BROWNSVILLE NAVIGATION DISTRICT

BID DOCUMENTS AND SPECIFICATIONS FOR

OIL DOCK #6 BULKHEAD REPAIRS



JUNE 7, 2021



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Advertisement for Bids

OIL DOCK #6 BULKHEAD REPAIRS

Notice to Bidders

Notice is hereby given that bids will be received by the Brownsville Navigation District (BND) of Cameron County, Texas on the "OIL DOCK #6 BULKHEAD REPAIRS" project at the Port of Brownsville, Cameron County, Texas.

Bids must be delivered in a sealed envelope to BND at 1000 Foust Road, Brownsville, Texas 78521 no later than **4:00 PM CDT** on **Monday**, **June 28**, **2021**, addressed to Ms. Lorena Hernández, CPA, BND Finance Director. Bids will be calculated on a unit price basis and must comply with the requirements set out in the **Bid Document**, which may be obtained from Mr. Ariel Chávez II, PE/RPLS, Director of Engineering Services at <u>achavez@portofbrownsville.com</u>, at (956) 831-4592, or at <u>www.portofbrownsville.com</u>. Bid security in the amount of 5% of the bid amount is required as specified in said **Bid Document**. A **Mandatory** Pre-Bid Virtual Meeting will be held at **2:30 PM CDT** on **Tuesday**, **June 15**, **2021**. The link will be made available to interested bidders.

The BND Board of Commissioners **HEREBY RESERVES THE RIGHT** to reject any and all bids, and to select the bid deemed most advantageous to the BND.

6/07/2021, 6/14/2021

Instructions to Bidders

OIL DOCK #6 BULKHEAD REPAIRS

1. RECEIPT AND OPENING OF BIDS:

The Brownsville Navigation District, Texas, (hereinafter called OWNER), invites bids on the form attached hereto, all blanks of which must be appropriately filled in, in ink.

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 Any bid may be withdrawn prior to the scheduled time for the opening of bids or authorized post-ponement thereof. Any bid received after the time and date specified shall not be considered. No bid may be withdrawn within ninety (90) days after the actual date of the opening thereof.

2. INSPECTION OF SITE:

Each BIDDER shall visit the 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 facilities involved, the difficulties and restrictions attending the performance of the Contract. The BIDDER should 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 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 thereof.

3. PRE-BID CONFERENCE: **MANDATORY**:

A mandatory Pre-Bid meeting 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 Invitation to Bid, unless re-scheduled by Addendum. Interested bidders are required to attend. Bids submitted by BIDDERS that were not in attendance at the Pre-Bid Meeting will NOT be considered.

4. PREPARATION OF BID AND USE BID FORMS:

This document includes 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 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 documents or deemed necessary by the BIDDER to fully describe his offering.

If any of the information submitted as part of the bid is considered to be proprietary by the BIDDER, he shall identify such in his bid.

a) <u>Preparation</u>. Each bid shall be carefully prepared using the Bid Form included as a part of the bid documents. Entries on the bid form shall be typed, using dark black ribbon, or legibly written in black ink. Bidder shall exercise extreme care in calculations of the extensions and of the total amounts. In case of discrepancy or mathematical errors, the unit price shown will govern.

The BIDDER shall acknowledge, in the space provided in the bid form, receipt of each

addendum issued for the specifications and documents during the bid period.

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

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

Proposals by partnerships shall be signed with the partnership name followed by the signature and designation of one of the partners or other authorized representative. A complete list of the partners shall be included with the proposal.

Proposals 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 person authorized to bind the corporation.

A proposal by a person who affixes his signature the word "president," "secretary," "agent," or other designation, without disclosing his principal, will be rejected. Satisfactory evidence of the authority of the officer signing in 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) <u>Submittal</u>. The original proposal (and its accompanying copy) shall be transmitted to arrive at the designated address not later than the date and time stipulated in the Legal Notice and Invitation to Bid.

Submit the signed original proposal and one signed copy of the proposal to:

Chairman, Board of Commissioners Brownsville Navigation District, Texas c/o Lorena Hernández, Director of Finance 1000 Foust Road Brownsville, Texas 78521

Each bid must be submitted 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 must be enclosed in another envelope addressed as specified in the bid form.

5. METHOD OF BIDDING: LUMP SUM OR UNIT PRICE.

Prices shall be firm, not subject to qualification, condition or adjustment. Prices shall be in United States dollars. Prices shall be unit price except where lump sum prices are requested in the bid form. If unit price items are required in the bid forms, the unit prices for each of the several items in the bid form 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

OIL DOCK #6 BULKHEAD REPAIRS

the total bid. Any bid not conforming to the requirement may be rejected as informal and non-responsive. The special attention of all BIDDERS is called to this provision, for should conditions make it necessary to revise the quantities, no limit will be fixed for such increased or decreased quantities nor extra compensation 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 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 advance by the Contractor.

6. 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 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 carry out properly the terms of the Contract. This shall also apply to any proposed subcontractor(s).

7. 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.

8. BID SECURITY:

Each bid must be accompanied by a CASHIER'S CHECK, or a BID BOND prepared on the Bid Bond form attached hereto, duly executed by the BIDDER as principal and having as surety therein a surety company approved by the OWNER, authorized to do business in the State of Texas in the amount of not less than five (5%) percent of the bid. Such checks, or bid bonds will be returned to all except the three lowest BIDDERS within fifteen (15) days after the opening of bids, and the remaining certified or cashier's checks, or bid bonds, will be returned promptly after the OWNER and the successful BIDDER have executed the contract or if no award has been made, within thirty (30) 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.

9. 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 the Engineering Services Department of the Brownsville Navigation District, and must be received at least ten (10) days prior to the date fixed for the opening of bids in order to be considered. Any and all such interpretations and any supplemental instructions will be in the form of written addenda to the

specifications which, if issued, will be on file at the Department mentioned above no later than five (5) days prior to the date fixed for opening of bids, and will be mailed by certified mail with return receipt requested to all prospective BIDDERS (at the respective addresses furnished for such purposes), not later than three (3) days prior to said date. It will be 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.

10. MODIFICATION:

Any BIDDER may modify his bid by mail at any time prior to the scheduled closing time for receipt of bids, provided such mail is received by the OWNER prior to the closing time. The mail should not reveal the total bid price, but should provide the addition or subtraction, or other modification, so that the final prices or terms will not be known by the OWNER until the original sealed bid is opened.

Revised bids submitted before the opening of bids, if representing an increase in excess of two percent (2%) of the original bid, must have the bid security adjusted accordingly; otherwise the bid will not be considered responsive.

11. TIME FOR RECEIVING BIDS:

Bids received prior to the advertised hour of opening will be securely kept sealed. 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 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.

12. OPENING OF BIDS:

At the time and place fixed for the 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 may be present, in person or by representative.

13. WITHDRAWAL OF BIDS:

Bids may be withdrawn on written request dispatched by the BIDDER in time for delivery in the normal course of business to the time fixed for opening. The bid security of any BIDDER withdrawing his bid in accordance with the foregoing conditions will be returned promptly.

14. 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 its 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 contract.

15. EXECUTION OF AGREEMENT: PERFORMANCE AND PAYMENT BOND:

Subsequent to the award and within ten (10) 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, each in a penal sum not less than the full amount of the contract as awarded, 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 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.

The failure of the successful BIDDER to execute such agreement and to supply the required bonds and insurance certificates within ten (10) 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 readvertise for bids, and may charge against the defaulting BIDDER the difference between the amount of the defaulted bid and the amount for which a 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 readvertising, the defaulting BIDDER shall have no claim against the OWNER for a refund.

16. TEXAS ETHICS COMMISSION FORM 1295 DISCLOSURES:

Companies doing business with the Brownsville Navigation District, a governmental entity, are required to file a "Disclosure of Interested Parties Form" (Form 1295 for short) with the Texas Ethics Commission. The successful bidder will, therefore, be required to file said Form 1295 with the Texas Ethics Commission prior to the Board signing the agreement for the work in this contract. Further information regarding this form may be found on the Texas Ethics Commission website. Instructions will be provided to the successful bidder.

17. 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) days after he has received notice of the acceptance of his bid, shall forfeit to the OWNER, as liquidated damages (and not as a penalty) for such failure or refusal, the security deposited with his bid.

18. TIME OF COMPLETION AND LIQUIDATED DAMAGES:

BIDDER must agree to commence work on or before a date to be specified in a written "Notice to

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Proceed" issued by the OWNER and to fully complete the project within the contract time, as provided in Article 3 of the Agreement.

BIDDER must agree also to pay as mutually agreed to liquidated damages, and not as a penalty, the sum of five hundred dollars (\$500.00) per day, unless otherwise specified in the Bid Form, for each consecutive calendar day thereafter, as provided in said Article 3.

19. NOTICE OF SPECIAL CONDITIONS:

Attention is particularly called to those parts of the contract documents and specifications which deal with the following:

- a) Inspection and testing of materials.
- b) Insurance requirements.
- c) Wage and Hour Provisions.
- d) State Sales and Use Tax Exemption Provisions

20. 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 shall apply to the contract throughout, and they will be deemed to be included in the contract the same as though herein written out in full.

21. 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, color, religion, sex, handicap, or national origin.

22. SUBMITTAL OF TRENCH SAFETY DESIGN:

If project includes open trench excavation deeper than 5 feet, contractor shall submit a Trench Safety System Plan to Engineer for review and approval prior to beginning of construction.

23. INFORMATION TO BE SUBMITTED WITH BID:

Each BIDDER shall submit with his bid pertinent information concerning proposed equipment and materials and proposed construction organization.

a) <u>Equipment and Materials</u>. In addition to the information submitted on the bid form, each BIDDER shall submit all specifications, preliminary drawings, and similar descriptive information necessary to describe completely the equipment and materials he proposes to furnish, if applicable.

The bid prices shall be based on new equipment and materials which comply with specifications and documents in every respect, unless the BIDDER takes specific exception as provided herein before. If alternate or "equal" equipment and materials are indicated in the bid form, 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 compensation or extension of time.

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b) <u>Contractor's Field Organization</u>. Each BIDDER shall submit with his bid an organization chart showing the names of field management, supervisory, and technical personnel, 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. The experience record of the Contractor's field superintendent shall be submitted with the bid.

24. PREFERENCE LAW:

Bid evaluation will take into consideration any Preference Laws of the Statutes of Texas.

25. SUBSURFACE CONDITIONS:

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 site, the locations and logs of the test borings are included in the plans.

It is to be expressly understood and acknowledged by the BIDDER, that any information on subsurface materials 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 conditions (including the presence or likelihood of encountering rock or rock-like materials and debris) prior to submitting his bid, which shall include any and all costs BIDDER associates with avoiding, managing or removing said subsurface conditions without claim for extra compensation against OWNER.

26. DISPOSAL OF EXCESS MATERIALS:

After backfilling and compacting any temporary trenches backfill or removing temporary earthen structures, there may be in some instances an excess of soil material over that required to bring the backfill up to the original grade. 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. Disposal of excess materials shall be subsidiary to other bid items, and shall not be paid for separately.

27. 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 sideslopes, as generally indicated on the construction drawings, 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 amount 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 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 recent federal legislation regulating storm water 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, retainage levees, drains, inlets, or other works to correct the condition. Upon completion of the work, such facilities shall be removed. Any such work shall be subsidiary to any corresponding bid items and shall not be paid for separately.

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 nearby water bodies.

28. SAFETY PROVISIONS:

BIDDER shall provide barricades, flares, warning signs, and/or flagmen so as to eliminate danger and inconvenience to the public, railroad and job site personnel. 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 with particular attention to be given to excavation and trench safety requirements.

29. PROTECTION OF PROPERTY AND EXISTING UTILITIES:

Within developed areas, all public and private property along and adjacent to the BIDDER'S operations, including 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 to show all known existing utilities on the PLANS, but the possibility remains 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 damage.

30. ENTRANCE FEES AND ACCESS TO PROJECT AREA:

The project is located within the Brownsville Navigation District's secure area. As such, the successful bidder's vehicles, personnel and equipment must enter the secure area through one of the BND's entrance gates. While the BND assesses an entrance fee to all commercial vehicles, the entrance fee for vehicles used by the successful bidder for this project shall be waived.

In addition, every individual entering the secure area must have a current and valid governmentissued identification, such as a driver's license. Any person that is unable or unwilling to present proper identification shall not be allowed to enter the secure area of the BND.

31. GUARANTEE:

The BIDDER shall guarantee the work for a period of one (1) year after date of acceptance in writing by the OWNER. During this period, the BIDDER shall make any repairs and/or replacements of defective materials and corrections due to poor workmanship, all as may be required for full compliance with the Specifications. This guarantee shall apply to all matters reported by the OWNER in writing within said one (1) year period and this guarantee shall be included in the

coverage period set forth in the Performance Bond.

32. ALL BILLS PAID AFFIDAVIT:

Upon completion of the project, the successful BIDDER shall submit an affidavit in the prescribed form included in the bid documents indicating that all subcontractors, suppliers, employees, and any creditors providing materials, labor or support for this project have been paid in full prior to receiving final payment for this work.

Intent to Bid Statement

OIL DOCK #6 BULKHEAD REPAIRS

June 28, 2021

1. CONTRACTOR'S INFORMATION:

Contractor:	
Address:	Main Phone:
City:	State: Zip:

2. CONTRACTOR'S INTENT TO BID STATEMENT:

We, the above-named contractor, hereby declare our intent to bid on the "OIL DOCK #6 BULKHEAD REPAIRS" project at the Port of Brownsville.

We acknowledge and understand that a **Mandatory Pre-Bid Virtual Meeting** will be held at the BND Administration Building, 1000 Foust Road, Brownsville, TX and will attend virtually. We assume responsibility to secure the link for said Virtual Meeting.

We hereby request to be included in the bidder's list and to be notified of the issuance of any Addenda for this project. We also acknowledge and understand that our company information on this form will be made available to the public.

3. **CONTRACTOR'S OFFICER**:

Name:	Work Phone:	
Title:	Cel Phone:	
Signature:	Date:	
Main eMail Address:		
Optional eMail Address:		

Bid Form

OIL DOCK #6 BULKHEAD REPAIRS

Bid to: Brownsville Navigation District 1000 Foust Road Brownsville, Texas 78521

Due Date: Before 4:00 P.M. C.D.T. on Monday, June 28, 2021.

Bid by	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 Navigation District, Texas, hereinafter called OWNER.

Gentlemen:

The BIDDER, in compliance with your invitation for bids for the "OIL DOCK #6 BULKHEAD REPAIRS" project, having examined the drawings and specifications with related documents and the site of the proposed work, and being familiar with all of the conditions surrounding the construction of the proposed project, including the availability of materials and labor, hereby proposes to furnish all labor, materials and supplies, and to construct the project in accordance with the contract documents, within the time set forth herein, and at the attached unit prices. 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 within ninety (90) days after the time set for 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 fully complete the project within <u>one hundred and twenty (120)</u> calendar days, as defined in the specifications. BIDDER further agrees to pay as liquidated damages, the sum of <u>five hundred (\$500.00) dollars</u> for each consecutive calendar day thereafter as hereinafter provided in Article 3 of the Agreement.

BIDDER agrees to perform all work for which he contracts as described in the specifications and as shown on the plans, for the attached unit prices:

SUBCONTRACTORS. The undersigned proposes that he will perform the majority 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

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BIDDER Agrees to perform all the work described in the Contract Documents for the following Unit Prices (which include any and all applicable taxes and fees):

June 28, 2021

BULKHEAD REPAIRS:

#	DESCRIPTION	EST. QTY.	UNIT COST	AMOUNT
B.1	MOBILIZATION	1 LS		
B.2	GRADED ROCK RIPRAP (GRR)		·	
a.	FURNISH AND INSTALL BEDDING LAYER (UNIT PRICE BID ITEM)	2420 CY		
b.	FURNISH AND INSTALL ARMOR GRR (UNIT PRICE BID ITEM)	2291 CY		
B.3	DEMOLITION			
a.	REMOVE EXISTING CONCRETE STEPS (INCLUDES LOADING, HAULING AND DISPOSAL AT BND SPECIFIED LOCATION)	2 EA		
b.	REMOVE EXISTING CONCRETE SIDEWALK (INCLUDES LOADING, HAULING AND DISPOSAL AT BND SPECIFIED LOCATION)	65 CY		
C.	REMOVE STAGE II BULKHEAD CAP (INCLUDES LOADING, HAULING AND DISPOSAL AT BND SPECIFIED LOCATION)	3 CY		
d.	REMOVE EXISTING HOT MIX ASPHALTIC CONCRETE (HMAC) PAVEMENT (INCLUDES MILLING, LOADING, HAULING AND DISPOSAL)	527 CY		
B.4	EXCAVATION			
a.	FURNISH AND INSTALL NEW COATED STEEL HSS WALER NO. 1 (INCLUDES REMOVAL OF CONCRETE PROTRUSIONS ON NORTH END OF EXISTING ANCHOR FRAME CAPS, FABRICATION AND COATING OF NEW WALERS, INSTALLATION OF WALERS AND GROUTING BETWEEN NEW WALERS AND EXISTING CAPS) (3,578.78 LBS)	6 EA		
b.	FURNISH AND INSTALL NEW COATED STEEL HSS WALER NO. 1 AND 3 (INCLUDES REMOVAL OF CONCRETE PROTRUSIONS ON NORTH END OF EXISTING ANCHOR FRAME CAPS, FABRICATION AND COATING OF NEW WALERS, INSTALLATION OF WALERS AND GROUTING BETWEEN NEW WALERS AND EXISTING CAPS) (5,542.84 LBS)	2 EA		
C.	CORE DRILL EXISTING STAGE I BULKHEAD CAP TO RECEIVE ANCHOR RODS (INCLUDES DRILLING THROUGH CORE, POCKET CORE AND CHIPPING SMOOTH THE CORE VERTICAL SURFACE TO RECEIVE BASEPLATE)	24 EA		

BULKHEAD REPAIRS:

#	DESCRIPTION	EST. QTY.	UNIT COST	AMOUNT
d.	FURNISH AND INSTALL NEW ANCHOR RODS (INCLUDES ANCHORAGE HARDWARE, CORROSION PROTECTION, ENCASEMENT, PRE-TENSIONING AND GROUTING)	24 EA		
e.	FURNISH AND INSTALL NEW MARINE CONCRETE TO RAISE ELEVATION OF EXISTING STAGE II CAP (INCLUDES DRILLING AND BONDING NEW REINFORCEMENT, PREPARING SURFACE, FORMING, PLACING AND CURING NEW MARINE CONCRETE)	5 CY		
B.6	BACKFILL (INCLUDES LOADING, HAULING, PLACING AND COMPACTION OF PREVIOUSLY EXCAVATED SOILS BELOW CRUSHED LIMESTONE BASE COURSE).	362 CY		
B.7	FURNISH AND INSTALL GEOTEXTILE AND TRIAXIAL GEOGRID FOR ROADWAY	732 SY		
B.8	CRUSHED LIMESTONE BASE COURSE (INCLUDES LOADING, HAULING, PLACING AND COMPACTION OF PREVIOUSLY EXCAVATED CRUSHED LIMESTONE BASE COURSE)	362 CY		
B.9	FURNISH AND INSTALL NEW CONCRETE SIDEWALK (INCLUDES EXCAVATION, FORMWORK, EXPANSION JOINTS, REINFORCING, PLACING, FINISHING, JOINTING, CURING AND SEALING)	61 CY		
B.10	FURNISH AND INSTALL 3" HMAC PAVEMENT	527 SY		
B.11	FURNISH AND INSTALL NEW REINFORCED CONCRETE STEPS AT MOORING STRUCTURES (INCLUDES SETTING DOWELS, FORMWORK, REINFORCING, PLACING, FINISHING AND CURING)	2 EA		
B.12	WATERSIDE WORK STAND-BY TIME (UNIT PRICE BID ITEM)	3 DAY		
B.13	LANDSIDE WORK STAND-BY TIME (UNIT PRICE BID ITEM)	5 DAY		
	TOTAL BASE BID FOR ALL WORK U		CONTRACT:	

NOTES:

The cost for all labor and materials required for the successful and functional completion of each of the bid items shall be included in the bid price, shall be subsidiary to the corresponding bid item, and shall not be paid for separately.

