece shape for rigidity. Gussets shall be provided on the guides to transfer the load from unseating head conditions to the wall. Guide member designs where water loads are transferred through the assembly bolts are not acceptable.
4. The portion of the wall mounted guide, where the anchor bolt penetrates, shall have a minimum thickness of 1/4-inch. Guide extensions shall be formed plate C-channel or Z-channel members and shall have a minimum weight of 6 lb/ft. Angles are not acceptable as guide extensions. Alternatively, the manufacturer may supply frames with a flange-back design utilizing fully welded gusset plate stiffeners, minimum 1/4-inch thickness in order to limit the frame deflection to lesser of 1/360 x L or 1/16 inch.
5. On self-contained gates, a yoke shall be provided across the top of the frame. The yoke shall be formed by two C-channel shaped structural members affixed to the top of the side frame members to provide a one-piece rigid assembly. The yoke shall be designed to allow removal of the slide. The maximum deflection of the yoke shall be 1/360 of the gate's span or 1/16 inch, whichever is less.
6. A rigid stainless steel invert member shall be provided across the bottom of the opening. The invert member shall be of the flushbottom type on upward opening gates. Flushbottom seal shall incorporate an embedded frame channel gate for new construction or an existing channel gate mount for existing channels.
7. A rigid stainless steel top seal member shall be provided across the top of the opening on gates designed to cover submerged openings.

8. The frame shall be capable of withstanding lateral forces as appropriate in this configuration as well as during the extraction of the slide with lifting cables at angles of up to 10 degrees.

C. Slides and Guides:

1. The slide and reinforcing stiffeners shall be constructed of stainless steel plate. All structural components shall have a minimum thickness of 1/4 inch.

2. The gate slide deflection shall not exceed 1/360th of gate width at maximum design head or 1/16 inch, whichever is less.

3. Reinforcing stiffeners shall be welded to the slide and mounted horizontally. Vertical stiffeners shall be welded on the outside of the horizontal stiffeners for additional reinforcement.

4. The stem connector shall be constructed of two angles or plates. The stem connector shall be welded to the slide. A minimum of two bolts shall connect the stem to the stem connector.

5. The gate guides shall be designed for maximum rigidity, having a weight of not less than 2-1/2 pounds for aluminum stop gates, 4.5 pounds for aluminum slide gates, and 9 pounds for stainless steel or, 4 pounds per foot for embedded frames and 7 pounds per foot for wall mounted frames. The guides shall be of sufficient length to properly support at least two-thirds of the height of the slide when the gate is fully open. On self-contained gates, where the guides extend above the operating floor, they shall be strong enough so that no further reinforcing shall be required.

6. Downward opening weir gates shall have a self-containing frame that extends beyond the weir elevation so that the top of gate slide elevation is at or lower than the weir elevation when fully open.

7. Each gate frame shall be fabricated with two integrated lifting lugs or eyes capable of supporting the entire weight of the gate assembly. The location of the lifting points shall be determined by the manufacturer for lifting from above.

D. Gate Stem and Lift:

1. Stems shall be of suitable length with minimum 1.5-inch diameter, and ample strength for the intended service. The operating stem shall be rising . The stem diameter shall be capable of withstanding twice the rated output of the operator and shall be capable of moving the gate slide with the specified seating and unseating head against the gate.

2. The stem shall be furnished in sections of sufficient length to completely open the gate as necessary and to permit reasonable ease transportation and in installation. Couplings shall be stainless steel and shall be bored and bolted or pinned. Stem threads shall be machine rolled or machine-cut full depth ACME threads. The threads shall be smooth and of uniform lead and cross-section, such that the nut can travel the full length without binding or excessive friction. The stem shall be provided with two bolt holes for connection to the stem connector on the slide or the stem shall be threaded for connection to the stem block or thrust nut on the gate slide or pinned to the gate with stainless steel bolts. The entire stem shall be of solid stainless steel material and the threaded portion of the stem shall have a rolled or machine cut full depth, full depth ACME threads with a 16-microinch finish or better. Stem extension pipes are not

acceptable unless specifically required by the Contract Documents and approved prior to installation by the Engineer.

3. Stem guides shall be fabricated from stainless steel with UHMWPE bushed collars and adjustable in two directions**.** Stem guide spacing shall be as recommended by the manufacturer.