The Brownsville Navigation District is exempt from sales taxes.

BIDDER Acknowledges receipt of the following addenda:

In case of discrepancy, the unit price amount shall govern.

The above included prices shall include all labor, materials, excavation, bailing, shoring, removal, backfill, overhead, profit, permits, 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.

BIDDER agrees that this Bid shall be good and may not be withdrawn for a period of ninety (90) days after the scheduled closing time for receiving bids.

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 parties likewise submitting a 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) days and deliver the Performance and Payment 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.

Respectfully	submitted,
--------------	------------

	BE - 4 of 4	PORT OF BROWNSVILLE
Attest:		
	Ā	Address
Corporation	ō	Officer's Title
Seal affixed here if BID is by a	Ō	Officer's Name
	S	Signature
	By:	

BF - 4 of 4

Bid Bond

OIL DOCK #6 BULKHEAD REPAIRS

STATE OF TEXAS	§ 8 K	
COUNTY OF CAMERON	§ N	NOW ALL MEN DT THESE FRESENTS.
THAT WE, the undersigned,		as Principal,
and		as Surety, are hereby held and firmly bound
unto the BROWNSVILLE N	AVIGATIC	N DISTRICT, TEXAS, as OWNER in the penal sum of for the payment of which, well and truly to
be made, we hereby jointly a	and severa	lly 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

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 "**OIL DOCK #6 BULKHEAD REPAIRS**" project;

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 Agreement attached hereto (properly completed in accordance with said BID) and shall furnish payment and performance bonds for his faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall furnish insurance certificates, and shall in all other respects perform the agreement created by the acceptance of said BID, then this obligation shall be void. Otherwise the same shall remain in 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 penalty amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its Bond shall be in no way impaired or affected by an extension of the time with 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 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 assigned by their proper officers, the day and year first set forth above.

Signed this day of	, 20 .
--------------------	--------

Principal

Surety

By: _____



To Vendors Doing Business with Brownsville Navigation District:

The Texas legislature passed two pieces of legislation that affect the relationship between the Brownsville Navigation District and its vendors. The Board of Commissioners of the Brownsville Navigation District has incorporated these new requirements into the *Code of Ethics* already in place for the District.

The District will now require that any vendor seeking to do business with the Brownsville Navigation District must file certain documents on an annual basis in order to be able to be awarded a purchase contract or a purchase order for goods or services. These forms are:

- 1. Vendor Registration Form
- 2. Conflict of Interest Questionnaire

These forms must be re-filed on an annual basis. Copies of the required forms and a full copy of the *Code of Ethics* are available on the District's website at:

www.portofbrownsville.com

Conflict of Interest Questionnaires can be found at the Texas Ethics Commission web site at:

http://www.ethics.state.tx .us/forms/CIQ.pdf

Conflict of Interest Questionnaires must be filed in regard to the Brownsville Navigation District "local government officers" which include the Navigation District Commissioners, the Port Director and CEO and the Deputy Port Directors. A listing of these persons is enclosed. Completed forms are to be filed with my office.

Please do not hesitate to contact me should you have any questions regarding these forms.

Sincerely yours,

Yourse Heronely

Lorena Hernandez, CPA Director of Finance (956) 838-7041 Fax (956) 831-5106 <u>lhernandez@portofbrownsville.com</u>

encl:

Brownsville Navigation District 1000 Foust Road / Brownsville, Texas 78521 / (956) 831 -4592 / (800) 378-5395 / Fax (956) 831-5106 www.portofbrownsville.com

BROWNSVILLE NAVIGATION DISTRICT ADMINISTRATION "LOCAL GOVERNMENT OFFICERS" Board of Navigation and Canal Commissioners

Sergio Tito Lopez Chairman Ralph Cowen Vice Chairman

Esteban Guerra Secretary of the Board John Wood Commissioner

John Reed Commissioner

Administration

Eduardo A. Campirano – Port Director & CEO Vacant – Deputy Port Director

Other Administrative Personnel

Ariel Chávez II, PE/RPLS – Director of Engineering Services Michael Davis – Harbor Master Margie Recio – Director of Administrative Services Lorena Hernandez, CPA – Director of Finance Carlos L. Garcia – Chief of Police José Herrera – Director of Facilities Maintenance Jorge Montero – Director of Communications Antonio Rodriguez – Director of Cargo Services Vacant – Director of Special Projects Martha González – Director of Real Estate Services

Brownsville Navigation District Vendor Registration Form

Please complete this form to give the District your contact information for use during an RFP process or to open or update a vendor account

Date:	Name of Person Providing Information:					
If you are currently participating in an RFP process for the District, please indicate the RFP title:						
If you are interested in receiving a notice when an RF	If you are interested in receiving a notice when an RFP is available, please indicate your areas of interest:					
Construction Contracts	Security Services					
Property/Liability Insurance	Bank Depository					
Group Insurance	Other:					
Salvage Offerings						
Uniform Service						

Vendor Name	Web Site
Contact Person:	Fax Number:
Phone Number:	eMail Address:
Mailing Address:	Physical Address:
Form of Business (Individual/Sole Proprietor/Partnership/Corporation/Other)	Taxpayer Identification Number:

Please return this form by fax to (956) 831-5106 or by email to vendor@portofbrownsville.com

Signature of Person Providing Information

This vendor is not a Listed Company as per: Section 2252 of the Texas Government Code *Federal Debarred List - SAM.gov

Signature of Purchasing Auditor

CONFLICT OF INTEREST QUESTIONNAIRE For vendor or other person doing business with local governmental entity	FORM CIQ
This questionnaire is being filed in accordance with chapter 176 of the Local Government Code by a person doing business with the governmental entity. By law this questionnaire must be filed with the records administrator of the local government not later than the 7th business day after the date the person becomes aware of facts that require the statement to be filed. <i>See</i> Section 176.006, Local Government Code. A person commits an offense if the person violates Section 176.006, Local Government Code.	OFFICE USE ONLY Date Received
 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 September 1 of the year for which an activity described in Section 176.006(a), Local Gov not later than the 7th business day after the date the originally filed questionnaire becon Describe each affiliation or business relationship with an employee or contractor of the local recommendations to a local government officer of the local governmental entity with resperies the local governmental entity of the local governmental entity with resperies to a local government officer of the local governmental entity with resperies to a local government officer of the local governmental entity with resperies to a local government officer of the local governmental entity with resperies to a local government officer of the local governmental entity with resperies to a local government officer of the local governmental entity with resperies to a local government officer of the local governmental entity with resperies to a local government officer of the local governmental entity with resperies to a local government officer of the local governmental entity with resperies to a local government officer of the local governmental entity with resperies to a local government officer of the local governmental entity with resperies to a local government officer of the local governmental entity with resperies to a local government of the local governmental entity with resperies to a local government of the local governmental entity with resperies to a local governmental entity with the local government officer dovernmental entity with the local governmental entity with the local g	e filing authority not later than ernment Code, is pending and nes incomplete or inaccurate.) governmental entity who makes ct to expenditure of money.
 Describe each affiliation or business relationship with a person who is a local government employs a local government officer of the local governmental entity that is the subject of th 	officer and who appoints or is questionnaire.

	CONFLICT OF INTEREST QUESTIONNAIREFORM (Page 2)For vendor or other person doing business with local governmental entityPage 2	
5	Name of local government officer with whom filer has affiliation or business relationship. (Complete this section only i answer to A, B, or C is YES.)	if the
	This section, item 5 including subparts A, B, C & D, must be completed for each officer with whom the filer has affiliatic business relationship. Attach additional pages to this Form CIQ as necessary.	on or
	A. Is the local government officer named in this section receiving or likely to receive taxable income from the filer of the questionnaire?	
	Yes No	
	B. Is the filer of the questionnaire receiving or likely to receive taxable income from or at the direction of the local government officer named in this section AND the taxable income is not from the local governmental entity?	nt
	Yes No	
	C. Is the filer of this questionnaire affiliated with a corporation or other business entity that the local government officer serve as an officer or director, or holds an ownership of 10 percent or more?	es
	Yes No	
	D. Describe each affiliation or business relationship.	
6	Describe any other affiliation or business relationship that might cause a conflict of interest.	
7		
	Signature of person doing business with the governmental entity Date	

Texas Government Code Sections 2270.002 and 2252.152

Disclosure Statement

The undersigned business entity hereby represents and warrants that the following statements are true and correct:

- (a) Pursuant to Section 2270.002, Texas Government Code, we hereby represent that we do not boycott Israel (as defined in Section 2270.002, Texas Government Code) and, subject to or as otherwise required by applicable Federal law, including, without limitation, 50 U.S.C. Section 4607, we agree not to boycott Israel during the term of this purchase agreement.
- (b) We hereby acknowledge that (a) we do not engage in business with Iran, Sudan, or any foreign organization and (b) we are not listed by the Texas Comptroller as described in Section 2252.152, Texas Government Code.

Company Name				
Authorized Signature				
Print Name and Position with the Company				
Date				

Statement of Non-Collusion

OIL DOCK #6 BULKHEAD REPAIRS

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

Company:	
Address:	
Phone:	
Fax:	
Bidder:	(Signatura)
	(Signature)
Bidder:	(Drint Name)
	(Find Name)
Title:	(Drint Title)
Signature of Co	ompany
Officer Authoriz	ing this
DIU.	(Signature)
Company Officer:	
	(Print Name)
Officer's Title	
	(Print Title)

Note: This form must be filled out and submitted with the sealed bid.

Certificate and Definitions

OIL DOCK #6 BULKHEAD REPAIRS

CERTIFICATE

I certify that all information provided is true and correct as of the date of this statement, that I have not knowingly withheld disclosure of any information requested; and that supplemental statements will be promptly submitted to the Brownsville Navigation District as changes occur.

Contractor:	
Certifying Name:	
Officer's Title:	
Signature:	Date:

DEFINITIONS

The following definitions of terms should be used in answering the questions set forth below:

- A. "Board Member" An elected member of any board, commission, or committee appointed by the Brownsville Navigation District of Brownsville, Texas.
- B. "Employee" Any person employed by the Brownsville Navigation District either on a full time or part-time basis, but not as an independent contractor.
- C. "Firm" Any entity operated for economic gain, whether professional, industrial or commercial, and whether established to produce or deal with a product or service, including but not limited to, entities operated in the form of sole proprietorship, as self employed person, partnership, corporation, joint stock company, joint venture, receivership or trust, and entities which for purposes of taxation are treated as non-profit organizations.
- D. "Official" The Chairman, members of the Brownsville Navigation District, General Manager, CEO, Deputy Port Director, Department and Division Heads.
- E. "Ownership Interest" Legal or equitable interest, whether actually or constructive held, in a firm, including when such interest is held through the agent, trust, estate or holding entity. "Consecutively held" refers to holding or control established through voting trusts, proxies, or special terms of venture of partnership agreements.

Please Complete and Submit to:

Chairman of the Board Brownsville Navigation District c/o Ariel Chávez II, P.E./ R.P.L.S. Director of Engineering Services 1000 Foust Road Brownsville, Texas 78521

Contractor's Pre-Bid Disclosure Statement

OIL DOCK #6 BULKHEAD REPAIRS

1.	This Pre-Bid Disclosure Statement is submitted to the Brownsville Navigation District by:							
Contr	actor:							
Addre	ess: Phone:							
City:	State: Zip:							
2.	Years in business under present business name:							
3.	Years of experience in construction work of the type called for in this contract as:							
4.	What projects has your organization completed? List most recent FIRST .							
Contr	act Amount Type of Work Date Completed Owner's Name and Address							
5. What projects does your organization have under way as often as this date? Contract Amount Type of Work Date Completed Owner's Name and Address								
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 major litigation 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 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 administrative manager for the work will be Mr./Ms, and your resident construction superintendent will
11.	What experience in this type of work is enjoyed by the individual designated as superintendent above?
12.	What portions of the work do you intent to sublet?
13. Qua	What equipment do you own that is available for the proposed work? Description, Size, Years in Present antity Capacity, etc. Condition Service Location
·	
14.	Have you received firm offers for all major items of material and/or equipment within the prices used in preparing your proposal?

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

Dated this _	da	ay of		,	20		
By: Name: Title:							
STATE OF COUNTY O	F						
Subscril	bed and	sworn to	me this _	- i	day of	 _, 20	
			No	otary	/ Public	 	

My commission expires:

Subcontractor's Pre-Bid Disclosure Statement

OIL DOCK #6 BULKHEAD REPAIRS							
1.	This Pre-Bid Disclosure Statement is submitted to the Brownsville Navigation District by:						
Subc	contractor:						
Addr	ess: Phone:						
City:	State: Zip:						
2.	Years in business under present business name:						
3.	Years of experience in construction work of the type called for in this contract as:						
4.	What projects has your organization completed? List most recent FIRST .						
Cont	ract Amount Type of Work Date Completed Owner's Name and Address	;					
5. Cont	What projects does your organization have under way as often as this date?ract AmountType of WorkDate CompletedOwner's Name and Address	5					
6.	Have you ever failed to complete any work awarded to you?						
7.	Are you at present in any major litigation 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 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 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 is enjoyed by the individual designated as superintendent above?
12.	What portions of the work do you intent to sublet?
13. Qua	What equipment do you own that is available for the proposed work? Description, Size, Years in Present antity Capacity, etc. Condition Service Location
14.	Have you received firm offers for all major items of material and/or equipment within the prices used in preparing your proposal? Yes No

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

Dated this	_day of	_, 20		
By: Name: Title:			-	
STATE OF COUNTY OF				
Subscribed a	and sworn to me this	day of	, 20	
	Nota	ary Public		

My commission expires:

OIL DOCK #6 BULKHEAD REPAIRS

THIS	AGREEMENT is dated as of the	day of	, 20 by and	ł
Between the	BROWNSVILLE NAVIGATION DIS	STRICT ,	Texas (hereinafter called OWNER)	,
and		of	(hereinafter	ſ
called CONTR	RACTOR).			

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

Article 1. WORK.

CONTRACTOR shall furnish all of the materials, 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:

OIL DOCK #6 BULKHEAD REPAIRS

at the Brownsville Navigation District, Texas. (hereinafter referred to as "Work").

Article 2. ENGINEER.

The project has been designed by the Department of Engineering Services of the Brownsville Navigation District (hereinafter also called ENGINEER).

Article 3. CONTRACT TIME.

3.1 The Work shall be substantially completed within the number of calendar days specified in the Bid form from issuance of the Notice to Proceed and shall be fully completed within fifteen (15) days after that date.

3.2 Liquidated Damages. OWNER and CONTRACTOR recognize that time is of the essence of this Agreement and that OWNER will suffer financial loss if the Work is not substantially complete within the time specified in paragraph 3.1 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. They 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 (\$500.00) dollars for each calendar day that expires after the time specified in paragraph 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 Bid Proposal, and OWNER shall pay CONTRACTOR in current funds based on the Bid Proposal.

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 Applications for Payment on or about the twentieth 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 completed bid items as per paragraph 14.1 of the General Conditions.

5.1.1 Prior to Substantial Completion progress payments shall be in an amount equal to 90% of the amount requested in the Application for Payment, with 10% remaining as retainage for the project, to be released in accordance paragraph 5.2.

5.1.2 Upon substantial completion, OWNER shall pay an amount sufficient to increase total payments to CONTRACTOR to 90% of the Contract Price, less such amounts OWNER shall determine in accordance with paragraph 14.7 of the General Conditions.

5.2 Final Payment. Upon final completion and acceptance of the Work in accordance with paragraph 14.13 of the General Conditions, OWNER shall pay the remainder of the Contract Price as recommended by OWNER as provided in said paragraph 14.13.

Article 6. CONTRACTOR'S REPRESENTATIONS.

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

6.1 CONTRACTOR has familiarized himself with the nature and extent of the Contract Documents, Work, locality, 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, 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 written notice of all conflicts, errors or discrepancies that he has discovered in the Contract Documents and the written resolution thereof by OWNER is acceptable to CONTRACTOR.

6.4 CONTRACTOR is skilled and experienced in the type of work described in the Contract Documents.

Article 7. CONTRACT DOCUMENTS.

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

- 7.1 Invitation to Bid.
- 7.2 Instructions to Bidders (pages 1 to 9, inclusive).
- 7.3 Intent to Bid Statement (page 1).
- 7.4 Bid Form (pages 1 to 3, inclusive).
- 7.5 Bid Bond.
- 7.6 Statement of Non-collusion.
- 7.7 Disclosure of Interests.
- 7.8 Certificate and Definitions
- 7.9 Contractor's Pre-Bid Disclosure Statement (pages 1 to 3, inclusive).
- 7.10 Subcontractor's Pre-Bid Disclosure Statement (pages 1 to 3, inclusive).
- 7.11 Agreement.
- 7.12 Performance Bond.
- 7.13 Payment Bond.
- 7.14 Certificates of Insurance.
- 7.15 Standard General Conditions (pages 1 to 44, inclusive).
- 7.16 Supplemental General Conditions (pages 1 to 14, inclusive).
- 7.17 Construction Specifications (Two hundred and two [202] Pages, inclusive).
- 7.18 Construction Drawings (Twenty-two [22] Sheets, inclusive).
- 7.19 Notice of Award & Acceptance of Notice.
- 7.20 Notice to Proceed & Acceptance of Notice.
- 7.21 Any modifications, including Addenda issued prior to bidding and/or 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 Modification (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 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 Agreement and the Contract Documents are subject to all applicable 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 and costs and any necessary 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 all prior agreements and understandings between the parties. The Contract can 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 all lawsuits arising from these Contract Documents shall lie in Cameron County, Texas.
IN WITNESS WHEREOF, the parties hereto have signed this Agreement in triplicate. One counterpart each has been delivered to OWNER and CONTRACTOR. All portions of the Contract Documents have been signed or identified by OWNER and CONTRACTOR, or by ENGINEER on their behalf.

This Agreement will be effective on the	day of	, 20
BROWNSVILLE NAVIGATION DISTRICT		
By:	Ву:	
Attest: ESTEBAN GUERRA, Secretary	Attest:	
Address for giving notices:	Address for giving notices:	
Attn: Mr. Ariel Chávez II, P.E./R.P.L.S., Director of Engineering Services 1000 Foust Road Brownsville, TX 78521	Attn:	

The Brownsville Navigation District is a governmental entity as defined by Texas Tax Code Section 151.309. District takes the position that this contract is exempt from taxation under Section 151.311 of the Texas Tax Code. The District will provide Contractor with evidence of District's status as a governmental entity, so that Contractor may claim exemption from sales tax for all purchases of tangible personal property used in the performance of this contract. The parties agree that for purposes of claiming the exemption Contractor is the agent of District within the meaning of 34 Texas Administrative Code Rule 3.322. However, District and Contractor further agree that (1) to the extent this contract or purchases made to fulfill this contract are taxable, that this is a "separated contract", and that 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: \$______, and (2) in no event shall District be liable to Contractor for an increase in the Contract Price because of sales taxes.

OIL DOCK #6 BULKHEAD REPAIRS

KNOW ALL MEN BY THESE PRESENTS:

THAT		
	(Name of Contractor)	
	(Address of Contractor)	
a		, hereinafter called Principal,
	(Corporation, Partnership, or Individual)	
and		
	(Name of Surety)	
	(Address of Surety)	

hereinafter called Surety, are held and firmly bound unto the BROWNSVILLE NAVIGATION DISTRICT, Texas, hereinafter called OWNER, 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 "OIL DOCK #6 BULKHEAD REPAIRS" project.

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 year post-construction guaranty 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 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 the right of any beneficiary hereunder, whose claim may be unsatisfied.

OIL DOCK #6 BULKHEAD REPAIRS

This bond is subject to and governed by Article 5160 of the Texas Revised Civil Statues 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)	
(Principal) Secretary	By: (Signature)	(s)
(SEAL)		
(Witness as to Principal)	(Address)	
(Address)		
ATTEST:	(Surety)	
(Surety) Secretary	By: (Attorney-in-Fact)	
(SEAL)		
(Witness as to Surety)	(Address)	
(Address)		

NOTE: Date of BOND must not be prior to date of Contract. If Contractor is a Partnership, all partners should execute BOND.

ATTACH

POWER OF ATTORNEY

TO BE FURNISHED BY CONTRACTOR

OIL DOCK #6 BULKHEAD REPAIRS

KNOW ALL MEN BY THESE PRESENTS:

THAT		
	(Name of Contractor)	
	(Address of Contractor)	
а		, hereinafter called Principal.
	(Corporation, Partnership, or Individual)	,
and		
	(Name of Surety)	
	(Address of Surety)	

hereinafter called Surety, are held and firmly bound unto the BROWNSVILLE NAVIGATION DISTRICT, Texas, hereinafter called OWNER, 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 ______, 2018, a copy of which is hereto attached and made a part hereof, for the construction of the "OIL DOCK #6 BULKHEAD **REPAIRS**" project.

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, coal and coke, 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 SUBCONTRACTOR 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 the right of any beneficiary hereunder, whose legally perfected claim may be unsatisfied.

OIL DOCK #6 BULKHEAD REPAIRS

This bond is subject to and governed by Article 5160 of the Texas Revised Civil Statues 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:	
(Principal) Secretary	(Signature)	
(SEAL)		
(Witness as to Principal)	(Address)	
(Address)		
ATTENT.		
ATTEST:	(Surety)	
	By:	
(Surety) Secretary	(Attorney-in-Fact)	
(SEAL)		
(Witness as to Surety)	(Address)	
(Address)		

NOTE: Date of BOND must not be prior to date of Contract. If Contractor Partnership, all partners should execute BOND.

ATTACH

POWER OF ATTORNEY

TO BE FURNISHED BY CONTRACTOR

Certificates of Insurance

OIL DOCK #6 BULKHEAD REPAIRS

ATTACH

CERTIFICATES OF INSURANCE

TO BE FURNISHED BY CONTRACTOR

General Conditions

OIL DOCK #6 BULKHEAD REPAIRS

STANDARD

GENERAL CONDITIONS

OF THE

CONSTRUCTION CONTRACT

Prepared by

Engineers' Joint Contract Documents Committee

and

Issued and Published Jointly By

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE A practice division of the NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

AMERICAN CONSULTING ENGINEERS COUNCIL

AMERICAN SOCIETY OF CIVIL ENGINEERS

CONSTRUCTION SPECIFICATION INSTITUTE

The document has been approved and endorsed by:

The Associated General Contractors of America

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GENERAL CONDITIONS

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 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 shall become a part of the Contract Documents and modify the drawings, specifications or other bid documents as indicated. No verbal changes in the Work as shown or described shall become binding.

Agreement - The written agreement between OWNER and CONTRACTOR covering the Work to be performed; other Contract Documents are attached to the Agreement and made a part thereof as provided therein.

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

Bid - The offer or proposal of the bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

Bonds - Bid, performance and payment bonds and other instruments of security.

Change Order - A document recommended by ENGINEER, which is signed by CONTRACTOR and OWNER and authorizes an addition, deletion or revision in the Work, or an adjustment in the Contract Price or the Contract Time, issued on or after the Effective Date of the Agreement.

Contract Documents - The 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) when attached as an exhibit to the Agreement, the Bonds, these General Conditions, the Supplementary Conditions, the Specifications and the Drawings as the same are more specifically identified in the Agreement, together with all amendments, modifications and supplements issued pursuant to paragraphs 3.4 and 3.5 on or after the Effective Date of the Agreement.

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

Contract Time - The number of days (computed as provided in paragraph 17.2) or the date stated in the Agreement for the completion of the Work.

CONTRACTOR - The person, firm or corporation with whom OWNER has entered into

the Agreement.

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

Drawings - The drawings which show the character and scope of the Work to be performed and which have been prepared or approved by ENGINEER and are referred to in the Contract Documents.

Effective Date of the Agreement - The date indicated in the Agreement on which it becomes effective, but if no such date is indicated it means the date on which the Agreement is signed and delivered by OWNER.

ENGINEER - The person, firm or corporation named as such in the Agreement.

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

General Requirements - Sections of Division 1 of the Specifications.

Laws and Regulations; Laws or Regulations - Laws, rules, regulations, ordinances, codes and/or orders.

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 Agreement.

Notice to Proceed - A written notice given by OWNER to CONTRACTOR (with a 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 - The public body or authority, corporation, association, firm or person with whom Contractor has entered into the Agreement and for whom the Work I to be provided.

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

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

Resident Project Representative - The authorized representative of ENGINEER who is assigned to the site or any part thereof.

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 illustrate material or equipment for some portion of the Work.

Specifications - Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards and workmanship as applied to the Work and certain administrative details applicable thereto.

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

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

Underground Facilities - All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such facilities or attachments, and any encasements containing such facilities which have been installed underground to furnish any of the following services or materials: electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, sewage and drainage removal, traffic or other control systems or water.

Unit Price Work - Work to be paid for on the basis of unit prices.

Work - The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. Work is the result of performing services, furnishing labor and furnishing and incorporating materials and equipment into the construction, 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 and recommended by ENGINEER, 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 paragraph 4.2 or 4.3 or to emergencies under paragraph 6.22. 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 paragraph 10.2.

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 nonengineering or nontechnical rather than strictly Work-related aspects of the Contract Documents.

ARTICLE 2. PRELIMINARY MATTERS

Delivery of Bonds:

2.1 When CONTRACTOR delivers the 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 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, upon request, at the cost of reproduction.

Commencement of Contract Time; Notice to Proceed:

2.3 The Contract Time will commence to run on the thirieth day after the after the effective Date of the Agreement, or if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within thirty days after the Effective Date of the Agreement. In no event will the Contract Time commence to run later than the seventy fifth day after the day the of Bid opening or the thirieth day after the Effective Date of the Agreement, whichever date is earlier.

Starting the Project:

2.4 CONTRACTOR shall start to perform the Work on the date when the Contract Time commences to run, but no Work shall be done at the site prior to the date on which the Contract Time commences to run.

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 liable to OWNER or ENGINEER for failure to report any conflict, error or discrepancy in the Contract Documents, if CONTRACTOR had actual knowledge thereof or should reasonably have known thereof.

2.6 Within ten 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 progress schedule indicating the starting and

completion dates of the various stages of the Work;

2.6.2 a preliminary schedule of Shop Drawings 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 Contract Price and will subdivide the Work into component parts in sufficient detail to serve as the basis for progress payments during construction. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work which will be confirmed in writing by CONTRACTOR at the time of submission.

2.7 Before any Work at the site is started, Contractor shall deliver to Owner, with a copy to Engineer, certificates (and other evidence of insurance requested by OWNER) which CONTRACTOR is required to purchase and maintain in accordance with paragraphs 5.3, 5.4, and Owner shall deliver to CONTRACTOR certificates (and other evidence of insurance requested by CONTRACTOR) which 0WNER is required to purchase and maintain in accordance with paragraphs 5.6 and 5.7.

Preconstruction Conference:

2.8 Within twenty days after the Effective Date of the Agreement, but before CONTRACTOR starts the Work at the site, a conference attended by CONTRACTOR, ENGINEER and others as appropriate will be held to discuss the schedules referred to in paragraph 2.6, to discuss procedures for handling Shop Drawings and other submittals and for processing Applications for Payment, and to establish a working understanding among the parties as to the Work.

Finalizing Schedules:

2.9 At least ten days before submission of the first Application for Payment a conference attended by CONTRACTOR, ENGINEER and others as appropriate will be held to finalize the schedules submitted in accordance with paragraph 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 schedule of Shop Drawing submissions will be acceptable to ENGINEER as providing submissions will be acceptable to ENGINEER as providing 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 the place of the Project.

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 to produce the intended result will be supplied 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 be specific or by implication, shall mean the latest standard specification, manual, code or Laws or Regulations in effect at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids), 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 or 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 consultants, 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 paragraph 9.15 or 9.16. Clarifications and interpretations of the Contract Documents shall be issued by ENGINEER 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 so report to ENGINEER in writing at once and before proceeding with the Work affected thereby shall obtain a written interpretation or clarification from ENGINEER. However, CONTRACTOR shall be not be liable to OWNER or ENGINEER for failure to report any conflict, error or discrepancy in the Contract Documents if CONTRACTOR had actual knowledge thereof or should reasonably have known thereof.

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 ways:

- 3.4.1 a Formal Written Amendment,
- a Change Order (pursuant to paragraph 10.4), or
- a Work Directive Change (pursuant to 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 paragraph 9.5),

3.5.2 ENGINEER's approval of a Shop Drawing or sample (pursuant to paragraphs 6.26 and 6.27), or

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

Reuse of Documents:

3.6 Neither CONTRACTOR nor any Subcontractor or Supplier or other person or organization performing or furnishing any of the Work under a direct or indirect contract with OWNER shall have or acquire any title to or ownership rights in any of the Drawings, Specifications or other documents (or copies of any thereof) prepared by or bearing the seal of ENGINEER; 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. 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 is prohibited.

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 and easements for access thereto and such other lands which are designated 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 these lands, rights-of-way or easements entitles CONTRACTOR to an extension of the Contract Time, CONTRACTOR may make a claim therefor as provided in Article 12. CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

Physical Condition:

4.2.1 Explorations and Reports: Reference is made to the Supplementary Conditions for identification of those reports of explorations and tests of subsurface conditions at the site that have been utilized by ENGINEER in preparation of the Contract Documents. CONTRACTOR may rely upon the accuracy of the technical data contained in such reports, but not upon nontechnical 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 subsurface conditions at the site.

4.2.2 Existing Structures: Reference is made to the Supplementary Conditions for 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 site that have been utilized by ENGINEER in preparation of the Contract Documents. CONTRACTOR may rely upon the accuracy of the technical data contained in such drawings, but not 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 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 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 and ENGINEER 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 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 conditions a change in the Contract Documents is required, a Work Directive Change or a Change Order will 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 amount or length thereof, a claim may be made therefor as provided in Articles 11 and 12.

Physical Conditions - 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 site is based on information and data furnished to OWNER or ENGINEER by the owners of such Underground Facilities 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 accuracy or completeness of any such information or data; and,

4.3.1.2 CONTRACTOR shall have full responsibility for reviewing and checking all such information and data, for locating all 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 repairing any damage thereto resulting from the Work, the cost of all of which will be considered as having been included in the Contract Price.

4.3.2 Not Shown or Indicated. If an Underground Facility is uncovered or revealed at or contiguous to the site which was not shown or indicated in the Contract Documents and which CONTRACTOR could not reasonably have been expected to be aware of, 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 the consequences of the existence of the Underground Facility, and the Contract Documents will 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 shall 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. If the parties are unable to agree as to the amount or length thereof, CONTRACTOR may make a claim therefor as provided in Articles 11 and 12.

Reference Points:

4.4 OWNER shall provide engineering surveys to establish reference points for construction which in ENGINEER's judgment are necessary to enable CONTRACTOR to proceed with the Work. CONTRACTOR shall be responsible for laying out the Work (unless otherwise specified in the General Requirements), shall protect and preserve the established reference points and shall make no changes or relocations without the prior written approval of OWNER. 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 shall be responsible for the accurate replacement or relocation of such reference points by professionally qualified personnel.

ARTICLE 5. BONDS AND INSURANCE

Performance and Other Bonds:

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 and payment of all CONTRACTOR's obligations under the Contract Documents. These bonds shall remain in effect 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 such other Bonds as are required by the Supplementary Conditions. 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 named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff Bureau of Accounts, U.S. Treasury Department. All Bonds signed by an agent must be accompanied by a certified copy of the authority to act.

5.2 If the surety on any Bond furnished by CONTRACTOR is declared a bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the

project is located or it ceases to meet the requirements of paragraph 5.1, CONTRACTOR shall within five days thereafter substitute another Bond or Surety, both of which must be acceptable to OWNER.

Contractor's Liability Insurance:

5.3 CONTRACTOR shall purchase and maintain such comprehensive general liability and other insurance as is 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' or workmen's compensation, disability benefits and other similar employee benefit acts;

5.3.2 Claims for damages because of bodily injury, occupational sickness or disease, or death of CONTRACTOR's employees;

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 motor vehicle.

The insurance required by these paragraphs 5.3 and 5.6 shall include the specific coverages and be written for not less than the limits of liability and coverages provided in the Supplementary Conditions, or required by law, whichever is greater. The comprehensive 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 contain a provision or endorsement that the coverage afforded will not be cancelled, materially changed or renewal refused until at least thirty days' prior written notice has been given to OWNER and ENGINEER 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 years after final payment and

furnish OWNER with evidence of continuation of such insurance at final payment and one year thereafter.

Contractual Liability Insurance:

5.4 The comprehensive general liability insurance required by paragraph 5.3 will include contractual liability insurance applicable to CONTRACTOR's obligations under paragraphs 6.30 and 6.31.

Owner's Liability Insurance:

5.5 Owner shall be responsible for purchasing and maintaining ONWER'S own liability insurance and, at OWNER's option, may purchase and maintain such insurance as will protect OWNER against claims which may arise from operations under the Contract Documents.

Property Insurance:

5.6 Unless otherwise provided in the Supplementary Conditions, OWNER shall purchase and maintain property insurance upon the Work at the site to the full insurable value thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER and ENGINEER's consultants in the Work, all of whom shall be listed as insureds or additional insured parties, 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, and shall include damages, losses and expenses arising out of or resulting from any insured loss or 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.

5.7 OWNER shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of OWNER, CONTRACTR, Subcontractors, ENGINEERS and ENGINEER's consultants in the Work, all of whom shall be listed as insured or additional insured parties.

5.8 All the policies of insurance (or the certificates or other evidence thereof) required to be purchased and maintained by OWNER in accordance with paragraphs 5.6 and 5.7 will contain a provision or endorsement that the coverage afforded will not be cancelled or materially changed or renewal refused until at least thirty days prior written notice has been given to CONTRACTOR by certified mail and will contain waiver provisions in accordance with paragraph 5.11.2.

5.9 OWNER shall not be responsible for purchasing and maintaining any property insurance to protect the interests of CONTRACTORS, Subcontractors or others in the Work to the extent of any deductible amounts that are provided in the Supplementary Conditions. The risk of loss within the deductible amount will be borne by CONTRACTOR. Subcontractor, or others suffering any such loss and if any of them wishes property insurance coverage within the

limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

5.10 If CONTRACTOR requests in writing that other special insurance be included in the property insurance policy, OWNER shall, if possible, include such insurance, and the cost thereof will be charged to CONTRACTOR by appropriate Change Order or Written Amendment. Prior to commencement of Work at the Site, OWNER shall in writing advise CONTRACTOR whether or not such other insurance has been procured by OWNER.

Waiver of Rights:

5.11.1 OWNER and CONTRACTOR waive all rights against each other 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 5.7 and any other property insurance applicable to the Work, and also waives all such rights against the Subcontractors. ENGINEER, ENGINEER's consultants and all other parties named as insureds in such policies for losses and damages so caused. As required by paragraph 6.11, each subcontract between CONTRACTOR and a Subcontractor will contain similar waiver provisions by the Subcontractor in favor of OWNER, CONTRACTOR, ENGINEER, ENGINEER's consultants and all other parties named as insureds. None of the above waivers shall extend to the rights that any of the insured parties may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy is issued.

5.11.2 OWNER and CONTRACTOR intend that any policies provided in response to paragraph 5.6 and 5.7 shall protect all of the parties 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 parties named as insureds or additional insureds, and if the insurers require separate waiver forms to be signed by ENGINEER or ENGINEER's consultant or any Subcontractor, CONTRACTOR will obtain the same, and if such waiver forms are required of any Subcontractor, CONTRACTOR will obtain the same.

Receipt and Application of Proceeds:

5.12. Any insured loss under the policies of insurance required by paragraphs 5.6 and 5.7 will be adjusted with OWNER and made payable to OWNER as trustee for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of paragraph 5.13. OWNER shall deposit in a separate account any money so received, and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreements is reached the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof and the Work and the cost thereof covered by an appropriate Change Order or Written Amendment.

5.13. OWNER as trustee shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within fifteen days after the occurrence of loss to OWNER's exercise of this power. If such objection be made, OWNER as trustee shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If required in writing by any party in interest, OWNER as trustee shall, upon the occurrence of any insured loss, give bond for the proper performance of such duties.

Acceptance of Insurance:

5.14. 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 and 5.4 on the basis of its not complying with the Contract Documents, OWNER shall notify CONTRACTOR in writing thereof within ten days of the date of delivery of such certificates to OWNER in accordance with paragraph 2.7. If CONTRACTOR has any objection to the coverage afforded by or other provisions of the policies of insurance required to be purchased and maintained by OWNER, in accordance with paragraphs 5.6 and 5.7 on the basis of their not complying CONTRACTOR shall notify OWNER in writing thereof within ten days of the date of delivery of such certificates to CONTRACTOR shall notify OWNER in accordance with paragraph 2.7. OWNER and CONTRACTOR shall each provide to the other such additional information in respect of insurance provided by each as the other may reasonably request. Failure by OWNER or CONTRACTOR to give any such notice of objection within the time provided shall constitute acceptance of such insurance purchased by the other as complying with the Contract Documents.

Partial Utilization - Property Insurance:

5.15. If OWNER finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work, such use or occupancy may be accomplished in accordance with paragraph 14.10 provided that no such use or occupancy shall commence before the insurers providing the property insurance have acknowledged notice thereof and in writing effected the changes in coverage necessitated thereby. The insurers providing the property insurance shall consent to such use or occupancy by endorsement on the policy or policies, but the property insurance shall not be cancelled or lapse on account of any such partial use or occupancy.

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. CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences and procedures of construction, but CONTRACTOR shall not be responsible for the negligence of others in the 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 responsible to see that the finished Work complies accurately with the Contract Documents.

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 to CONTRACTOR.

Labor, Materials and Equipment:

6.3. CONTRACTOR shall provide competent, suitably qualified personnel to survey

and lay out the Work and perform construction as required by the Contract Documents. CONTRACTOR shall at all times maintain good discipline and order at the site. Except in connection with the safety or protection of persons or the Work or property at the site or adjacent thereto, and except as otherwise indicated in the Contract Documents, all Work at the site shall be performed during regular working hours, and CONTRACTOR will not permit overtime work or the performance of Work on Saturday, Sunday or any legal holiday without OWNER's written consent given after prior written notice to ENGINEER.

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.

6.5. All materials and equipment shall be of good quality and new, except as otherwise provided in the Contract Documents. If required by ENGINEER, CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. 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 instructions will be effective to assign to ENGINEER, or any of ENGINEER's consultants, 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 paragraph 9.15 or 9.16.

Adjusting Progress Schedule:

6.6. CONTRACTOR shall submit to ENGINEER for acceptance (to the extent indicated in paragraph 2.9) adjustments in the progress schedule to reflect the impact thereon of new developments; these 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:

6.7.1. 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 and quality required. Unless the name is followed by words indicating that no substitution is permitted. materials or equipment of other Suppliers 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. 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 that the proposed substitute will perform adequately 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 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 work on the Project) 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 license fee or royalty. All variations of the proposed substitute from that specified will be identified in the application and available maintenance, repair and replacement service will be indicated. The application will also contain an itemized estimate of all costs that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other contractors affected by the resulting change, all of which shall be considered by ENGINEER in evaluating the proposed substitute. ENGINEER may require CONTRACTOR to furnish at CONTRACTOR's expense additional data about the proposed substitute.

6.7.2. If a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents, CONTRACTOR may furnish or utilize a substitute means, method, sequence, technique or procedure of construction acceptable to ENGINEER, if CONTRACTOR submits sufficient information to allow ENGINEER to determine that the substitute proposed is equivalent to that indicated or required by the Contract Documents. The procedure for review by ENGINEER will be similar to that provided in paragraph 6.7.1 as applied by ENGINEER and as may be supplemented in the General Requirements.

6.7.3. 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 expense a special performance guaranty or other surety with respect to any substitute. ENGINEER will record time required by ENGINEER and ENGINEER's consultants in evaluating substitutions proposed by CONTRACTOR and in making 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 ENGINEER's consultants for evaluating each proposed substitute.

Concerning Subcontractors, Suppliers and Others:

6.8.1. CONTRACTOR shall not employ any Subcontractor, Supplier or other person or organization (including those acceptable to OWNER and ENGINEER as indicated in paragraph 6.8.2), 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.