4. An adjustable bronze, or stainless steel stop collar shall be provided to limit both upward and downward travel of the fabricated gate. The stop collar shall be internally threaded and provided with a stainless steel set screw. Removable upstops and downstops can also be provided on the slide and frame.

5. Provision shall be made to prevent stem rotation within the thrust nut at the connection with the gate slide.

6. The gate manufacturer shall ensure that the stem is sufficiently stiff and is able to carry the load of the actuator without buckling.

E. Seals:

1. All gates shall be equipped with self-adjusting UHMW polyethylene side and bottom seat/seals to restrict leakage and to prevent metal to metal contact between the frame and slide.

2. Upward opening gates requiring top closure shall be provided with self-adjusting UHMW seals across the top seal member. Downward opening gates shall be provided with self adjusting UHMW seals along the invert member.

3. The seat/seals shall extend the full height of the frame and guides to accommodate the height of the slide when the slide is in the fully closed or fully opened position.

4. The seal system shall be durable and shall be designed to accommodate high velocities and frequent cycling without loosening or suffering damage.

5. Wall mounted upward opening gates shall be provided with a resilient seal to seal the bottom portion of the gate. The seal shall be attached to the invert member or the bottom of the slide and it shall be held in place with stainless steel attachment hardware and chemically retained.

6. All seals must be bolted or otherwise mechanically fastened to the frame or slide. All seals must be field replaceable without the need to remove the gate frame from the wall or without the need to remove grout. Arrangement with seals that are force fit or held in place with adhesives are unacceptable.

7. The seals shall be mounted so as not to obstruct the gate opening.

8. The seal system shall be factory tested to confirm negligible wear (less than 0.02 inches) and proper sealing.

2.04 ELECTRIC MOTOR OPERATORS

A. Hand-wheel: Operators shall be equipped with an auxiliary hand-wheel to provide for actuation of the valve in the event of power failure. The hand-wheel shall not turn during normal operation of the valve. The hand/auto selection lever should be pad-lockable in both "Hand" and "Auto" positions. It should be possible to select hand operation while the

actuator is running or start the actuator motor while the hand/auto selection lever is locked in "Hand" without damage to the drive train. The hand-wheel drive must be mechanically independent of the motor drive, and any gearing should be such as to permit emergency manual operation in a reasonable time.

B. Drive Bushing: The actuator shall be furnished with a drive bushing easily detachable for machining to suit the valve stem or gearbox input shaft. Normally the drive bushing shall be positioned in a detachable base of the actuator. Thrust bearings, when housed in a separate thrust base, should be of the sealed-for-life type.

C. Electric motor operators shall be pedestal mounted where shown. The stainless steel pedestals shall have adaptor plates with a minimum thickness of 1/2-inch thick.

D. Power Gearing:

1. The actuator gearing shall be totally enclosed in an oil-filled gear-case suitable for operation at any angle. All main drive gearing must be of metal construction. Where the actuator operates gate valves or large diameter ball or plug valves, the drive shall incorporate a lost-motion hammer-blow feature. For rising spindle valves, the output shaft shall be hollow to accept a rising stem and incorporate thrust bearings of the ball or roller type at the base of the actuator, and the design should be such as to permit the gear-case to be opened for inspection or disassembled without releasing the stem thrust or taking the valve out of service.

E. Motor:

1. The electric motor shall be Class F insulated with a time rating of at least 15 minutes at 104 deg. F (40 deg. C) or twice the valve stroking time, whichever is the longer, at an average load of at least 33 percent of maximum valve torque.

2. Electrical and mechanical disconnection of the motor should be possible without draining the lubricant from the actuator gear case. Plugs and sockets are not acceptable as a means of electrical connection for the motor.

3. Motor enclosures shall be NEMA 4 explosion-proof submersible per IP 68.

4. Motor Protection shall be single phasing protection. The motor shall be de-energized in the event of stall when attempting to unseat a jammed valve. Motor temperature shall be sensed by a thermostat to protect against overheating.

F. Electrical:

1. The actuators shall be suitable for use on a nominal 480 volts, 3 phase, 60 Hertz power supply and are to incorporate motor, gearbox, integral reversing starter, local control facilities, and terminals for remote control and indication connections.

2. The actuator shall include a phase discriminator: a device to ensure that the motor runs with the correct rotation for the required direction of valve travel with either phase sequence of the three-phase power supply connected to the actuator.

G. Torque and Turns Limitations: Torque and turns limitation to be adjustable as follows:

1. Torque Rating: 3115 ft-lb, minimum or as required by the valve supplier.

2. Position Setting Range: 2.5 to 100,000 turns, with resolution to 15 degrees of actuator output.

3. Torque Setting: 40 to 100 percent rated torque.
4. Torque sensing must be affected purely electrically or electronically. Extrapolating torque from mechanically measured motor speed is not acceptable due to response time; nor shall springs be utilized.
5. “Latching" to be provided for the torque sensing system to inhibit torque off during unseating or during starting in mid-travel against high inertia loads.
6. The electric circuit diagram of the actuator should not vary with valve type remaining identical regardless of whether the valve is to open or close on torque or position limit. An inexpensive setting tool is required for non-intrusive calibration and interrogation of the actuator. This setting tool will provide speedy interrogation capabilities as well as security in a non-intrusive intrinsically safe watertight casing.

H. Controls:

1. Remote Valve position/Actuators Status Indication:
    a. The actuator must provide a local display of the position of the valve via a LCD in percentages, even when the power supply is not present. In the event of a main power supply loss or failure, the position contacts must continue to be able to supply remote position feedback and maintain interlock capabilities. A shade cover shall be provided for the LCD screen to prevent sun damage.
    b. Open/Close Operating Actuators:
        1). Four latching volt free contacts shall be provided which can be selected to indicate any position of the valve with each contact selectable as normally open or normally closed. Each contact can be configured to either -normally open- or -normally closed- and rated at 5 mA to 5 amps, 120 VAC, 30 VDC.
        2). Any of the four above contacts shall be independently configurable to signal one of the following:
            a). Valve Position - fully open, fully closed or intermediate positions (0-99 percent open).
            b). Status - Valve opening, closing, moving (continuous or pulsing signal), local stop selected, local selected, remote selected, open or close interlock active, ESD active.
            c). Valve Alarms - Motor tripped on torque in mid travel, motor tripped on torque going open, going closed, valve jammed, actuator being operated by hand-wheel, general fault.
2. Local Position Indication: The actuator shall include a digital position indicator with a display from fully open to fully closed in 1 percent increments. Red, green, and yellow lights corresponding to Open, Closed, and Intermediate positions shall be included on the actuator. The digital display shall be maintained even when the power to the actuator is isolated and shall have a UV protective screen or other device. The local display should be large enough to be viewed from a distance of 6 feet when the actuator is powered up. Provision shall be made in the design for the addition of a transmitter without contacts to give a 4-20 mA analog signal corresponding to valve travel for remote indication when required.

3. Integral Starter and Transformer: The reversing starter, control transformer, and local controls shall be integral with the valve actuator, suitably housed to prevent breathing and condensation buildup. For ON/OFF service, this starter shall be an electromechanical type suitable for 60 starts per hour and of rating appropriate to motor size. The controls supply transformer shall be fed from two of the incoming three phases. The transformer shall be furnished with sufficient capacity to operate the contactor. It shall have the necessary tapping and be adequately rated to provide power for the following functions:
    a. 120 VAC energizing of the contactor coils.
    b. 24 VDC output where required for remote controls.
    c. Supply for all the internal electrical circuits.
    d. The primary and secondary windings shall be protected by easily replaceable fuses.
4. Integral Push Buttons and Selector Switches:
    a. Local, Stop, and Remote Selector Switch lockable in the Stop position.
    b. Open/Close selector switch.
5. Controls shall be arranged so that direction of valve travel can be reversed without the necessity of stopping the actuator.
6. Internal Wiring and Terminal:
    a. Internal wiring shall be of tropical grade PVC insulated stranded cable of appropriate size for the control and three- phase power. Each wire shall be clearly identified at each end. The terminals shall be embedded in a terminal block of high tracking resistance compound. The terminal compartment shall be separated from the inner electrical components of the actuator by means of a watertight seal. The terminal compartment of the actuator shall be provided with a minimum of three threaded cable entries.
    b. All wiring supplied as part of the actuator to be contained within the main enclosure for physical and environmental protection. Control logic circuit boards and relay boards must be mounted on plastic mounts to comply with double insulated standards. No more than a single primary size fuse shall be provided to minimize the need to remove single covers for replacement.
    c. A durable terminal identification card showing plan of terminals shall be provided attached to the inside of the terminal box cover indicating serial number, external voltage values, wiring diagram and terminal layout.
7. Separate Control Module: There shall be furnished and mounted on each operator a separate control module, submersible, explosion-proof, containing a lockable power disconnect which shall disconnect all power from the operator for servicing. Supply voltage disconnect that meets the rating of the actuator.
8. Reversing Contactors: Each operator shall have an integral three-phase, full-voltage, reversing contactor with mechanical and electrical interlocks and three overload sensing relays. The contactor control voltage shall be 120 VAC. The contactor shall have auxiliary contacts as shown in the schematics.