6.8.2. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers or other persons or organizations (including those who are to furnish the principal items of materials and equipment) to be submitted to OWNER in advance of the specified date prior to the Effective Date of the Agreement for acceptance by OWNER and ENGINEER and if CONTRACTOR has submitted a list thereof in accordance with the Supplementary Conditions, OWNER's or ENGINEER's acceptance (either in writing or by failing to make written objection thereto by the date indicated for

acceptance or objection in the bidding documents or the Contractor Documents) of any such Subcontractor, Supplier or other person or organization so identified may be revoked 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 will be issued or Written Amendment signed. All increases or decreases in the Contract Price shall be governed by all state and local statutes, codes, laws, ordinances, rules and regulations governing competitive bidding and Change Orders. 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 defective Work.

6.9. 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 or indirect contract with CONTRACTOR just as CONTRACTOR is responsible 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, Supplier or other person or organization, nor shall it create any obligation on the part of OWNER or ENGINEER to pay or to see to the payment of any moneys due any such Subcontractor, Supplier or other person or organization except as may otherwise be required by Laws and Regulations.

6.10. 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.

6.11. All Work performed for CONTRACTOR by a Subcontractor will be pursuant to an appropriate agreement between CONTRACTOR and the Subcontractor which specifically binds the Subcontractor to the applicable terms and conditions of the Contract Documents for the benefit of OWNER and ENGINEER and contains waiver provisions as required by paragraph 5.11. CONTRACTOR shall pay each Subcontractor a just share of any insurance moneys received by CONTRACTOR on account of losses under policies issued pursuant to paragraph 5.6 and 5.7.

Patent Fees and Royalties:

6.12. 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 or ENGINEER its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by OWNER in the Contract Documents. CONTRACTOR shall indemnify and hold harmless OWNER and ENGINEER and anyone directly or indirectly employed by either of them from and against 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.

Permits:

6.13. 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, or if there are no Bids on the Effective Date of the Agreement. CONTRACTOR shall pay all charges of utility owners for connections to the Work, and OWNER shall pay all charges of such utility owners for capital costs related thereto such as plant investment fees.

Laws and Regulations:

6.14.1. 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, neither OWNER nor ENGINEER shall be responsible for monitoring CONTRACTOR's compliance with any Laws or Regulations.

6.14.2. If CONTRACTOR observes 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 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 notice to ENGINEER, CONTRACTOR shall bear all costs arising therefrom; however, it shall not be CONTRACTOR's primary responsibility to make certain that the Specifications and Drawings are in accordance with such Laws and Regulations.

Taxes:

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

Use of Premises:

6.16. 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 and other land and areas permitted by Laws and Regulations, rights-of-way, permits and easements, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. CONTRACTOR shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof or any of the land or areas contiguous thereto, resulting from the performance of the Work. Should any claim be made against OWNER or ENGINEER by any such 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 arbitration or at law. CONTRACTOR shall, to the fullest extent permitted by Laws and Regulations, indemnify, hold OWNER and ENGINEER harmless from and against all claims, damages, losses and expenses (including, but not limited to, fees of engineers, architects, attorneys and other professionals and court and arbitration costs) arising directly, indirectly or consequentially out of any action, legal or

equitable, brought by any such other party against OWNER or ENGINEER to the extent based on a claim arising out of CONTRACTOR's performance of the Work.

6.17. 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 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 site clean and ready for occupancy by OWNER. CONTRACTOR shall restore to original condition all property not designated for alteration by the Contract Documents.

6.18. CONTRACTOR shall not load or permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall CONTRACTOR subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

Record Documents:

6.19. CONTRACTOR shall maintain in a safe place at the site one record copy of all Drawings, Specifications, Addenda, Written Amendments, Change Orders, Work Directive Changes, Field Orders and written interpretations and clarifications (issued pursuant to paragraph 9.4) in good order and annotated to show all changes made during construction. These record documents, together with all approved samples and a counterpart of all approved Shop Drawings, will be available to ENGINEER for reference. Upon completion of the Work, these record documents, samples and Shop Drawings will be delivered to ENGINEER for OWNER.

Safety and Protection:

6.20. CONTRACTOR shall be 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, and shall provide the necessary protection to prevent damage, injury or loss to:

6.20.1. all employees on the Work and other persons and organizations who may be affected thereby;

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

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

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 of Underground Facilities and utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation and replacement of their property. All damage, injury or loss to any property referred to in paragraph 6.20.2 or 6.20.3 caused, directly or indirectly, in whole or in

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part, by OWNER and ENGINEER, and 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 (except as otherwise expressly provided in connection with Substantial Completion).

6.21. CONTRACTOR shall designate a responsible representative at the site whose duty shall be the prevention of accidents. This person shall be CONTRACTOR's superintendent unless otherwise designated in writing by CONTRACTOR to OWNER.

Emergencies:

6.22. In emergencies affecting the safety or protection of persons or the Work or property at the site or adjacent thereto, CONTRACTOR, without special 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 Contract Documents is required because of the action taken in response to an emergency, a Work Directive Change or Change order will be issued to document the consequences of the changes or variations.

Shop Drawings and Samples:

- 6.23. Not Used
- 6.24. Not Used
- 6.25 Not Used

6.26. ENGINEER will review and approve with reasonable promptness Shop Drawings and samples, but ENGINEER's review and approval will be only for conformance with the design concept of the Project and for compliance with the information given in the Contract Documents and shall not extend to 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 safety precautions or programs incidents thereto. The review and approval of a separate item as such will not indicate approval of a separate item as such will not indicate approval of the assembly in which the item 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 specific attention in writing to revisions other than the corrections called for by ENGINEER on previous submittals.

6.27. 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 attention to each such variation at the time of submission as required by paragraph 6.25.2 and ENGINEER has given written approval of each such variation by a specific written notation thereof incorporated in or accompanying the Shop Drawings or sample approval; nor will any approval by ENGINEER

relieve CONTRACTOR from responsibility for errors or omissions in the Shop Drawings or from responsibility for having complied with the provisions of paragraph 6.25.1

6.28. 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 the sole expense and responsibility of CONTRACTOR.

Continuing the Work:

6.29. CONTRACTOR shall carry on the Work and adhere to the progress schedule during all disputes or disagreements with OWNER. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by paragraph 15.5 or as CONTRACTOR and OWNER may otherwise agree in writing.

Indemnification:

6.30. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER and ENGINEER and their consultants, agents and employees from and against all claims, damages, losses and expenses, direct, indirect or consequential (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and court and arbitration costs) arising out of or resulting from the performance of the Work, provided that any such claim, damage, loss or expense (a)is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than work itself) including the loss of use resulting therefrom and (b) is caused in whole or in part by any negligent act or omission 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, or regardless of whether or not it is caused in part by a party indemnified hereunder or arises by or is imposed by Law and Regulations regardless of the negligence of any such party.

6.31. In any and all claims against OWNER or ENGINEER 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 6.30 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.

6.32. The obligations of CONTRACTOR under paragraph 6.30 shall not extend to the liability of ENGINEER, ENGINEER's consultants, agents or employees arising out of the preparation or approval of maps, drawings, opinions, reports, surveys, Change Orders, designs or specifications.

ARTICLE 7 - OTHER WORK

Related Work at Site:

7.1. OWNER may perform other work related to the Project at the site by OWNER's own forces, have other work performed by utility owners or let other direct contracts therefor which shall contain General Conditions similar to these. If the fact that such other work is to be performed was not noted in the Contract Documents, written notice thereof will be given to CONTRACTOR prior to starting any such other work; and, if CONTRACTOR believes that such performance will involve additional expense to CONTRACTOR or requires additional time and the parties are unable to agree as to the extent thereof, CONTRACTOR may make a claim therefor as provided in Articles 11 and 12.

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

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

Coordination:

7.4. If OWNER contracts with others for the performance of other work on the Project at the site, the person or organization who will have authority and responsibility for coordination of the activities among the various prime contractors will be identified in the Supplementary Conditions, 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. Unless otherwise provided in the Supplementary Conditions, neither OWNER nor ENGINEER shall not have any authority or responsibility in respect of such coordination.

ARTICLE 8 - OWNER'S RESPONSIBILITIES

8.1. OWNER shall issue all communications to CONTRACTOR through ENGINEER.

8.2. In case of termination of the employment of ENGINEER, OWNER shall appoint an engineer against whom CONTRACTOR makes no reasonable objection, whose status under

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the Contract Documents shall be that of the former ENGINEER. Any dispute in connection with such appointment shall be subject to arbitration.

8.3. OWNER shall furnish the data required of OWNER under the Contract Documents promptly and shall make payments to CONTRACTOR promptly after they are due as provided in paragraphs 14.4 and 14.13.

8.4. OWNER's duties in respect of providing lands and easements and providing engineering surveys to establish 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 reports of explorations and tests of subsurface conditions at the site and in existing structures which have been utilized by ENGINEER in preparing the Drawings and Specifications.

8.5 OWNER's responsibility in respect of purchasing and maintaining liability and property insurance are set forth in paragraphs 5.5 through 5.6.

8.6. OWNER is obligated to execute Change Orders as indicated in paragraph 10.4.

8.7. OWNER's responsibility in respect of certain inspections, tests and approvals is set forth in paragraph 13.4.

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

ARTICLE 9 - ENGINEERS STATUS DURING CONSTRUCTION

Owner's Representative:

9.1. ENGINEER will be OWNER's representative during the construction period. The duties and responsibilities and the limitations of authority of ENGINEER as OWNER's representative during construction are set forth in the Contract Documents and shall not be extended without written consent of OWNER and ENGINEER.

Visits to Site:

9.2. ENGINEER will make visits to the site at intervals appropriate to the various stages of construction to observe the progress and quality of the executed Work and to determine, in general, if the Work is proceeding in accordance with the Contract Documents. ENGINEER will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. ENGINEER's efforts will be directed toward providing for OWNER a greater degree of confidence that the completed Work will conform to the Contract Documents. On the basis of such 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 guard OWNER against defects and deficiencies in the Work.

Project Representation:

9.3. If OWNER and ENGINEER agree, ENGINEER will furnish a Resident Project

Representative to assist ENGINEER in observing the performance of the Work. The duties, responsibilities and limitations of authority of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions. If OWNER designates another agent to represent OWNER at the site who is not ENGINEER's agent or employee, the duties, responsibilities and limitations of authority of such other person will be as provided in the Supplementary Conditions.

Clarifications and Interpretations:

9.4. ENGINEER, after consultation with OWNER, 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 justifies an increase in the Contract Price or an extension of the Contract Time and the parties are unable to agree to the amount or extent thereof, CONTRACTOR may make a claim therefor as provided in Article 11 or Article 12.

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 perform the Work involved promptly. 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 therefor as provided in Article 11 or 12.

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 6.23 through 6.28 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 of Applications for Payment, etc., see Article 14.

Determinations for Unit Prices:

9.10. ENGINEER will determine the actual quantities and classifications of 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, unless, within ten days after the date of any such decision, either OWNER or CONTRACTOR delivers to the other party to the Agreement and to ENGINEER written notice of intention to appeal from such a decision.

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 to ENGINEER and the other party to the Agreement promptly (but in no event later than thirty 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 days after such occurrence unless ENGINEER allows an additional period of time 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, ENGINEER will not be liable in connection with any interpretation or decision rendered in good faith in such 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 14.16) will be a condition precedent to any exercise by OWNER or CONTRACTOR of such rights or remedies as either 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 duty or responsibility of ENGINEER to CONTRACTOR, and 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 term "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 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 or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.15 or 9.16.

9.15. ENGINEER will not be responsible for CONTRACTOR's means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs

incident thereto and 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; 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 therefor as provided in Article 11 or Article 12.

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 6.22 and except in the case of uncovering Work as provided in paragraph 13.9.

10.4. OWNER and CONTRACTOR shall 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 acceptance of defective Work under paragraph 13.13 or correcting defective Work under paragraph 13.14, or are 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 6.29.

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, the giving of any such notice will be CONTRACTOR'S responsibility, and the amount of each applicable Bond will 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 performing the Work. All duties, responsibilities and obligations assigned to or undertaken by CONTRACTOR shall be at his expense without change in the 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 written notice delivered by the party making the claim to the other party promptly and to ENGINEER promptly (but in no event later than thirty 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 be delivered within sixty 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 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 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 quantities of the 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 locality of the Project, 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 agreed upon by OWNER and CONTRACTOR. 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 fringe
benefits 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 ay applicable thereto. Such employees shall include superintendents and foremen at the site. The expenses of performing Work after regular working hours, on Saturday, Sunday or legal holidays, shall be included in the above to the extent authorized 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 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.

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 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 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 rental agreements approved by OWNER with the advice of ENGINEER, 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. site.

11.4.5.4. Sales, consumer, use or similar taxes related to the Work, and for which CONTRACTOR is liable, imposed by Laws and Regulations.

11.4.5.5. Deposits lost for causes other than negligence of CONTRACTOR, any Subcontractor or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

11.4.5.6. Losses and damages (and related expenses), not compensated by insurance or otherwise, to the Work or otherwise sustained by CONTRACTOR in connection with the performance and furnishing of the Work (except losses and damages within the deductible amounts of property insurance established by OWNER in accordance with paragraph 5.9), provided they have resulted from causes other than the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the 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 services 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

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

11.4.5.9. Cost of premiums for additional Bonds and insurance required because of changes in the Work and premiums for property insurance coverage within the limits of the deductible amounts established by OWNER in accordance with paragraph 5.9.

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 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 CONTRACTOR's office at the 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 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 same (except for the cost of premiums covered by subparagraph 11.4.5.9 above).

11.5.5. Costs due to 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, disposal of materials or equipment wrongly supplied and making good any damage to 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 percent;

11.6.2.2. for costs incurred under paragraph 11.4.3, the CONTRACTOR's Fee shall be five 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 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 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 percent of the net decrease; and

11.6.2.5. when both additions and credits are involved in any one 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 submit in 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 all allowances so named in the Contract Documents and shall cause the Work so covered 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. The allowances include the cost to CONTRACTOR (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the site, and all applicable taxes; and

11.8.2. CONTRACTOR's costs for unloading and handling on the site, labor, installation costs, overhead, profit and other expenses contemplated for the allowances have been included in the Contract Price and not in the allowances. No demand for additional payment on account of any thereof 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:

11.9.1. 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 times the estimated quantity of each item as indicated in the Agreement. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual 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 estimated quantity of such item indicated in the Agreement and there is no corresponding adjustment with respect to any other item of Work and if CONTRACTOR believes that CONTRACTOR has incurred additional expense as a result thereof. CONTRACTOR may make a claim for an increase in the Contract Price in accordance with Article 11 if the parties are unable to agree as to the amount of any such increase.

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 written notice delivered by the party making the claim to the other party and to ENGINEER promptly (but in no event later than thirty 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 be delivered within sixty 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 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 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 control of CONTRACTOR if a claim is made therefor as provided in paragraph 12.1. Such delays shall include, but not be limited to, acts or neglect by OWNER or others performing additional work as contemplated by Article 7, or to fires, floods, labor disputes, epidemics, abnormal weather conditions or acts of God.

12.3. All time limits stated in the Contract Documents are 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 and ENGINEER that all Work will be in accordance with the Contract Documents and will not be defective. Prompt notice of all defects shall be given to CONTRACTOR. All defective Work, whether or not in place, may be rejected, corrected or accepted as provided in this Article 13.

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 provide proper and safe conditions for such access.

Tests and Inspections:

13.3. CONTRACTOR shall give ENGINEER 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 therefor, pay all costs in connection therewith and furnish ENGINEER the

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required certificates of inspection, testing or approval. CONTRACTOR shall also be responsible for and shall pay all costs in connection with any inspection or testing required in connection with OWNER's or ENGINEER's acceptance of a Supplier of materials or equipment proposed to be incorporated in the Work, or if materials or equipment submitted for approval prior to CONTRACTOR's purchase thereof for incorporation in the Work. The cost of all inspections, tests and approvals other than those which are required by the Contract Documents 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 and CONTRACTOR (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 covered without written concurrence of ENGINEER, it must, if requested by ENGINEER, be uncovered for observation. Such uncovering shall be at CONTRACTOR's expense unless CONTRACTOR has given ENGINEER timely notice of CONTRACTOR's intention to cover the same and ENGINEER has not acted with reasonable promptness in response to such notice.

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

Uncovering Work:

13.8. If any Work is covered contrary to the written request of ENGINEER, it must, if requested by ENGINEER, be uncovered for ENGINEER's observation and replaced at CONTRACTOR's 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 request, shall uncover, expose or otherwise make available for observation, inspection or testing as ENGINEER may require that portion of the Work in question, furnishing all necessary labor, material and equipment. If it is found that such Work is defective, CONTRACTOR shall bear all direct, indirect and consequential costs of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction, (including but not limited to fees and charges or engineers, architects, attorneys and other professionals), 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, may make a claim therefor 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, inspection, testing and reconstruction; and, if the parties are unable to agree as to the amount or extent thereof, CONTRACTOR may make a claim therefor 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 and reconstruction; and, if the parties are unable to agree as to the amount or extent thereof, CONTRACTOR may make a claim therefor as provided in Articles 11 and 12.

Owner May Stop the Work:

13.10. If the Work is defective, or CONTRACTOR fails to supply sufficient skilled workers or suitable materials or equipment, or fails to furnish or perform the Work in such a way that the completed Work will conform to the Contract Documents, OWNER may order CONTRACTOR to stop the Work, or any portion thereof, until the cause for such order has been

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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 party.

Correction or Removal of Defective Work:

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

One Year Correction Period:

13.12. If within one year after the date of issue of the Certificate of Acceptance or such longer period of time as may be prescribed by Laws or Regulations, any Work is found to be defective, CONTRACTOR shall promptly, without cost to OWNER and in accordance with OWNER's written instruction, either correct such defective Work, or, if it has been rejected by OWNER, remove it from the site and replace it with nondefective Work. If CONTRACTOR does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, 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 engineers, architects, attorneys and other professionals) will be paid by CONTRACTOR. In special circumstances where a particular item of equipment is placed in continuous service before acceptance of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications or by Written 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 payment), prefers to accept it, OWNER may do so. CONTRACTOR shall bear all direct, indirect and consequential costs attributable to OWNER's evaluation of and determination to accept such defective Work (such costs to be approved by ENGINEER as to reasonableness and to include but not be limited to fees and charges of engineers, architects, attorneys and other professionals). If any such acceptance occurs prior to ENGINEER's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and 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 may make a claim therefor as provided in Article 11. If the acceptance occurs after such final payment, an appropriate amount as determined by OWNER will be paid by CONTRACTOR to OWNER.

OWNER May Correct Defective Work:

13.14. If CONTRACTOR fails within a reasonable time after written notice of ENGINEER to proceed to correct and to 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 seven days'

written notice to CONTRACTOR, correct and remedy any such deficiency. In exercising the rights and remedies under this paragraph OWNER shall proceed expeditiously. To the extent necessary to complete corrective and remedial action, OWNER may exclude CONTRACTOR from all or part of the site, take possession of all or part of the Work, and suspend CONTRACTOR's services related thereto, take possession of CONTRACTOR's tools, appliances, construction equipment and machinery at the site and incorporate in the Work all materials and equipment stored at the site or for which OWNER has paid CONTRACTOR but which are stored elsewhere. CONTRACTOR shall allow OWNER, OWNER's representatives, agents and employees such access to the 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 may make a claim therefor as provided in Article 11. Such direct, indirect and consequential costs will include but not be limited to fees and charges of engineers, 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 hereunder.

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 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 completed.

Application for Progress Payment:

14.2. At least twenty 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 filled out and signed by CONTRACTOR covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice or other documentation warranting that OWNER has received the materials and equipment free and clear of all liens, charges, security interests and encumbrances (which are hereinafter in these General Conditions referred to as "Liens") and evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect OWNER's interest therein, all of which will be satisfactory to OWNER. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

CONTRACTOR's Warranty of Title:

14.3. CONTRACTOR warrants and guarantees that title to all Work, materials and

equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to OWNER no later than the time of payment free and clear of all Liens.