9. Phase Failure Relay: Each operator shall be protected against loss of any one phase, phase unbalance, and phase rotation reversal.

I. Communications:

1. Monitoring and Diagnostic:

a. Shall provide eight programmable feedback status including:

1). Local-Stop-Remote (remote position status).

2). Open status.

3). Closed status.

4). High Torque alarm.

5). 2 Intermediate position 0-99 percent.

6). Internal failure.

b. Actuators shall include a diagnostic module, which will store and enable download of historical actuator data to permit analysis of changes in actuator or valve performance. A software tool shall be provided to allow configuration and diagnostic information to be reviewed and analyzed and reconfigured.

c. Diagnostic status screens must be provided to show multiple functions simultaneously so troubleshooting can be affected rapidly and efficiently. All diagnostic information should be contained on no more than eight screens so multiple functions can be checked simultaneously.

d. Provision shall be made to graphically display valve torque demand as a percent of rated actuator torque vs. position simultaneously in 1 percent increments so as to facilitate valve troubleshooting and diagnostics.

J. Enclosure:

1. Actuators shall be 'double O' ring sealed, watertight to NEMA 6, IP68 during operation and shall at the same time have an inner watertight and dustproof 'O' ring seal between the terminal compartment and the internal electrical elements of the actuator fully protecting the motor and all other internal electrical elements of the actuator from ingress of moisture and dust when the terminal cover is removed on-site for cabling.

2. Enclosure must allow for temporary site storage without the need for electrical supply connection or require special storage instructions, desiccants shall not be used. A space shall not be required due to the enclosure design.

3. All external fasteners should be of stainless steel.

3.00 EXECUTION

3.01 INSTALLATION

A. Fabricated gates shall be installed in accordance with the recommendations of the gate manufacturer. Guide frames for fabricated gates shall be as shown on the schedule. The bottom of the fabricated gate structure shall be embedded flush bottom, unless otherwise indicated.

B. Install the gates in a manner that will prevent leakage around the frame and will prevent binding of the slide during operation. Keep surfaces where metal and the concrete placed come in contact free from oil, grease, loose mill scale, loose paint, surface rust, and other debris or objectionable coatings. Secure anchor bolts, and spigot frames in true position in the forms and hold in alignment during the placement of the concrete. Finish surfaces to provide a smooth and uniform contact surface where concrete and rubber seals come in contact and where frames or plates are installed. When a gate or stop log frame is installed against concrete, the Contractor shall either install using double-nuts and a nominal 1-inch grout pad or a minimum 3/8-inch thick 1/2-inch EPDM mounting gasket or 1/2-inch non-shrink grout shall be placed between the gate and the concrete. If a gasket is utilized, the installer must ensure that the surface around the opening is sufficiently flat per the manufacturer's instructions.

C. Carefully align gate stems, stem guides and gate lifts so the stem is parallel to the guide bars or angles on the gate frame after installation.

3.02 FIELD QUALITY CONTROL

Prior to final acceptance by the Owner, the slide gates shall be tested in the presence of the Engineer. A seating head and/or unseating head, at the Engineer's request, corresponding to the maximum water level shall be placed on the slide gate and the gate examined for leakage. The maximum allowable leakage for fabricated gates shall be per Paragraphs 2.03.A.2 and 2.03.A.3. Manufacturer shall provide test certificates to show that they meet the leakage rate required in this Section. The slide gate shall be opened from the fully closed position under maximum seating head, and closed from the fully open position under average flow conditions to verify that the gate lift is operational and in satisfactory working order.

3.03 CLEAN AND ADJUST

A. After installation, clean, lubricate, and otherwise service the gate and lift in accordance with the manufacturer's instructions.

3.04 SCHEDULES

A. Fabricated gates shall be supplied in accordance with the following schedule: The required gates and certain pertinent data are given below. This list is given to facilitate description of the various gates and as an aid to plan take-off, and is not guaranteed to be complete.

No. Req.	Location /Service	ID Tag	Opening Size	Opening Direction	Gate Type	Gate Material	Mount	Seating/ Unseating Head (feet)	Operator Type
1	Chlorine Contact Basin #1	F104	4' X 5'	Upward	SLU	316 SS / 316 L SS	EW-WM	10/10	MTR
1	Chlorine Contact Basin #2	F105	4' X 5'	Upward	SLU	316 SS / 316 L SS	EW-WM	10/10	MTR

No. Req.	Location /Service	ID Tag	Opening Size	Opening Direction	Gate Type	Gate Material	Mount	Seating/ Unseating Head (feet)	Operator Type
1	Chlorine Contact Basin #3	F100	4’ X 5’	Upward	SLU	316 SS / 316 L SS	WM	10/10	MTR

LEGEND	
Opening Direction	Upward (Fabricated Gates) Downward (Weir Gates)
Gate Type	Slide Gate (SLD) Sluice Gate (SLU) Stop Gate (STP) Weir Gate (WRG)
Mount	Existing Structure Existing Channel Mount (EC) Existing Wall Mount (EW) Bottom Seal Chanel Mount (CB) Wall Mount (WM)
Operator Type	Motor (MTR) Manual (MAN) Stem Nut (STM)

END OF SECTION

40 90 02 SUPERVISORY CONTROL AND DATA ACQUISITION

1.00 GENERAL

1.01 SCOPE

A. This section specifies programming, testing, and start-up operations of a complete control system for three motor operated valves as indicated in the Plans and as specified herein. The system shall be totally integrated with the existing SCADA system. Existing Allen-Bradley Flex I/O SCADA infrastructure shall be used.

1.02 SYSTEM DESCRIPTION

A. Control functions shall include digital logic control and peer to peer communications.

B. Include all application programming and configuration, as necessary, to make the system completely functional and operational in accordance with the Contract Documents. All necessary components and equipment which are not specifically described in the Contract Documents, but which are necessary to configure an operational distributed control system as described herein, shall be identified, furnished, and installed by the CONTRACTOR. The system provided shall be the vendor's standard; a prototype system will not be accepted.

1.03 REFERENCE STANDARDS:

1. American National Standards Institute (ANSI)/Institute of Electrical and Electronic Engineers (IEEE)
2. Electronic Industries Association (EIA)
3. National Electrical Manufacturers Association (NEMA):
    a. ICS 1, General Standards for Industrial Control and Systems.
    b. ICS 1.1, Safety Guidelines for the Application, Installation and Maintenance of Solid State Control.
    c. ICS 2, Industrial Control and Systems Controllers, Contactors and Overload Relays Rated 600V
    d. ICS 4, Terminal Blocks for Industrial Use.
    e. ICS 6, Enclosures for Industrial Controls and Systems.
    f. ICS 19, Diagrams, Device Designations, and Symbols for Industrial Control and Systems.
    g. Publication No. 250, Enclosures for Electrical Equipment (1000 V maximum).
4. National Electric Code.
5. ISA Standards
6. IEC 2 KV Isolation test
7. IEEE472/ANSI C37-90A Surge withstand capability test.
8. IEEE 802.3
9. Factory Mutual (FM)

10. Underwriters Laboratories, Inc. (UL)
11. National Fire Protection Association (NFPA)
12. Joint Industrial Council (JIC)

1.04 SUBMITTAL

A. Submittals shall conform to the requirements set forth in Section 01 30 00 “Contract Administration.”

B. Loop diagrams shall be prepared according to ISA Standard ISA-S5 and using loop numbers provided.

C. Schematic ladder diagrams shall include all terminal blocks, hardware devices, software interlocks, software data links, and control.

D. A schedule defining all I/O, database reference, and point of origin or destination, and PLC system internal address.

E. Submit written description of functions, loops, and logic.

F. Submit all SAMA Logic and Wiring Diagrams and ISA Logic Diagrams for all equipment requiring programming at the PLCs, with all set points and ranges indicated.