Review of Applications for Progress Payment:

14.4. OWNER will, within ten days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to OWNER, or return the Application to CONTRACTOR indicating in writing ENGINEER's reasons for refusing to make payment. In the latter case, CONTRACTOR may make the necessary corrections and resubmit the Application. Ten days after presentation of the Application for Payment with ENGINEER's recommendation, the amount recommended will (subject to the provisions of the last sentence of paragraph 14.7) become due and when due will be paid by OWNER to CONTRACTOR.

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 on-site observations of the Work in progress as an experienced and gualified 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 point indicated, that, to the best of ENGINEER's knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under paragraph 9.10 and to any other qualifications stated in the recommendation); 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 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 payment will constitute an additional representation by ENGINEER to OWNER that the conditions precedent to CONTRACTOR's being entitled to final 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 opinion, it would be incorrect to make 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 loss because:

14.7.1. the Work is defective or completed Work has been damaged requiring 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. 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 refuse to make payment in whole or in part of the amount recommended by ENGINEER because claims have been made against OWNER on account of CONTRACTOR's performance or furnishing of the Work or Liens have been filed in connection with the Work or there are other items entitling OWNER to a set-off against the amount recommended, but OWNER must give CONTRACTOR written notice (with a copy to ENGINEER) stating the reasons for such action.

Substantial Completion:

14.8. When CONTRACTOR considers the entire Work ready for its intended use CONTRACTOR shall notify OWNER and ENGINEER in writing that the entire Work is substantially complete (except for items specifically listed by CONTRACTOR as incomplete) and request that ENGINEER issue a certificate of Substantial Completion. Within a reasonable time thereafter, OWNER, CONTRACTOR and ENGINEER shall make an inspection of the Work to determine the status of completion. If ENGINEER does not consider the Work substantially complete, ENGINEER will notify CONTRACTOR in writing giving the reasons therefor. 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 items to be completed or corrected before final payment. OWNER shall have ten 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 days after submission of the tentative certificate to OWNER notify CONTRACTOR in writing, stating the reasons therefor. If, after consideration of OWNER's objections, ENGINEER considers the Work substantially complete, ENGINEER will within said twenty days execute and deliver to OWNER and CONTRACTOR a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as ENGINEER believes justified after consideration of any objections from OWNER. At the time of delivery of the tentative certificate of Substantial Completion, ENGINEER will deliver to OWNER and CONTRACTOR a written recommendation as to division of responsibilities pending final payment between OWNER and CONTRACTOR with respect to security, operation, safety, maintenance, heat, utilities, insurance and warranties. Unless OWNER and CONTRACTOR agree otherwise in writing and so inform ENGINEER prior to ENGINEER's issuing the definitive certificate of Substantial Completion, ENGINEER's aforesaid recommendation will be binding on OWNER and CONTRACTOR until final payment.

14.9. OWNER shall have the right to exclude CONTRACTOR from the Work after the date of Substantial Completion, but OWNER shall allow CONTRACTOR reasonable access to complete or correct items on the tentative 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 agree constitutes a separately functioning and usable part of the Work that can be used 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 its intended use and substantially complete. If CONTRACTOR agrees, CONTRACTOR will certify 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. CONTRACTOR at any time may notify OWNER and ENGINEER in writing that CONTRACTOR considers any such part of the Work ready for its intended use and substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. Within a reasonable time after either such request, OWNER, CONTRACTOR and ENGINEER shall make an inspection of that part of the Work to determine its status of completion. If ENGINEER does not consider that part of the Work to be substantially complete, ENGINEER will notify OWNER and CONTRACTOR in writing giving the reasons therefor. If ENGINEER considers that part of the Work to be substantially complete, the provisions of paragraphs 14.8 and 14.9 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

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, CONTRACTOR and ENGINEER shall make an inspection of that part of the Work to determine its status of completion and will prepare a 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 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, heat, 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 operation and prior to Substantial Completion of such part of the Work, OWNER shall allow CONTRACTOR reasonable access to complete or correct items on said list and to complete other related Work.

14.10.3. No occupancy or separate operation of part of the Work will be accomplished prior to compliance with the requirements of paragraph 5.15 in respect of property insurance.

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 in which this inspection reveals that the Work is incomplete or defective. CONTRACTOR shall immediately take such measures as are necessary to remedy such deficiencies.

Final Application for Payment:

14.12. After CONTRACTOR has completed all such corrections to the satisfaction of ENGINEER and delivered all maintenance and operating instructions, schedules, guarantees, Bonds, certificates of inspection, marked-up record documents (as provided in paragraph 6.19) and other 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 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 Liens arising out of or filed in connection with the Work. In lieu thereof and as approved by OWNER, CONTRACTOR may furnish receipts or releases in full; an affidavit of CONTRACTOR that the releases and receipts include all labor, services, material and equipment for which a Lien could be filed, and that all payrolls, material and equipment bills, and other indebtedness connected with the Work for which OWNER or OWNER's property might in any way be responsible, have been paid or otherwise satisfied; and consent of the surety, if any, to final payment. If any Subcontractor or Supplier fails to furnish a release or receipt in full, CONTRACTOR may furnish a Bond or other collateral satisfactory to OWNER to indemnify OWNER against any Lien.

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 ten days after receipt of the final Application for Payment, indicate in writing ENGINEER's recommendation of payment and present the Application to OWNER 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 make the necessary corrections and resubmit the Application. Thirty days after presentation to OWNER of the Application and accompanying documentation, in appropriate form and substance, and with ENGINEER's recommendation and notice of acceptability, the amount recommended by ENGINEER will become due and will be paid by OWNER to CONTRACTOR.

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 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 payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

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Contractor's Continuing Obligation:

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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 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 acceptance by OWNER nor any failure to do so, nor any review and approval of a Shop Drawing or sample submission, 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 claims arising from unsettled Liens, from 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 in respect of 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 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 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 makes an approved claim therefor as provided in Articles 11 and 12.

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 state 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 state 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 property of CONTRACTOR is for the purpose of enforcing a Lien against such property or for the purpose of general administration of such 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 suitable materials or equipment or failure to adhere to the progress schedule established under paragraph 29. 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 authority of ENGINEER; or

15.2.9. if CONTRACTOR otherwise violates in any substantial way any provisions of the Contract Documents;

OWNER may, after giving CONTRACTOR (and the surety, if there be one) seven days' written notice and to the extent permitted by Laws and Regulations, terminate the services of CONTRACTOR, exclude CONTRACTOR from the site and take possession of the Work and of all CONTRACTOR's tools, appliances, construction equipment and machinery at the site and use the same to the full extent they could be used by CONTRACTOR (without liability to CONTRACTOR for trespass or conversion), incorporate in the Work all materials and equipment stored at the site or for which OWNER has paid CONTRACTOR but which are stored elsewhere, and finish the Work as OWNER may deem expedient. In such case CONTRACTOR shall not be entitled to receive any further payment. If the unpaid balance of the Contract Price exceeds the direct, indirect and consequential costs of completing the Work (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and court and arbitration costs) such excess will be kept by OWNER. If such costs exceed such unpaid balance, CONTRACTOR 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 now be required to obtain the lowest price for the Work performed.

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

15.4. Upon seven 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. In such case, CONTRACTOR shall be paid for all Work executed and any expense 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 engineers, architects, attorneys and other professionals and court and arbitration costs).

15.5. If through no act or fault of CONTRACTOR, the Work is suspended for a period of more than ninety days by OWNER or under an order of court or other public authority, or ENGINEER fails to act on any Application for Payment within thirty days after it is submitted, or OWNER fails for thirty days to pay CONTRACTOR any sum finally determined to be due, then CONTRACTOR, may upon seven days written notice to OWNER and ENGINEER terminate the Agreement and recover from OWNER payment for all Work executed an any expense sustained plus reasonable termination expenses. In addition and in lieu of terminating the Agreement, if ENGINEER has failed to act on an Application for Payment or OWNER has failed to make any payment as aforesaid, CONTRACTOR may upon seven day's written notice to OWNER and ENGINEER stop the Work until payment of all amounts then due. The provisions of this paragraph shall not relieve CONTRACTOR of the obligations under paragraph 6.29 to carry on the Work in accordance with the progress schedule and without delay during disputes and disagreements with OWNER.

ARTICLE 16 (Reserved)

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 given if delivered in person to the individual or to a member of the firm or to an officer of the corporation in the case of the CONTRACTOR or the General Manager in the case of the OWNER for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

Computation of Time:

17.2.1. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.2.2. A calendar day of twenty-four hours measured from midnight to the next midnight shall constitute a day.

General:

17.3. Should OWNER or CONTRACTOR suffer injury or damage to person or property because of any error, omission or act of the other party or of any of the other party employees or agents or others for whose acts the other party is legally liable, claim will be made in writing to the other party within a reasonable time of the first observance 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 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 6.30, 13.1, 13.12, 13.14, 14.3 and 15.2 and all of the rights and remedies available to OWNER and ENGINEER 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 and ENGINEER which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee or by other provisions of the Contract Documents, and the provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right and remedy to which they apply. 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 statements contained in any document required by OWNER, whether delivered at the time of the execution of the Contract Documents or at a later date, shall constitute representations, warranties and guarantees herein.

Supplementary General Conditions

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1. <u>GENERAL</u>

The Standard General Conditions of the construction Contract prepared by the ENGINEER's Joint Contract documents Committee (No. 1910-8 1990 Edition) shall form a part of this contract, together with the following Supplementary General Conditions. A copy of the Standard General Conditions (No. 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 these articles, the unaltered provisions of that part shall remain in effect.

2. <u>DETAILED AMENDMENTS TO THE GENERAL CONDITIONS</u>

The following Articles of the Standard General Conditions are hereby amended as follows:

- ARTICLE 1: The definition for Contract Documents is hereby amended to insert the word "General and Supplementary General Conditions", after the word "Agreement"
- ARTICLE 2: Add the following definitions:
- a. Standard abbreviations: Wherever reference is made to standard specifications, standard of quality or performance, as established by a recognized national authority, the reference may be by initials as generally recognized throughout the authority.
- b. Addenda: Supplements to, change in or corrections to the Drawings and/or Specifications issued in writing by the Engineer during the period of bidding. These addenda shall become 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 becoming binding.
- c. Alternates: Additions, omissions from, or changes to requirements for the project, each of which shall be bid separately and shall be included in or omitted from the contract at the discretion of the owner.
- d. Furnish: To supply at the job site the material, equipment, etc., referred to. Installation is not required of the supplier by the Specifications, but shall be arranged for by the General CONTRACTOR.
- e. Provide: To furnish and install in the location shown or approved at the job site, the material, equipment, etc., referred to.

ARTICLE 5: BONDS AND INSURANCE

Delete the last sentence of Article 5.1 delaying with U.S. Treasury Department Listing and substitute the following:

All the surety companies providing bonds for this project must be registered with the Secretary of State of the State of Texas.

Add to Article 5.3 the following subparagraphs:

- 5.3.1. COMPENSATION INSURANCE. The Contractor shall procure and shall maintain during the life of this Contract, Workmen's Compensation Insurance for all of his employees to be engaged in work on this project under this Contract, and in case of any such work sublet, the CONTRACTOR shall require the subcontractor similarly to provide Workmen' Compensation Insurance for all the latter's employees to be engaged in such work unless employees are covered by the protection afforded by the CONTRACTOR's Compensation Insurance. In case of any class of employees engaged in hazardous work on the project, under this Contract and is not protected under the Workmen's Compensation Statute, the CONTRACTOR shall provide and shall cause each subcontractor to provide adequate insurance for employees not otherwise protected.
 - Worker's Compensation Which Complies with the Texas Workers Compensation Act as well as all Federal acts applicable to the Contractor's operation at the site.

Employer's Liability

\$1,000,000.00 for each occurrence.

5.3.2. CONTRACTOR'S PUBLIC LIABILITY AND PROPERTY DAMAGE INSURANCE. The Contractor shall procure and shall maintain during the life of this contract CONTRACTOR's Public Liability Insurance for injuries, including accidental death, to any one person, and subject to the same limit for each person, on account of one accident, and CONTRACTOR's Property Damage Insurance in amount as follows:

Comprehensive General Liability

\$1,000,000.00 Combined Single Limit (\$ 4,000,000.00 if explosives are involved in the performance of the contract)

Including: Bodily Injury Liability, Personal Injury Liability, Property Damage Liability, Broad Form Property Damage Liability, Contractual Liability, Products/Completed Operations Liability, Liability for Property of Others in the Care, Custody and Control of the Contractor.

Comprehensive Automobile Liability \$1,000,000.00 Combined Single Limit

- 5.3.3. SUBCONTRACTOR'S PUBLIC LIABILITY AND PROPERTY DAMAGE INSURANCE. The CONTRACTOR shall require each of his subcontractors to procure and to maintain, during the life of this subcontract, Subcontractor's Public Liability and Property Damage Insurance of the type in subparagraph.
- 5.3.4. Hereof, in amounts approved by the OWNER.
- 5.3.5. SCOPE OF INSURANCE AND SPECIAL HAZARDS. The insurance required under subparagraph 5.3.2. and 5.3.3. hereof shall provide adequate protection for the Contractor

and his subcontractors respectively against damage claims which may arise from operations under this Contract, whether such operations be by the insured or by anyone against any special hazards which may be encountered in the performance of this contract.

ARTICLE 6. CONTRACTOR'S RESPONSIBILITIES

Add to subparagraph 6.5:

The CONTRACTOR shall notify the OWNER in writing of any conflict between the Manufacturer's directors and the Contract Documents and shall not perform any work on any item until such conflict has been resolved.

Upon reward of the Contract, the OWNER will, on written request of the CONTRACTOR, furnish the CONTRACTOR with a certificate of exemption from the Limited Sales, Excise and Use Tax in an amount not exceeding the above mentioned bid price for 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.

Add the following Subparagraph:

6.3.3. The CONTRACTOR shall acquaint himself with all matters and conditions concerning site and existing construction. Any practical criticism or exception regarding feature of the work presented in writing with the Proposal will be considered at that time. If no criticism or exception is given with the Proposal, it shall be assumed that the Contractor agrees that the project, as outlined in the Drawings and Specifications, can be completed satisfactorily. After a Contract Agreement to perform the work has been signed by the CONTRACTOR, it shall then be his responsibility to provide satisfactory work that will meet the full intent of the Contract Documents. The 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.

ARTICLE 13. WARRANTY AND GUARANTEE: TESTS AND INSPECTIONS: CORRECTIONS, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK.

Add the following Subparagraph:

13.1 Disputes over Improper Functioning. In case of dispute as to the cause of improper functioning of all or any part of the work, the burden of proof that he has complied with the Contract Documents rests with the CONTRACTOR for this work. He shall submit in writing his opinion of the cause of his recommendation for proving the adequacy of his work. The OWNER shall have those tests made, which he deems advisable, by an independent testing laboratory of this choice. If any tests so made indicate 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 published data and specifications, the entire cost of all such tests shall be paid for the by the CONTRACTOR, and he shall also pay for retesting of the corrected work until it functions satisfactorily.

ARTICLE 14. PAYMENTS AND COMPLETION.

Add the following to Paragraph 14.1 1:

A qualified person representing the CONTRACTOR shall be present at this final inspection to demonstrate the systems and prove the performance of the equipment. Prior to this inspection, all work shall have been completed, tested, balanced and adjusted and in final operating condition.

Make the following change to Paragraph 14.4 "Approval of Payments"

OWNER shall, within twenty (20) days of presentation to him of an approved application for Payment, pay Contractor the amount approved by Engineer.

ARTICLE 16. ARBITRATION. Delete this entire Article.

Add the following Article.

ARTICLE 18. THE CONTRACTOR SHALL COMPLY WITH THE COMPELAND ACT 48, STATUTE 948 AND ALL AMENDMENTS OR MODIFICATIONS OF THE ORIGINAL ACT OF JUNE 13,1934.

- 3. <u>TEMPORARY FACILITIES</u>
 - (a) Sanitary Facilities for Workmen
 - (1) CONTRACTOR, shall provide and maintain suitable weathertight, painted sanitary toilet facilities for all workmen for the entire construction period. Comply with all requirements of applicable health authorities. When toilet facilities are no longer required, promptly remove from the site, disinfect and clean the area as required.
 - (2) CONTRACTOR shall keep toilet facility swept and supplied with toilet tissue at all times.
 - (b) Weather Protection
 - (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 shall be covered or otherwise protected as required.
 - (c) Work Areas
 - (1) The CONTRACTOR shall be confined to all working easements provided. Storage of excavation material and all contractor equipment and material

shall remain within the limits of working easements.

4. <u>TEMPORARY UTILITIES</u>

The CONTRACTOR shall furnish all temporary utilities as required, for the completion of the work.

5. <u>CONSTRUCTION SEQUENCE</u>

- (1) That the following sequence of work be used as a basis for preparation to the Construction Schedule.
- (2) To cooperate with and facilitate the Contractor in the whole of the work to be carried out subject to the following being observed:
- (a) The CONTRACTOR shall, within five (5) calendar days after the date of the Award of Contract, submit a Construction Schedule for the approval of the Owner and Engineer. This Schedule shall outline an orderly sequence of construction as required to meet the completion time stipulated in the contract.
- (b) The 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 work will be maintained at a normal rate.
- (c) Satisfactory access or detour roads shall be provided where necessary due to construction.

6. <u>MEASUREMENT</u>

Before ordering any material or doing any work, the 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 the Engineer for consideration before proceeding with the work. No extra compensation will be allowed because of differences between actual dimensions and measurements indicated on the working drawings.

7. <u>PROTECTION</u>

- a. The CONTRACTOR shall send proper notices, make all necessary arrangements and perform all other services required for the care, protection and maintenance of all public utilities, including fire plugs, telephone and telegraph poles and wires, and all other items of this character on or about the site, assuming all responsibility and paying all costs for which the OWNER may be liable.
- b. Temporary Drainage. The CONTRACTOR shall construct and maintain all necessary temporary drainage and do all pumping necessary to keep the excavation free of water.
- c. Bracing, Shoring and Sheeting. The CONTRACTOR shall provide all shoring, bracing. and sheeting as required for safety and for the proper execution of the

work; and have same removed when the work is completed.

d. Fires shall not be built on the premises except by the express consent of the OWNER and City Fire Marshall.

8. <u>CONTRACTOR'S AND SUBCONTRACTOR'S INSURANCE</u>

- a. The CONTRACTOR shall not commence work under this Contract until he has obtained all the insurance required under this paragraph and such insurance has been approved by the OWNER, nor shall the CONTRACTOR allow any subcontractor to commence work on this Contract until the insurance required of the subcontractor has been so obtained and approved.
- b. Compensation Insurance. The CONTRACTOR shall procure and shall maintain, during the life of his Contract, Workmen's Compensation Insurance for all of his employees to be engaged in work on this project under this Contract and, in case of any such work sublet, the Contractor shall require the subcontractor similarly to provide Workmen's Compensation Insurance for all the latter's employees to be engaged in such work unless employees are covered by the protection afforded by the CONTRACTOR's Compensation.

Insurance. In case of any class of employees engaged in hazardous work on the project under this Contract is not protected under the Workmen's Compensation Statute, the CONTRACTOR shall provide and shall cause each subcontractor to provide adequate insurance for employees not otherwise protected.

c. CONTRACTOR's Public Liability and Property Damage Insurance. The CONTRACTOR shall procure and shall maintain during the life of this contract, Contractor's Public Liability Insurance for injuries, including accidental death, to any one person, and subject to the same limit for each person, on account of one accident, and CONTRACTOR's Property Damage Insurance in amounts as follows:

Comprehensive General Liability

\$1,000,000.00 Combined Single Limit (\$ 4,000,000.00 if explosives are involved in the performance of the contract)

Including: Bodily Injury Liability, Personal Injury Liability, Property Damage Liability, Broad Form Property Damage Liability, Contractual Liability, Products/Completed Operations Liability, Liability for Property of Others in the Care, Custody and Control of the Contractor.

Comprehensive Automobile Liability\$1,000,000.00 Combined Single Limit

NOTE: Automobile insurance shall cover all automobiles and trucks owned by the CONTRACTOR.

d. Subcontractor's Public Liability and Property Damage Insurance. The CONTRACTOR shall require each of his subcontractors to procure and maintain

during the life of his subcontract, Subcontractor's Public Liability and Property Damage Insurance of the type specified in subparagraph C hereof, in amounts approved by the OWNER.

e. Proof of Carriage of Insurance. The CONTRACTOR shall furnish the OWNER with certificates showing the type, amount class of operations covered, effective dates and dates of expiration of policies. Such certificates shall also contain substantially the following statements. "The insurance covered by this certificate will not be concealed or materially altered except after ten days written notice has been received by the OWNER.

9. ACCIDENT PREVENTION

Precaution shall be exercised at all times for the protection of persons (including employees) and property, and hazardous conditions shall be guarded against or eliminated.

10. TIME FOR COMPLETION AND LIQUIDATED DAMAGES

- a. 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 completion of the work to be done thereunder are ESSENTIAL CONDITIONS of this Contract; and it is further mutually understood and agreed, by and between the parties hereto, that the work embraced in this Contract shall be commenced on a date to be specified in the work order.
- b. The CONTRACTOR agrees that said work shall be prosecuted regularly, diligently, and uninterrupted at such rate of progress as will insure full completion thereof within the time specified. It is expressly understood and agreed, by and between the parties hereto, that the time for the completion of the work described herein is a reasonable time for completion of same, taking into consideration the average climatic range and usual industrial conditions prevailing in the locality.
- c. If the said CONTRACTOR shall neglect, fail or refuse to complete the work within the time herein specified, then the said Contractor does hereby agree, as a part consideration for awarding of this Contract, not as a penalty but as liquidated damages for such breach of calendar day that the CONTRACTOR shall be in default after the time stipulated in the Contract for completing the work.
- d. The Damage to OWNER by reason of this contract not being completed as of that date are parties hereto have therefore fixed and limited such damages to the amount stated in the agreement per day for each day the job runs beyond such date and the fixing of such damages constitutes a part of the consideration for the Contract.
- e. It is further agreed that time is of the essence of each and every portion of this contract and of the specifications wherein a definite and certain length of time is fixed for the performance of any act whatsoever; and where, under the Contract, additional time is allowed for the completion of any work, the new time fixed by

such extension shall not be charged with liquidated damages or any excess cost when the delay in the completion of work is due:

- (1) To any preference, priority or allocation order duly issued by the Government.
- (2) To enforceable cause, beyond the control and without the fault or negligence of the CONTRACTOR, including, but not restricted to, acts of God, or the public enemy, acts of the OWNER, acts of another Contractor in the performance of the Contract with OWNER, fires, floods, epidemics, Quarantine restriction, strikes, freights embargoes, and unusually severe weather.
- (3) To any delays of subcontractors and/or material suppliers occasioned by any of the causes specified in (1) and (2).
- (4) Provided, further, that the Contractor shall, within seven (7) days from the beginning of such delay, notify the OWNER, in writing, of the causes of the delay, who shall ascertain the facts and extent of the delay and notify the CONTRACTOR within a reasonable time of its decision in the matter.

11. INSPECTION AND TESTING OF MATERIALS

- a. All materials and equipment/furnished by manufacturers shall be tested, inspected, and certified in accordance with the Contract Documents, laws, ordinances, or any public authority requiring any work to be specifically tested. The cost of such tests, inspections and certifications shall be borne by the CONTRACTOR.
- b. The CONTRACTOR shall cooperate with the testing laboratory to the end that the function and services of the laboratory may be properly performed. The Contractor shall give the OWNER's representative and testing laboratory a minimum of twenty-four (24) hour notice of readiness for all testing as required. Costs of all field tests by such a laboratory shall be borne by the OWNER, unless otherwise stipulated in the Supplementary General Conditions, Article 13.

12. <u>REFERENCE POINTS</u>

The ENGINEER will establish horizontal and vertical controls only (reference points and benchmarks) as shown on the construction plans.

The CONTRACTOR must notify the ENGINEER at least 48 hours prior to starting work on any section or part of the work where controls have not been established or are not identifiable or visible to the CONTRACTOR.

The ENGINEER will upon such advance notice assist the CONTRACTOR in locating and identifying the various CONTRACTOR in location and identifying the various control points and will replace any control points that have been destroyed by others prior to beginning of CONTRACTOR's operations.

After the control points are established and/or identified as outlined above, maintenance of such control points will be the responsibility of the CONTRACTOR. Any re-staking

required for any reason thereafter shall be the final responsibility of the CONTRACTOR.

The CONTRACTOR will provide all other construction staking (cut stakes, blue topping, intermediate string line control, etc.) required to verify grades, depths, thickness and alignment of the various items of construction.

13. SERVICES AT START UP

The CONTRACTOR shall provide the services of technical representative, for the CONTRACTOR furnished equipment, for a sufficient period to assist in start up and initial adjustment of all equipment and to train, advice and consult with the OWNER's operating personnel.

14. <u>PERMITS</u>

Permits, fees and licenses necessary for the pursuit of the work shall be obtained and paid for by the CONTRACTOR.

15. MAINTENANCE OF SITE AND CLEANUP

The work site shall be kept reasonably clean at all times. Surplus materials shall be disposed of by the CONTRACTOR except for the designated to be salvaged. In final cleanup operations, all equipment, scrap materials and temporary structures shall be removed and the site left clean.

16. PROTECTION AND REPLACEMENT OF PROPERTY

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 condition by the CONTRACTOR. Temporary drainage is to be provided as necessary.

17. CONSTRUCTION AREA

CONTRACTOR shall be responsible to maintain and protect in good condition while under construction and exposed areas that become damage shall be CONTRACTOR's responsibility to repair at no cost to owner. This includes construction area being exposed to rainfall, vehicular traffic, etc.

CONTRACTOR shall be responsible for providing temporary access in a safe and approved manner at all times to private properties being affected by this work. After work is complete, any damages, alterations or modifications to existing structures as part of the temporary access construction activities shall be restored to original conditions or repaired as necessary at the sole expense of the CONTRACTOR.

18. PROTECTION OF TREES, AND SHRUBS

Care shall be exercised to prevent damage to trees, plants and shrubs along the work site. No tree, plant or shrub shall be removed unless it interferes unduly with the construction work. Permission for such removal must first be obtained from the

ENGINEER. Provisions of the Technical Specifications shall govern in matters of this nature.

19. BARRICADES AND WARNINGS

Adequate barricades and warning devices shall be provided at the work site. Lights shall be provided between sunset and sunrise when necessary in the opinion of the ENGINEER in accordance with the Traffic Controllers Manual.

20. LOCATION OF & DAMAGE TO EXISTING UTILITIES AND STRUCTURES

The CONTRACTOR is Responsible for locating underground obstacles. It is not represented that the Plans show all sewers, water lines, gas lines, telephone lines, and other underground obstacles. The CONTRACTOR shall exercise caution to prevent damage to existing facilities during the progress of the construction work, taking care to locate same, where possible, in advance of the actual work. The ENGINEER will render all assistance possible to the CONTRACTOR in the matter of determining the location of existing utilities by making available such maps, records and other information as may be accessible to him, when requested to do so, but the accuracy of such information will not be guaranteed. The CONTRACTOR shall make good on 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 the ENGINEER requires strengthening, altering or moving, the CONTRACTOR shall perform such work on same, as the ENGINEER may order, which work will be paid for as extra work in accordance with the terms of the Contract relating to extra work. Should the 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 the ENGINEER, he shall bring such conditions to the attention of the ENGINEER for his determination of the method to be used to remove or bypass such obstructions.

It is essential that in the event of any damage being caused to existing units then immediate attention be given to their repair, if necessary at the expense of labor and material scheduled to be employed at the new work. Any repair work carried out shall be at the cost of the CONTRACTOR and shall be to the complete satisfaction of the OWNER, who will acknowledge the same in writing.

It is therefore the duty of the CONTRACTOR prior to the commencement of construction to inspect and accurately record in writing to the OWNER and ENGINEER, the conditions of any unit which he reasonably suspect or knows to be damaged, faulty, or defective.

In addition, any such unit(s) so recorded, which in the opinion of the Contractor may deteriorate further as a result of the proposed mode of operations should be protected and/or remedial measures employed as agreed to, and at the cost of the Owner.

21. MATERIALS AND WORKMANSHIP

No material which has been used by the CONTRACTOR for any temporary purpose whatsoever is to be incorporated in the permanent structure without written consent of the ENGINEER. Where materials or equipment are specified by a trade for brand name, it is not the intention of the Owner to discriminate against an equal product of another manufacturer, but rather to set a definite standard of quality or performance and to establish an equal basis for the evaluation of bids. Where the words "equivalent", "proper" or "equal to" are used, they shall be understood to mean that the thing referred to shall be properly the equivalent of or equal to some other thing, in the opinion of judgment of the ENGINEER. Unless otherwise specified, all materials shall be of the best of their respective kinds and shall be in all cases fully equal to the approved samples.

Notwithstanding that the words "or equal to" or other such expressions may be used in the Specifications in connection with a material, manufactured article or process, the material, article or process specifically designated shall be used, unless a substitute shall be approved in writing by the ENGINEER, and the ENGINEER shall have the right to require the use of such specifically designated material, article or process.

22. <u>CUTTING, PATCHING AND FITTING</u>

The CONTRACTOR shall perform all cutting, patching, or fitting of this work that met be required to make its several parts come together properly and fit it to receive or be received by work or others shown on, or reasonably implied to the drawings and Specifications for the completed structure or facility. The CONTRACTOR shall not endanger any work by cutting, digging or otherwise, and shall not cut or alter the work of others unless specifically noted on the drawings and specifications or authorized in writing by the ENGINEER and the OWNERS of such other work.

23. <u>RIGHT OF ENTRY</u>

The OWNER reserves the right to enter the property or location on which the work herein contracted for is to be constructed or installed, by such agents as it may elect, for the purpose of supervising and inspecting the work, or for the purpose of constructing or installing collateral work as said OWNER may desire.

24. SUPERINTENDENT AND INSPECTION BY OWNER

It is agreed by the CONTRACTOR that the OWNER shall be and is hereby authorized to appoint from time to time subordinate engineers, supervisors, or inspectors, as the said OWNER may deem proper, to inspect the material furnished and work done under this agreement, and to see that the said material is furnished and said work is done in accordance with the Specifications. The CONTRACTOR shall regard and obey the directions and instructions of any sub-coordinate engineers, supervisors, or inspectors as appointed, when such directions are consistent with the obligations of this agreement and these accompanying Specifications, provided, however, that should the CONTRACTOR object to any order by any subordinate engineer, supervisor, or inspector, the CONTRACTOR may, within six (6) days, make written notice to the ENGINEER for his decision. Except, as herein before provided, the authority of subordinate engineers, supervisors, or inspectors shall be limited to the rejection of unsatisfactory work and materials and to the suspension of the work, until the question of acceptability can be referred to the ENGINEER.

25. <u>SUPERINTEDENT BY CONTRACTOR</u>

Except where the CONTRACTOR is an individual and gives his personal superintendent to the work, the CONTRACTOR shall provide a competent superintendent, satisfactory to the OWNER and the ENGINEER, on the work at all times during working hours with full authority to act from him. The CONTRACTOR shall provide an adequate staff for the proper coordination and expediting of his work.

The CONTRACTOR shall provide an on-site representative, satisfactory to the OWNER and the ENGINEER, available at all times (i.e., twenty-four (24) hours per day, seven (7) days per week). The on-site representative shall be stationed close enough to be on the site within 30 minutes of notification. The on-site representative shall have full access to all equipment and material and have full authority necessary to correct any problems, deficiencies, or emergencies which may arise during non-working hours and during the absence of the superintendent.

The name, address, and phone number of both the superintendent and the on-site representative shall be given in writing to the ENGINEER and the Local Public Agency prior to the beginning of construction.

Additional provisions concerning superintendent by the CONTRACTOR are given in General Condition 102 of these Contract Documents.

26. <u>"AS BUILT" DRAWINGS – Not Required</u>

A complete set of contract drawings shall be stapled together and the official "As Built" set on which the CONTRACTOR shall record currently the work carried out through all phases of construction.

The set shall be kept in the office in a neat and clean condition and be available for inspection by the OWNER or ENGINEER at any time during the Contract period. At the completion of the Contract it shall be handed to the ENGINEER accompanied by a letter stating that each drawing has been signed by the CONTRACTOR to the effect that the drawings are a true and accurate record of the work carried out.

27. <u>ACCEPTANCE AND FINAL PAYMENT</u>

Upon written notice that the work is ready for inspections and acceptance, the OWNER shall promptly make such inspection, and when he finds the work acceptable under the Contract fully performed, he shall promptly issue a final certificate over his own signature, stating that the work provided for in this Contract has been completed and is accepted by him under the terms and conditions thereof, and the entire balance found to be due the CONTRACTOR, including the retained percentages, shall be paid to the CONTRACTOR at the office of the OWNER within fifteen (15) days after the date of said final certificate. The CONTRACTOR shall submit satisfactory evidence to the OWNER that all payrolls, material bills, and other indebtedness connected with the work have been paid before the final certificate is issued.

The making and acceptance of the final payment shall constitute a waiver of all claims by the OWNER, other than those arising from unsettled liens, from faulty work appearing after final payment or from requirements of the Specifications, and of all claims by the CONTRACTOR, except those previously made and still unsettled.

28. <u>GUARANTEE</u>

The work shall be guaranteed to be free from defects due to faulty workmanship or materials for a period of one year from the date of issue of the Certificate of Acceptance. Work found to be improper or imperfect shall be replaced or drone without cost to the OWNER within the year guarantee period. Neither the Certificate nor Acceptance, final payment, of any provision of the Contract Documents shall free the CONTRACTOR from his guarantee. Failure to repair or replace faulty work entitles the OWNER to repair or replace the same and recover the costs from the CONTRACTOR and/or his Surety. The CONTRACTOR shall be the sole guarantor of the work installed under this contract and no third party guarantees by subcontractors or suppliers of various components or materials will be acceptable, nor shall agreements with subcontractors or material or component suppliers by the CONTRACTOR reduce the CONTRACTOR's responsibility under this agreement. The Performance Bond shall remain in full force and effect through the guarantee period.

29. PREFERENCE IN EMPLOYMENT

Preference employment shall be given to resident citizens of the area where such persons are available and fully qualified to perform the work to which the employment relates.

30. ANTI-KICKBACK REGULATIONS

The CONTRACTOR shall comply with the Copeland Act 48, Statute 948 and all amendments or modifications of the original act of June 13, 1934.

31. <u>CONTRACTOR'S RESPONSIBILITY</u>

Nothing in these documents shall be constructed as relieving the CONTRACTOR of sole responsibility for coordinating all work, work schedules, and securing proper interface between the various trades, and Subcontractors.

32. BRAND NAMES

The items listed by brand name are to indicate level of quality only and are not a propriety name. They should have added to the listing of a brand name the phrase- "Or Equal".

33. OPERATIONS & MAINTENANCE LITERATURE

All items of equipment required for this contract shall be bid to provide and include as part of the price, literature explaining "Operation & Maintenance" of that item of equipment. If a manufacturer does not print such a standard O & M Manual approved, in writing, by the Manufacturer.

34. MODIFICATIONS OR BID OR WITHDRAWAL PRIOR TO OPENING

At any time prior to bid opening, the CONTRACTOR may, after handing in or submitting

his bid, obtain his bid for purposes of modification or withdrawal. Bid opening is defined at the time and date at which bids are received and publicly opened. No bid will be received after that time and date.

35. RETAINAGE AND PROGRESS PAYMENTS

OWNER will make monthly progress payments to CONTRACTOR in response to properly submitted and approved pay requests utilizing the format included in this project manual. Amount due each pay request shall be equal to the Gross amount of work completed to date, less five percent (5%) retainage, less previous payments made on the project.

Technical Specifications

Brownsville Navigation District

Oil Dock 6 Bulkhead Repair

Brownsville, Texas May 21, 2021



HDR Engineering Inc.

555 N. Carancahua, Suite 1600, Corpus Christi, TX 78401-0849 TBPELS Firm Registration No. F-754 (361) 696-3300

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DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 06 00

SPECIAL CONDITIONS 09/15

PART 1 GENERAL

1.1 TESTING

All testing required by specification shall be paid for by the CONTRACTOR. The OWNER reserves the right to perform testing. Such testing by OWNER does not relieve testing requirements by the CONTRACTOR.

- 1.2 JOB SITE SAFETY
 - A. The CONTRACTOR and Subcontractors are obligated to operate the job in accordance with the General Conditions of the contract and OSHA regulations. The CONTRACTOR shall comply with all pertinent provisions of the Contract Work Hours and Safety Standards Act as amended, commonly known as the Construction Safety Act.
 - The CONTRACTOR is advised that they shall provide for: в.
 - 1. Means for assuring that all workmen have, or are provided with, knowledge of how to do their job safely;
 - 2. Means of keeping the job in a state of good housekeeping;
 - 3. Free and easy access to and around the job;
 - 4. Sufficient fire protection facilities, including water supply;
 - Methods of controlling temporary heaters;
 Safe operations around power lines;

 - 7. Ample protection and safety equipment; and
 - 8. Reporting of accidents to the OWNER
 - C. The OWNER will report all serious accidents to the EDA Regional Office.
 - D. Compliance with Federal, State, and local regulations is required under the terms of the contract. The handling and storage of explosives, operation of steam boilers, operation of cranes in the vicinity of power lines, operations of mines and quarries, and other related activities normally require State permits and inspection which must be obtained by the CONTRACTOR
 - E. The CONTRACTOR is solely responsible for Jobsite Safety. The OWNER is not responsible for Jobsite Safety, or the Safety of other offsite locations.
- 1.3 CONTRACTOR'S SUPERINTENDENT'S FIELD OFFICE
 - A. Establish at site of Project.
 - B. Equipment: Wifi, telecopy, mailing address, and sanitary facilities.
 - C. Assure attendance at this office during the normal working day.
 - D. At this office, maintain complete field file of Shop Drawings, posted Contract Drawings and Specifications, and other files of field operations including provisions for maintaining "Red-line Drawings."
 - E. Remove field office from site upon acceptance of the entire work by the

OWNER.

1.3.1 Owner's Representative and Field Office

The CONTRACTOR shall furnish a trailer for the OWNER's representative. The trailer shall be a minimum of 8 ft by 20 ft and shall include two desks and chairs, two file cabinets, and a conference table with two chairs. It shall have electricity and air conditioning. The CONTRACTOR is to provide a \$3000 allowance for computer and IT support. Restroom facilities are to be provided. The CONTRACTOR shall be responsible for cleaning service once a week, and maintenance of the trailer and its services for the duration of the project. The door lock is to be on the outside and all keys provided to the OWNER. Office shall be within the fenced project limits. The trailer needs to meet all applicable codes. The trailer needs to come with hurricane tie-downs and the CONTRACTOR is responsible to tie the trailer down.

1.4 PROTECTION OF EXISTING EQUIPMENT, STRUCTURES, AND UTILITIES

- A. The CONTRACTOR shall use care during construction. Should damage occur to any equipment, structures, or utilities, the CONTRACTOR shall contact the OWNER immediately. All repairs shall be at the CONTRACTOR's expense. Utility locations have not been field verified. It shall be the CONTRACTOR's responsibility to verify existing equipment, structures, and the condition of existing utilities and locations thereof prior to bidding.
- B. The drawings show the locations of all known surface structures pertinent to the work. In the case of underground or underwater obstructions such as existing water, sewer, storm sewer, gas, electrical lines, piling, debris, or partial structures that are not shown on the drawings, their location is not guaranteed. The OWNER assumes no responsibility for failure to show any or all these structures on the drawings or to show them in their exact location. Failure to show will not be considered sufficient basis for claims for additional compensation for extra work in any manner whatsoever, unless the obstruction encountered in such as to necessitate substantial changes in the lines or grades, or requires the building of special work for which no provision is made in the drawings and which is not essentially subsidiary to some item of work for which provision is made. It is assumed that as elsewhere provided the CONTRACTOR has thoroughly inspected the site, is informed as to the correct location of surface structures, and has included the cost of such incidental work in the price bid, and has considered and allowed for all foreseeable incidental work due to variable subsurface conditions, whether such conditions and such work are fully and properly described on the drawings or not.Minor changes and variations of the work specified and shown on the drawings shall be expected by the CONTRACTOR and allowed for as incidental to the satisfactory completion of a whole and functioning work or improvement.
- C. The CONTRACTOR shall maintain sufficient clearance between his equipment and existing structures or adjacent property, or portions thereof, and utilize precautionary devices or other means as necessary. Should the CONTRACTOR allow the equipment to become in contact with any portion of these existing features or structures, repairs to the damaged areas shall be made by the CONTRACTOR to the satisfaction of the OWNER ,at no additional cost to the OWNER.