1.05 QUALITY ASSURANCE

A. Suppliers Qualifications: The complete system shall be configured and programmed by one qualified system supplier who is regularly engaged and qualified in designing and building instrument control systems. The systems company shall have been in existence under its own name for at least 10 years. Qualifications shall include five years of successfully providing similar systems, a qualified local area-based Brownsville technical staff and design office, physical facilities, and personnel to complete the work specified, and competent service personnel to service and operate the equipment provided. The system suppliers shall assume complete systems responsibility, including coordination and interfacing with all subsystems and equipment suppliers and manufacturers. The installation supervisor shall have had experience in overseeing installation and start-up of at least three similar installations. The bidder shall submit, upon ENGINEER's request, complete company history, resumes of full time project manager for this project, other key full-time system analysts, programmers, technicians, and submit project list with costs, OWNER, contact person, phone number, etc.

B. Tests: The complete system shall be assembled and tested at the job site. The OWNER'S representative will be required at the time of final testing at the system supplier's facilities.

C. Standards: All applicable NEC, ISA, IEEE, NEMA, UL, ANSI, IEC, FCC, FM standards shall apply.

D. Acceptable SCADA Installers:

1. Trac-N-Trol
2. Texas Automation Systems (TAS).

1.06 WARRANTY

A. The equipment supplier and the CONTRACTOR shall warrant the equipment as to defects in material and workmanship for a period of one year from the date of final acceptance of the project. Vendor shall include a copy of his special equipment warranty with the shop drawings. The warranty specified by this specification shall be exclusive, and in lieu of all other warranties whether written, implied, orally presented, or statutory.

2.00 PRODUCTS

2.01 INPUT/OUTPUT CONNECTION REQUIREMENTS:

A. Outputs shall be fused:

1. External fusing shall be provided if output module does not possess internal fusing.
2. Fuses provided external to output model shall:
   a. Be in accordance with module manufacturer's specifications.
   b. Be installed at terminal block.

B. Install bleeding resistors across input from field devices which leak current sufficiently to flicker input status light.

C. Make connections to I/O subsystem by terminating all field wiring on terminal blocks within the I/O enclosure.

D. Prewire I/O modules to terminal blocks.

3.00 EXECUTION

3.01 INSTALLATION

A. System equipment shall be installed where indicated in the Contract Documents. Power and signal connections between components shall provide the specified functions. Install according to equipment manufacturer's instruction.

B. The system Supplier Contractor shall utilize their own printers, monitor's, and computers for programming, testing, and start-up. The use of the OWNER's computers, monitor's, or printers shall not be acceptable until the entire system has been installed, debugged, programmed, and operated to ENGINEER's satisfaction.

3.02 PROGRAMMING

A. The loop descriptions and diagrams shown in the Contract Documents are functional only and do not attempt to specify detail program coding that may be required. The CONTRACTOR shall utilize this functional information to develop complete application programming to match as closely as practicable existing programming language and requirements. New graphics shall include information shown on existing graphics. All such

work shall be done at no extra cost to the OWNER. Before programming the graphics, the CONTRACTOR shall furnish a set of drawings for ENGINEERS review.

3.03 DOCUMENTATION

A. The CONTRACTOR shall provide documentation for all application software. Documentation system shall be diagrams in functional block format, and shall show all input devices to the left of the left "power rail" and all outputs to the right of the right "power rail." The diagrams shall show all device codes and functional description used in the project manual, and shall also show PLC address codes, element codes, and I/O assembly codes, modules numbers, and terminal numbers.

3.04 TESTS

A. All elements of the SCADA system, both hardware and software, shall be tested to demonstrate that the total system satisfies all of the requirements of the Specifications.

B. As a minimum, the testing shall include the following:

1. Operational Readiness Tests (ORT)
2. Functional Demonstration Tests (FDT)
3. 30-Day Acceptance Test

C. Each test shall be in the cause and effect format. The person conducting the test shall initiate an input (cause) and, upon the system's or subsystem's producing the correct result (effect), the specific test requirement will have been satisfied.

D. All tests shall be conducted in accordance with Owner-approved procedures and documented. Each specific test to be performed shall be described and a space provided after it for signoff by the appropriate party after its satisfactory completion.

E. Copies of signoff test procedures, forms, and checklists will constitute the required test documentation.

F. Provide all special testing materials and equipment. Wherever possible, perform tests using actual process variables, equipment, and data. Where it is not practical to test with real process variables, equipment, and data, provide suitable means of simulation. Define these simulations techniques in the test procedure.