1.5 MISPLACED MATERIAL

A. Should the CONTRACTOR, during the progress of the construction, lose, dump, throw overboard, sink, or misplace any material, plant, machinery or appliance, which in the opinion of the OWNER may be dangerous to or obstruct navigation, the CONTRACTOR shall recover and remove the same with the utmost dispatch. The CONTRACTOR shall give immediate notice, with description and location of such obstructions, until the same are removed. Should he refuse, neglect or delay compliance with the above requirements, such obstructions may be removed by the OWNER, and the cost of such removal may be deducted from any money due or to become due the CONTRACTOR, or may be recovered under his bond. The liability of the CONTRACTOR for the removal of a vessel wrecked or sunk without fault or negligence shall be limited to that provided in Sections 15, 19, and 20 of the river and Harbor Act of 1899 (33 U.S.C. 410 et seq).

1.6 SIGNAL LIGHTS

A. The CONTRACTOR shall display signal lights and conduct his operations in accordance with the General Regulations of the Department of the Army and of the Coast Guard governing lights and day signals to be displayed by towing vessels with tows on which no signals can be displayed, vessels working on wrecks, dredges, and vessels engaged in laying cables or pipe or in submarine or bank protection operations, lights to be displayed on dredge pipe lines, and day signals to be displayed by vessels of more than 65 feet in length moored or anchored in a fairway or channel, and the passing by other vessels of floating plant working in navigable channels, as set forth in Commandant U.S. Coast Guard Instruction M16672.2, Navigation Rules: International -Inland (COMDTINST M16672.2) or 33CFR81 Appendix A (International) and 33 CFR 84 through 89 (Inland) as applicable.

1.7 CHANNEL TRAFFIC

- A. Traffic in the Brownsville Ship Channel and Turning Basin consists of seagoing vessels, ships, tankers, cargo vessels, small boats of various sizes, tugs and tows consisting of a tug and one or more barges. These vessels produce large wakes and/or surges. The CONTRACTOR is informed that channel traffic may interfere with construction to some extent, and allowances for this shall be included in the CONTRACTOR's Bid.
- B. The CONTRACTOR will be required to conduct the work in such manner as to obstruct navigation as little as possible. If the CONTRACTOR's plant does obstruct the Channel and makes traffic movement difficult or endangers the passage of vessels, said plant shall be promptly moved on the approach of any vessel to the extent necessary to afford a practicable passage. The CONTRACTOR is encouraged to contact the Harbormaster prior to bidding, and inform himself as to the conditions to be expected. Upon the completion of the work, the CONTRACTOR shall promptly remove his plant, including ranges, buoys, piles, other markers, temporary structures, embankments, berms, swales, levees or other temporary features to assist in construction placed by him under the contract.

1.8 PHYSICAL DATA

A. Information furnished below is for the CONTRACTOR's review. However, it is expressly understood that the OWNER will not be responsible for any
interpretation or conclusion drawn therefrom by the CONTRACTOR. The OWNER also shall not be responsible for any lack of information herein pertaining to physical conditions of the site. The CONTRACTOR shall make every effort possible to familiarize himself with and research the conditions to be expected at the site.

- Tidal Conditions: Under ordinary conditions, the mean monthly tidal range is about one and one-half feet. The height of tide is largely dependent on the force, direction and duration of the wind. Strong northerly winds may depress the water surface as much as, and in some instances more than, three feet below mean low tide; while south-easterly winds may raise the water surface as much as, and in some instances more than, three feet above mean low tide (exclusive of tropical storm activity).
- 2. Project Location: The Brownsville Ship Channel is located on the south coast of Texas, about 3.5 miles north of the Rio Grande, which forms the boundary between the United States and Mexico, and about 125 miles south of Port Aransas, Texas. The work site is located on the north bank of the Brownsville Ship Channel between Oil Dock No. 3 and Oil Dock No. 5.
- 3. The CONTRACTOR is notified that construction will occur adjacent to active, existing marine and waterfront facilities.
- 4. The site is adjacent to the Brownsville Ship Channel, and subsurface groundwater conditions and elevations will change. The CONTRACTOR shall include all costs for any expected dewatering in his bid. Changes in groundwater elevations shall not be just cause for increased compensation.
- 1.9 USE OF THE SITE
 - A. The work will be carried out in an active Port. The CONTRACTOR shall coordinate their operations with the Harbormaster, and notify the Harbormaster and the local Coast Guard office five (5) days prior to beginning work at the site. The Port shall remain functional and open to traffic at all times. Work shall not interfere with the operations of adjacent existing dock facilities, specifically Oil Dock No.3 and Cargo Dock No. 5. Coordinate sequence of construction activities with scheduled dock operation activities.
 - B. Existing Oil Dock No. 6 is an active public oil dock that is used frequently by barges. Generally, The CONTRACTOR will be required to move barges, floats, boats and/or materials and equipment as directed or as necessary for navigation and mooring of any vessels using this facility. However, the OWNER will close all barge and other vessel traffic to Oil Dock No. 6 for a period of six-weeks to allow for the facility enhancements to be constructed. This six- week period can begin at the CONTRACTOR's convenience with a minimum of thirty days written notice to the OWNER identifying the requested start date.
 - C. The CONTRACTOR shall keep the adjoining streets free of tracked and/or spilled materials going to or from the construction area. Hand labor and/or mechanical equipment shall be used where necessary to keep these roadways clear of job-related materials.

1.10 PROTECTION OF JOB SITE

A. The CONTRACTOR shall be responsible for protection of the job site. The CONTRACTOR shall be solely responsible for the safety of himself, his employees and other persons, as well as for the protection of the safety of the property of himself or any other person, as a result of his operations hereunder. Drawings and specifications as well as any additional information concerning the work to be performed passing from or through the OWNER shall not be interpreted as requiring or allowing CONTRACTOR to deviate from the plans and shall not be interpreted as requiring or allowing CONTRACTOR to deviate from the plans and specifications, the intent of such drawings, specifications an any other such instructions being to define with particularity the agreement of the parties as to the work the CONTRACTOR is to perform. CONTRACTOR shall be fully and completely liable, at his own expense, for design, construction, installation and use, or non-use, of all items and methods incident to performance of the contract, and for all loss, damage or injury incident thereto, either to person or property, including, without limitation, the adequacy of all temporary supports, shoring, bracing, formwork, scaffolding, machinery or equipment, safety precautions or devices, and similar items or devices used by him during construction.

1.11 HORIZONTAL AND VERTICAL CONTROL

- A. OWNER's Responsibilities: At such times as he may elect, the OWNER may make surveys to check conformance of the work with required lines, grades or quantities. OWNER provided project benchmarks and control points are as indicated on the drawings.
- B. CONTRACTOR'S Responsibilities: The CONTRACTOR shall provide any and all construction staking, baselines or reference points that may be required by his operations to insure conformance with the lines and grades shown on the drawings. It shall also be responsibility of the CONTRACTOR to maintain and preserve all stakes and other marks established by the OWNER until authorized to remove them. If such marks are destroyed by the CONTRACTOR through his negligence prior to their authorized removal, they may be replaced at the discretion of the OWNER. The expense of replacement will be deducted from any amounts due, or to become due to the CONTRACTOR.

The CONTRACTOR's responsibility for verifying conditions is defined in General Conditions. The CONTRACTOR shall establish from information on the drawings all lines, grades, and levels and will be responsible for maintenance and accuracy thereof. The CONTRACTOR shall employ an experienced, registered surveyor or ENGINEER to establish alignment and control, elevations for excavations, and layout facilities from the information provided on the drawings.

1.12 SANITARY FACILITIES

A. The CONTRACTOR shall furnish, install and maintain sanitary facilities for the workers. As the needs arise, a sufficient number of enclosed temporary toilets shall be conveniently placed as required. Drinking water shall be provided from an approved source, so piped or transported as to keep it safe and fresh and served from single service containers or satisfactory types of sanitary drinking stands or fountains. All such facilities and services shall be furnished in strict accordance with existing and governing health regulations.

1.13 ASSIGNMENT OR NOVATION

- A. The CONTRACTOR shall not assign or transfer, whether by an assignment or novation, any of its rights, duties, benefits, obligations, liabilities, or responsibilities under this Contract without the written consent of the OWNER; provided, however, that assignments to banks or other financial institutions maybe made without the consent of the OWNER. No assignment or novation of this Contract shall be valid unless the assignment or novation expressly provides that the assignment of any of the CONTRACTOR's rights or benefits under the Contract is subject to a prior lien for labor performed, services rendered, and materials, tools, and equipment supplied for the performance of the work under this Contract in favor of all persons, firms, or corporations rendering such labor or services or supplying such materials, tools, or equipment.
- 1.14 LOSS FROM NATURAL CAUSES
 - A. All loss or damage arising out of the nature of the work to be done, or from the action of the elements, or from any unforeseen circumstances, or from unusual circumstances, or from unusual difficulties encountered in the prosecution of the work shall be sustained by the CONTRACTOR at his own expense.
- 1.15 NON-LIABILITY OF THE BOARD OF COMMISSIONERS
 - A. It is understood and agreed that the members of the Board of Commissioners of the Brownsville Navigation District of Cameron County, Texas are contracting here only in their capacities as Commissioners, and neither they nor the Navigation District shall be liable hereunder for any amount of money, except insofar as same may be paid from accumulated revenues of the Port of Brownsville or the proceeds of revenue bonds issued by said District.
- 1.16 SCHEDULING OF WORK
 - A. In general, the CONTRACTOR shall be responsible for scheduling his own work. However, there are scheduling milestones and/or stipulations that the CONTRACTOR shall abide with which are:
 - 1. OWNER's on-site representative will be on-site for only 40 hours per week. CONTRACTOR can work on items that cannot be concealed without opportunity for review.
 - 2. Other work may be scheduled at the CONTRACTOR's option.
 - 3. Placement of graded riprap to be completed prior to repair work on bulkhead.
 - 4. OWNER's on-site representative will be given a minimum of 24- hour notice for all testing. The OWNER's on-site representative will be present for all testing that will be used as acceptance of work performed. No testing will be scheduled outside of normal working hours.

1.17 BID PROTEST PROCEDURE

A. In the event that a bidder wishes to protest the award of a contract by the Brownsville Navigation District, the following procedure shall be followed. The bidder wishing to protest the award must submit a written Notice of Intent to Protest. In this protest, the bidder must state the reason for the protest and state all reasons why the award should not be approved. This written notice must be addressed to Mr. Sergio Lopez, Brownsville Navigation District, 100 Foust Road, Brownsville, Texas 78521, and received at least seven (7) days prior to the date of the meeting of the Board of Commissioners at which award of the contract is scheduled to take place. Bidders failing to submit a protest as specified above may not be afforded an opportunity to speak before the Board of Commissioners relative to award of the contract.

1.18 WORKER SAFETY REQUIREMENTS FOR EXCAVATION AND TRENCHING OPERATIONS

- A. Worker Safety in excavations and trenches shall be provided by the CONTRACTOR in accordance with Occupational Safety and Health Administration (OSHA) Standards, 29 CFR Part 1926, Subpart P -Excavations, Trenching, and Shoring.
- B. It is the sole responsibility of the CONTRACTOR, and not the OWNER to determine and monitor the specific applicability of a safety system to the field conditions to be encountered on the job site during the project.
- C. The CONTRACTOR shall indemnify and hold harmless the OWNER from all damages and cost that may result from failure of methods or equipment used by the CONTRACTOR to provide for worker safety.
- D. Trenches as used herein shall apply to any excavation into or around which structures, utilities, or sewers are placed in excess of five feet in depth.

1.19 SPECIFIC REQUIREMENTS

- A. All subcontracts must contain a nondiscrimination clause.
- B. Each subcontract must contain a requirement for compliance with the Davis-Bacon and related Acts.
- C. Each subcontractor must submit each week payroll records and a weekly statement of compliance. These documents should be submitted to the prime CONTRACTOR. The subcontractor can satisfy these requirements by submitting a properly completed Department of Labor Form WH-347.
- D. Each subcontract with every subcontractor must contain a clause committing the subcontractor to employment of local labor to the maximum extent possible.
- E. Each subcontractor must be required to maintain weekly payroll records. These records are to be retained for a period of three years from the date of completion of the project audit. Each subcontractor must also be required to furnish a copy of each payroll to the OWNER. The OWNER may check payrolls to assure the following:
 - Wage rate and fringe benefits paid agree with the Department of Labor or applicable State wage decision (see Exhibit A attached; and
 - 2. Name, address, and Social Security Number is shown for all employees.

1.20 TARIFFS AND FEES

- A. The following tariffs/fees associated with the construction will be waived:
 - 1. BND water usage fees;
 - 2. BND daily entrance permit (truck deliveries of product;
 - 3. BND Wharfage fees (charge for bringing project materials across docks); and
 - 4. The Port will waive dockage fees for its facilities. However, the loading & unloading at any of the Port docks must be done by Stevedores, who will charge their rates. CONTRACTORs cannot load or unload with their own personnel.
- B. The following tariffs/fees associated with the construction will be the responsibility of the CONTRACTOR:
 - 1. Electrical service fees. CONTRACTOR will require a temporary meter and is responsible for electrical usage.
 - 2. Vessel Dockage fees (shipping fees charged by suppliers) will be at the discretion of the suppliers/delivery company.

1.21 SPECIAL CONSIDERATIONS

- A. CONTRACTOR shall be responsible for negotiations of any waivers or alternate arrangements required to enable transportation of materials to the site.
- B. Maintain conditions of access road to site such that access is not hinders as the result of construction related deterioration.
- C. Repair to original or better condition any existing improvements or property damaged during construction, at no expense to the OWNER.
- D. The Oil Dock No. 6 Bulkhead Repair project is covered under the U.S. Army Corps of Engineers Permit SWG-2009-00689 dated, April 28, 2016 and is attached as Exhibit B.1 at the end of this section. CONTRACTOR shall comply with all conditions for the permit during construction.
- 1.22 HISTORICAL AND ARCHAEOLOGICAL
 - A. If, during the course of construction, evidence of deposits of historical or archeological interest is found, the CONTRACTOR shall cease operations affecting the find and shall notify OWNER. No further disturbance of the deposits shall ensue until the CONTRACTOR has been notified by OWNER that CONTRACTOR may proceed. OWNER will issue a notice to proceed after appropriate authorities have surveyed the find and made a determination to OWNER. Compensation to the CONTRACTOR, if any, for lost time or changes in construction resulting from the find, shall be determined in accordance with changed or extra work provisions of the Contract Documents. The site has been previously investigated and has no known history of historical or archaeological finds.

1.23 MISCELLANEOUS

- A. A government issued identification card with photograph is required to access inside the Port.
- B. All Oil Dock No. 6 work must be performed within a secured fenced area.

Installation, extensions, and removal of fence are to be coordinated with the Harbormaster.

- C. A Transportation Worker Identification Card (TWIC) and escort endorsement is needed if workers are within the Oil Dock No. 6 secured area. Any entry into the secured area is to be coordinated in advance with the Harbormaster. The Harbormaster will identify security and identification requirements on a case-by-case basis.
- D. Road closures for installation of utilities are to be coordinated in advance with the Harbormaster. The Harbormaster will identify security and identification requirements on a case-by-case basis.
- E. Demolished concrete rubble is to be relocated to the east end of RL Ostos Road in a manner approved by the Port. Alternate locations may be available.
- F. Stand-by time for placement of bedding and GRR will be limited to those occurrences where the Port directs the operations to cease.
- G. CAD files will not be provided to Bidders.
- H. Epoxy coated rebar is not required.
- I. No water meter fees shall be charged. The Port will provide the meters. The CONTRACTOR is responsible for payment of water consumption.
- J. The dredge depth shown on the Oil Dock No. 6 plans is correct. The plans are designed for a future deepening of the ship channel.
- K. Oil Dock No. 6 Bulkhead Cast-in-Place Concrete Finishing:All vertical surfaces of exposed concrete shall receive a Grout- Cleaned Rubbed finish upon form removal. Begin cleaning operations after contiguous surfaces to be cleaned are completed and accessible. Do not clean surfaces as work progresses. Wet the surface and apply grout consisting of one part Portland cement and one and one-half parts fine sand with enough water to produce the consistency of thick paint. Match color of surrounding concrete. Scrub grout into voids, and remove excess grout. When grout whitens, rub the surface and keep the surface damp for 36 hours afterward.
- L. Street Cleaning: The CONTRACTOR shall keep the adjoining streets free of tracked and/or spilled materials going to or from the construction area. Hand labor and/or mechanical equipment must be used where necessary to keep these roadways clear of job-related materials. Such work must be completed without any increase in the Contract price.

Streets and curb line must be cleaned at the end of the workday or more frequently, if necessary. No visible material that could be washed into storm sewer is allowed to remain on the Project site or adjoining streets.

CONTRACTOR shall clean work area of all engine oil, transmission and hydraulic fluids or other unsightly material prior to completing work.

Any determination as to when streets and curbs require clearing and cleaning due to any tracking or spilled materials falls entirely to the OWNER only. The OWNER will also be the sole judge in determining when the tracked or spilled materials have been satisfactorily cleaned or cleared from.

M. The laydown and stockpile area for materials, project trailers, and any other project related items will be contained within the project limits. Limits are as identified in the drawings.

To protect the site, install construction fencing. Maintain the fencing for the duration of the project. All construction materials for fencing shall be hot dip galvanized. Utilize typical fence post mounting details. All access points (vehicle and personnel) shall be approved by the OWNER.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

EXHIBIT A – WAGE RATES

"General Decision Number: TX20210003 01/01/2021

Superseded General Decision Number: TX20200003

State: Texas

Construction Types: Heavy and Highway

Counties: Cameron, Hidalgo and Webb Counties in Texas.

HEAVY & HIGHWAY CONSTRUCTION PROJECTS

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.95 for calendar year 2021 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.95 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2021. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number Publication Date 0 01/01/2021

* 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 FOUTPMENT OPERATOR
Asphalt Distributor
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
Stool Workon (Poinfoncing) \$ 14.07
Steel worker (Reinforcing)
TRUCK DRIVER
Lowbov-Float\$ 13.63
Single Axle\$ 10.82
Single or Tandem Axle Dump\$ 14.53
Tandem Axle Tractor with
Semi Trailer\$ 12.12
WEI DER \$ 14.02
WELDERS - Receive rate prescribed for craft performing
operation to which welding is incidental.

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

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

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

Union Rate Identifiers

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

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

Survey Rate Identifiers

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

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

Union Average Rate Identifiers

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

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

WAGE DETERMINATION APPEALS PROCESS

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

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

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

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

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

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

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

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

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

Administrative Review Board U.S. Department of Labor

200 Constitution Avenue, N.W. Washington, DC 20210

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

END OF GENERAL DECISION

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EXHIBIT B – USACE PERMITS

B.1 Permit SWG-2009-689: Oil Dock No. 6



DEPARTMENT OF THE ARMY GALVESTON DISTRICT, CORPS OF ENGINEERS CORPUS CHRISTI REGULATORY FIELD OFFICE 5151 FLYNN PARKWAY, SUITE 306 CORPUS CHRISTI, TEXAS 78411-4318

April 28, 2016

ATTENTION OF: Corpus Christi Regulatory Field Office

SUBJECT: Permit Application - SWG-2009-00689

Mr. Ariel Chavez, II Brownsville Navigation District 1000 Foust Road Brownsville, Texas 78521-1000

Dear Mr. Chavez:

The above numbered permit has been approved and a signed copy is enclosed for your retention. In addition, also enclosed are ENG Form 4336 and a copy of "Notice to Permittee" which provides important information for permit administration. You should notify the Corpus Christi Regulatory Field Office, in writing, upon completion of the authorized work.