G. Coordinate all testing with other Contractors, the OWNER, and the Engineer.

H. The OWNER and/or ENGINEER will actively participate in many of the tests. The OWNER and/or ENGINEER reserves the right to test or retest any and all specified functions whether or not explicitly stated in the approved test procedures. The OWNER and/or ENGINEER reserves the right to observe and/or inspect the work during any phase.

I. The Engineer's decision shall be final regarding the acceptability and completeness of all testing.

3.05 FUNCTIONAL DEMONSTRATION TEST (FDT)

A. A witnessed Functional Demonstration Test shall be performed on the complete system to demonstrate that it is operating and in compliance with the Contract Documents. Each specified function shall be demonstrated on a paragraph-by-paragraph, loop-by-loop, and component-by-component basis. This test shall be scheduled and conducted only after the plant has been detected and resolved.

B. Simulation of field signals, or simulation of the response of the process, or the response of individual components, or the functions being monitored or controlled, shall not be permitted. Simulation may be permitted with the express permission of the ENGINEER. The decision to simulate is the ENGINEER's alone. The CONTRACTOR shall include in the Contract Price the time necessary to wait for all process responses.

C. The Owner or Engineer will observe each test once on a pass-fail basis. The Owner or Engineer alone has the authority to determine if a test passes or fails. Only one (1) fifteen minute window per day will be allowed during the test procedure to make corrections to software or to field equipment and successfully pass a re-test; otherwise, that test will be declared a failure. If a test fails, it will be put on a retest schedule. If other tests to follow rely on a particular test which has failed, then the following tests will also be placed on a retest schedule even though they were not tested. Retesting shall not interrupt the test schedule. The CONTRACTOR may schedule retest days during the testing period, but not more than two per week. All retesting shall only occur on a day designated in the schedule or at the end of testing.

D. All time and expense incurred by the Engineer and/or OWNER'S staff for all retests shall be borne by the CONTRACTOR and paid to the OWNER. Time and expense incurred shall be on a time and material basis tracked by the Engineer and OWNER for their own staff and presented to the CONTRACTOR on a periodic basis.

E. The CONTRACTOR shall expedite the repair or correction of any deficiency discovered during testing. The CONTRACTOR shall have personnel representing each trade to standby during the test period to immediately correct, repair, or adjust any item of hardware, software or field equipment causing a test to fail.

F. The system shall operate continuously for 100 hours without failure before this test will be considered successful.

3.06 30-DAY ACCEPTANCE TEST

A. All database errors must be corrected prior to the start of the 30-Day Acceptance Test. The 30-Day Acceptance Test will not be considered successful until all database is correct.

B. Any malfunction during the test shall be analyzed and corrections made by the Contractor. The Engineer and Owner will determine whether any such malfunctions are sufficiently serious to warrant a repeat of the test. The cost of a retest shall be borne by the CONTRACTOR as specified.

C. After completion of the Functional Demonstration Test and project Start-up, the Owner shall be responsible for operation of the entire System for a period of 30 consecutive days, under conditions of full operation, without single non-field repairable malfunction.

D. During this test, Contractor personnel shall be present during startup and as required. The Contractor shall provide personnel for this test who have an intimate knowledge of the hardware and software of the system and also are familiar with the overall plant process..

E. While this test is proceeding, the Owner shall have full use of the system.

F. Any malfunction, during this 30 consecutive day test period, which cannot be corrected within 24 hours of occurrence by the Contractor's personnel, or more than two similar failures of any duration, will be considered as a non-field-repairable malfunction.

G. Upon completion of repairs, by the Supplier, the test shall be repeated as specified herein.

H. In the event of rejection of any part or function, the Supplier shall perform repairs within 5 days or replacement within 30 days.

I. Upon successful completion of the 30-Day Acceptance Test, approval of all as-built drawing and O&M Manuals, completion of all related Owner training, and delivery of all spare, expendable, and test equipment, the systems shall be considered substantially complete and the warranty period shall commence.

3.07 TRAINING

A. Provide an integrated training program for the Owner's personnel at the jobsite. Tailor the training program to meet the specific needs of the Owner's personnel.

3.08 START-UP AND TESTING TEAM

A. The Supplier shall provide, on-site, a team of experienced engineering, technician, trades personnel, and software/configuring personnel during the total construction period to:

1. Thoroughly check the installation, termination, and adjustment of all the subsystems and their components.
2. Perform and complete all on-site tests.
3. Provide start-up assistance.

END OF SECTION