This permit does not authorize any injury or interference with any Federal property; nor does it grant property rights, access privileges, or rights-of-way entrance authorizations to any property including those owned by State or Federal agencies. There are Federal properties (owned OR CONTROLLED by Corps of Engineers) identified within the project area. All appropriate accesses, authorizations, rights-of-way on the Corps Federal project area must be procured from the Corps Real Estate Division prior to impacting any of these Federally-owned/operated lands. This Permit authorization is limited to those impacts exactly as depicted. If property access and/or use is denied and/or requires modification to the project as permitted, this authorization becomes null and void and would require a new authorization to adequately address these new impacts. Please visit the USACE Galveston District's website for the most current information regarding the District's outgrant policy at http://www.swg.usace.army.mil/BusinessWithUs/RealEstateDivision/Outgrants.aspx.

To assist us in improving our service to you, please complete the survey found at http://corpsmapu.usace.army.mil/cm apex/f?p=136:4:0.

Sincerely,

1/1/1)

Matthew Kimmel Supervisor Corpus Christi Regulatory Field Office

Enclosures

Copies Furnished:

EPA, Region 6

USFWS

NOAA-NMFS

TPWD

Commander (oan), Eighth Coast Guard District, Hale Boggs Federal Building, 501 Magazine Street, New Orleans, Louisiana 70130-3396 (w/encl)

Director, National Ocean Service, Coast & Geo. Sur., Mapping & Charting Branch, Source Data Unit, Attn: N/CG2211, Station 7317, SSMC3, 1315 East-West Highway, Silver Spring, Maryland 20910-3233

Real Estate Division

DEPARTMENT OF THE ARMY PERMIT

Permittee Brownsville Navigation District

Permit No. SWG-2009-00689

Issuing Office _ Galveston District

NOTE: The term "you" and its dcrivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description: To construct a vessel dock and associated berth along with various ancillary structures to support petroleum product loading and unloading activities. Ancillary structures include an approximate 110-foot-long by 35-foot-wide dock structure constructed with a combination of concrete/steel piles with an associated dredged berth of -53 feet MLT at the proposed project site. In addition, the project will include waterfront features to serve user vessels including a dredged vessel berth with steel-sheet pile bulkhead, installation of slope protection on the vessel slip approach and bulkhead, and installation of associated mooring and breasting structures and associated catwalks. Approximately 220,000 cubic yards of material will be mechanically and hydraulically excavated from the Brownsville Ship Channel (BSC) and placed in an authorized Port of Brownsville placement area (5A, 5B, 7 or 8). The proposed vessel slip approach will have a 3:I side slope. Additional slope protection consisting of approximately 4,000 cubic yards of crushed stone over geo-textile fabric will be placed along the sheet-pile bulkhead and forward slope of the slip in a 4-foot thick layer over a 90-foot by 300-foot (27,000-square-foot) area. Six mooring structures will be constructed in uplands and four breasting structures, consisting of steel pipe piles with concrete caps, will be constructed within the proposed vessel berth. Each breasting structure will measure 21 feet by 15 feet and will be equipped with guardrails, mooring hooks, and access catwalks to connect the mooring structures with the dock/unloading area. The project will be conducted in accordance with the attached plans, in 8 sheets.

Project Location: Along the north side of the Brownsville Ship Channel in the Port of Brownsville, Cameron County, Texas between Oil Docks 3 and 5.

Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on <u>31 December 2021</u>. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

ENG FORM 1721, Nov 86

EDITION OF SEP 82 IS OBSOLETE.

(33 CFR 325 (Appendix A))

EXHIBIT B.1 Page 3 of 15 4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

1. The permittee understands and agrees that if future operations by the United States require the removal, relocation or other alteration of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate or alter the structural work or obstructions caused thereby without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. When structures or work authorized by this permit are determined by the District Engineer to have become abandoned, obstructive to navigation or cease to be used for the purpose for which they were permitted, such structures or other work must be removed, the area cleared of all obstructions, and written notice given to the Corpus Christi Regulatory Field Office, within 30 days of completion.

3. The permittee must install and maintain, at the permittee's expense, any safety lights, signs and signals required by the U.S. Coast Guard, through regulations or otherwise, on the permittee's fixed structures. To receive a U.S. Coast Guard Private Aids to Navigation marking determination, at no later than 30 days prior installation of any fixed structures in navigable waters and/or prior to installation of any floating private aids to navigation, you are required to contact the Eighth Coast Guard District (dpw), 500 Poydras St. Suite 1230, New Orleans, LA 70130, (504) 671-2328 or via email to: D80anPATON@uscg.mil. For general information related to Private Aids to Navigation please visit the Eighth Coast Guard District web site at: http://www.uscg.mil/d8/waterways/PATON.Home.asp.

4. The permittee must coordinate the use of Dredged Material Placement Areas 5A, 5B, 7 or 8 with the Corps of Engineers Galveston District's Southern Area Office, the Navigation Branch and the Operations Division, at least 60 days prior to conducting any and all work in or affecting the disposal areas to assure that the work will not conflict with U. S. Government dredging or disposal area management activities.

5. Prior to the performance of hydraulic dredging, the permittee will obtain a Section 401-water quality certification from the Texas Commission on Environmental Quality (TCEQ) for the effluent or return water. The permittee will submit a copy of the Section 401certification to the Corps of Engineers, Galveston District, Regulatory Division, Corpus Christi Field Office (Corps), prior to performing hydraulic dredging. Work cannot begin under NWP 16 until written approval from the Corps has been received.

6. Contaminant testing of the area to be dredged will be required in accordance with the U.S. Army Corps of Engineers, Galveston District document labeled "Sampling & Analysis Plan-Private Dredging Application" (April 2014). The plan will be submitted to the Corpus Christi Regulatory Field Office for approval prior to beginning any work. The testing work will be contracted to a qualified contractor and the results will be sent in a separate mailing.

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

(X) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).

- (X) Section 404 of the Clean Water Act (33 U.S.C. 1344).
- () Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal project.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions. General condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

EXHIBIT B.1 Page 5 of 15 Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

IL RE/RIPLS. (PERMITTEE)

ARIEL CHAVEZ IT BROWNSVILLE NAVIGATION DISTRICT

April 20, 2016

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

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(DISTRICT ENGINEER) MATTHEW L. KIMMEL CORPUS CHRISTI REGULATORY FIELD OFFICE FOR COLONEL RICHARD P. PANNELL

28 April 2016 (DATE)

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferce sign and date below.

(TRANSFEREE - Typed/Printed Name)

(TRANSFEREE - Signature)

(DATE)

(Mailing Address)



EXHIBIT B.1 Page 7 of 15



EXHIBIT B.1 Page 8 of 15



EXHIBIT B.1 Page 9 of 15



EXHIBIT B.1 Page 10 of 15



EXHIBIT B.1 Page 11 of 15



EXHIBIT B.1 Page 12 of 15



EXHIBIT B.1 Page 13 of 15



EXHIBIT B.1 Page 14 of 15

NOTICE TO PERMITTEES

Department of the Army Permits for Work in Navigable Waters require attention to administration and policies which are often misunderstood or disregarded. To avoid possible misinterpretations and to expedite procedures, permit post-authorization requirements and pertinent information are outlined as follows:

1. Permits remain in effect until revoked, relinquished, or the structures are removed. An extension of time for <u>completion</u> of structures or work may be granted provided that a public notice is issued and that evidence is furnished of the bona fide intention of the permittee to complete the work within a reasonable time. If work or structures are not completed within the time provided in the permit, it is the <u>permittee's responsibility</u> to request an extension of time at least 4 months before the expiration date.

2. Maintenance of authorized completed structures may be done at any time without extending the completion period. It is, however, required that the District Commander be notified prior to commencement of maintenance.

3. SPECIAL REGULATIONS GOVERN MAINTENANCE WORK INVOLVING DREDGING OR FILL. This maintenance is not authorized by the original permit and specific prior approval is required before such work is commenced in navigable waters. Your request for authorization should be submitted in time for public notice requirements and coordination with other agencies.

4. If ownership of structures or work covered by a permit is transferred, the District Commander must be notified immediately. The notification will provide information so that permit responsibilities can be changed to the new owner or assignee.

5. Permittees are reminded that the Area Engineer must be notified as soon as possible of the time for <u>commencement</u> of construction or work, and immediately upon <u>completion</u>. If pipelines across Federal project channels are covered by the permit, the Area Engineer should be informed of the date the pipelines are to be placed in time for him to arrange for an inspector to be present.

6. All material changes in location or plans must be submitted promptly to the District Commander for approval before construction is begun.

7. Permits should not be considered as an approval of design features of any structure authorized or an implication that such structure is adequate for the purpose intended.

DISTRICT COMMANDER GALVESTON DISTRICT CORPS OF ENGINEERS

SWG FL 279 24 April 85

SECTION 01 14 00

WORK RESTRICTIONS 11/11

PART 1 GENERAL

- 1.1 RELATED DOCUMENTS
 - A. Drawings, Special Conditions, Standard General conditions, Supplementary Conditions and Technical Specifications apply to this Section.
- 1.2 SCHEDULE OF WORK
 - A. All work shall be complete within the number of calendar days set forth in the Contract and further defined herein.
- 1.3 USE OF PREMISES
 - A. Work Area:
 - Limit use of premises to work in areas indicated on the drawings. Do not disturb portions of site beyond areas in which the Work is indicated.
 - B. Use of site:
 - Any additional areas required and not shown on the plans shall be provided by the CONTRACTOR for storage, field office location, staging of materials and equipment, receiving of materials and all other needs required to support construction operations. This additional area shall be paid for by the CONTRACTOR.
 - CONTRACTOR shall not allow parking of vehicles or equipment, associated with his workforce, outside the fenced area of the project.
 - 3. CONTRACTOR shall not allow his workforce to congregate or loiter at or around Oil Dock No. 6 dock or in immediate vicinity.
 - 4. CONTRACTOR is subject to up to a \$5,000 fee as a result of encroaching into the Oil Dock secured area.
 - C. Site Storm Protection:
 - 1. During hurricane season, June 1st through November 30th, the CONTRACTOR shall be prepared to secure the site in the event of an approaching hurricane. Any and all work involved in the preparation and securing of the site for a storm event, as well as the demobilization and remobilization of his crew and equipment shall be at no cost to the OWNER.
 - 2. When a warning of gale force winds is issued by the National Weather Service, take precautions to minimize danger to persons, and protect the work. Precautions shall include, but are not limited to, closing openings; removing loose materials, tools and equipment from exposed locations; and removing or securing

scaffolding and other temporary work. Close openings in the work when storms of lesser intensity pose a threat to the work. Dumpsters shall be emptied when high winds (greater than 35 knots sustained) are imminent.

 Hurricane Condition of Readiness: Unless directed otherwise, comply with:

a. Condition FOUR (Sustained winds of 50 knots or greater expected within 72 hours): Maintain "Condition FOUR" requirement and commence securing operations necessary for "Condition ONE" which cannot be completed within 18 hours. Cease all routine activities which might interfere with securing operations. Commence securing and stow all gear and portable equipment. Make preparations for securing site. Review requirements pertaining to "Condition TWO" and continue action as necessary to attain "Condition THREE" readiness. Contact City Engineer for weather updates and completion of required actions.

b. Condition THREE (Sustained winds of 40 knots or greater expected within 48 hours): Maintain "Condition Four" requirements and commence securing operations necessary for "Condition ONE" which cannot be completed within 18 hours. Cease all routine activities which might interfere with securing operations. Commence securing and tow all gear and portable equipment. Make preparations for securing site. Review requirements pertaining to "Condition TWO" and continue action as necessary to attain "Condition THREE" readiness. Contact City Engineer for weather updates and completion of required actions.

c. Condition TWO (Sustained winds of 50 knots or greater expected within 24 hours): Curtail or cease routine activities until securing operation is complete. Reinforce or remove form work and scaffolding. Secure machinery, tools, equipment, materials, or remove from the jobsite. Expend every effort to clear all missile hazards and loose equipment from work areas. Contact City Engineer for weather and Condition Readiness (COR) updates and completion of required actions.

d. Condition ONE (Sustained winds of 50 knots or greater expected within 12 hours): Secure the jobsite, and leave the premises.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 16 00

ENVIRONMENTAL PROTECTION MEASURES

PART 1 GENERAL

1.1 SCOPE OF WORK

This section covers prevention of environmental pollution and damage as the result of construction operations under this Contract and for those measures set forth in the other Specifications. For the purpose of this specification, environmental pollution and damage is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare, unfavorably alter ecological balances of importance to human life, affect other species of importance to man, or degrade the utility of the environment for aesthetic, cultural, and/or historical purposes. The control of environmental pollution and damage requires consideration of air, water, and land and includes management of visual aesthetics, noise, solid waste, radiant energy and radioactive materials, as well as other pollutants. The environment shall be protected and all natural resources shall be preserved during construction. All Federal, State, and local laws and regulations shall be complied with during construction.

1.2 CONTRACTOR FACILITIES

The **CONTRACTOR's** field offices, staging areas, stockpile storage, and temporary buildings shall be placed in areas approved by the **Owner**. Temporary movement or relocation of **CONTRACTOR** facilities shall be made only on approval by the **Owner**. Disposal areas shall not be located in any wetlands, water body, or stream bed. Fuel and lubricate equipment in a manner that protects against spills and evaporation. Provide a berm with impervious liner around fuel and liquid chemical storage tanks to contain the tank contents in the event of a leak or spill. No refueling shall be done onsite unless approved in advance with acceptable spill protection measures.

1.3 QUALITY CONTROL

The **CONTRACTOR** shall establish and maintain quality control for environmental protection of all items set forth herein. The CONTRACTOR shall record on daily reports any problems in complying with laws, regulations, and ordinances and corrective action taken. Any damage caused by the **CONTRACTOR** during construction shall be repaired, replaced, or restored to the satisfaction of OWNER. The CONTRACTOR shall maintain all erosion and sediment control devices in good working order. If a repair is necessary it will be done at the earliest date possible, but no later than seven (7) days after the surrounding exposed ground has dried sufficiently to minimize further damage from heavy equipment. Areas adjacent to creeks and drainage ways shall have priority.

1.4 TRAINING OF CONTRACTOR PERSONNEL IN POLLUTION CONTROL

The **CONTRACTOR** shall train his personnel in all phases of environmental protection. The training shall include methods of detecting and avoiding pollution, familiarization with pollution standards, both statutory and

contractual, and installation and care of facilities (vegetative covers, and instruments required for monitoring purposes) to ensure adequate and continuous environmental pollution control.

1.5 VOLATILE ORGANIC COMPOUNDS (VOC)

Contractors are required to comply with the Local, State, and Federal VOC laws and regulations and shall have an acceptable VOC compliance plan. The plan shall demonstrate that the use of paints, solvents, adhesives, and cleaners comply with local VOC laws and regulations governing VOC materials and that all required permits have been obtained or will be obtained prior to starting work involving VOC's, in the air quality district in which the start of work. An acceptable compliance plan shall contain, as a minimum, a listing of each materials subject to restrictions in the air quality management district in question, the rule governing its use, a description of the actions which the CONTRACTOR will take, a description of the actions which the CONTRACTOR will use to comply with the laws and regulations, and any changes in the status of compliance during the life of the Contract. Alternatively, if no materials are subject to the restrictions of the air quality management district where the work will be performed, or if there are no restrictions, the compliance plan shall so state.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.1 PROTECTION OF ENVIRONMENTAL RESOURCES

The environmental resources within the project boundaries and those affected outside the limits of permanent work under this contract shall be protected during the entered period of this contract. The CONTRACTOR shall confine his activities to areas defined by the plans and specifications. Environmental protection shall be as stated in the following subparagraphs.

3.2 PROTECTION OF WATER RESOURCES

The CONTRACTOR shall keep construction activities under surveillance, management and control to avoid pollution of surface and ground waters. Special management techniques as set out below shall be implemented to control water pollution by the listed construction activities which are included in this contract. As soon as possible the CONTRACTOR shall clear all waterways of temporary embankments, temporary bridges, matting, falsework, debris, or other obstructions placed during construction operations that are not part of the finished work. The CONTRACTOR is responsible for maintaining area drainage during construction. Water shall not be allowed to pond on any roadway surface, and runoff from adjacent properties shall not be impeded by project work.

3.3 PROTECTION OF LAND RESOURCES

Prior to the beginning of any construction, the CONTRACTOR shall identify all land resources to be approved by the OWNER. The CONTRACTOR shall not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, topsoil, and land forms without special permission from the OWNER. No ropes, cables, or guys shall be fastened to or attached to any trees for anchorage unless specifically authorized. Where such special emergency use is permitted, the CONTRACTOR shall provide effective protection for land and vegetation resources at all times as defined in the following subparagraphs.

3.4 PROTECTION OF FISH AND WILDLIFE RESOURCES

The CONTRACTOR shall keep construction activities under surveillance, management and control to minimize interference with, disturbance to and damage of fish and wildlife. Prior to beginning of construction operation, the CONTRACTOR shall list species that require specific attention and describe measures for their protection.

3.5 PROTECTION OF AIR RESOURCES

The CONTRACTOR shall keep construction activities under surveillance, management, and control to minimize pollution of air resources. All activities, equipment, process, and work operated or performed by the CONTRACTORS in accomplishing the specified construction shall be in strict accordance with the State of Texas Clean Air Act implemented in 1967, and all Federal emission and performance laws and standards. Ambient Air Quality Standards set by the Environmental Protection Agency shall be maintained for those construction operations and activities specified in this section. Special management techniques as set out below shall be implemented to control air pollution by the construction activities that are included in the contract.

3.6 PARTICULATES CONTROL

The CONTRACTOR shall maintain all excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, excavated areas, borrow areas, demolition areas and all other work areas within or outside the project boundaries free from particulates which would cause the air pollution standards mentioned in paragraph 3.5 above to be exceeded or which would cause a hazard of a nuisance. Sprinkling, chemical treatment of an approved type, light bituminous treatment, bughouse, scrubbers, electrostatic precipitators or other methods will be permitted to control particulates in the work area. Sprinkling, to be efficient, must be repeated at such intervals as to keep the disturbed area damp at all times. the CONTRACTOR must have sufficient competent equipment available to accomplish this task. Particulate control shall be performed as the work proceeds and whenever a particulate nuisance or hazard occurs. If and when sand blasting, provide tarp drop cloths and windscreens under and around blasting operations to confine and collect dust, sand paint and other debris.

3.7 CONTROL AND DISPOSAL OF HAZARDOUS WASTES

Hazardous wastes are defined in 40 CFR 261. Hazardous wastes that are produced as a result of performing work under this contract shall be handled, stored, transported, and disposed of according to 40 CFF 262, where applicable. Prevent hazardous wastes from entering the ground, drainage areas, and surface waters. Immediately notify the OWNER of hazardous material spills.

3.8 SANITARY WASTE

All sanitary waste shall be collected by a licensed sanitary waste management CONTRACTOR from the portable units as necessary or as required by local regulation.

3.9 CONSTRUCTION DEBRIS

The CONTRACTOR shall collect and properly dispose all trash and construction debris in accordance with all local and state solid waste management regulations and practices. No construction waste material shall be buried on the Project Site. The CONTRACTOR shall store all waste materials in approved metal dumpsters, or other containers approved by the OWNER. The dumpster shall be emptied as necessary or as required by local and state regulation, and the contents hauled away for proper disposal. No construction waste material shall be buried within in the project limits.

3.10 POST CONSTRUCTION CLEANUP

The CONTRACTOR shall clean up areas used for construction to the satisfaction of the OWNER.

3.11 RESTORATION OF DAMAGE

The CONTRACTOR shall restore all features damaged or destroyed during construction operations outside the limits of the approved work areas (as described on the drawings). Such restoration shall be in accordance with the plan submitted for approval by the OWNER. This work will be accomplished at the CONTRACTOR's expense without compensation.

-- End of Section --

SECTION 01 22 00.00 10

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 SUMMARY

The extended prices stated on CONTRACTOR'S Bidding Schedule will be considered maximum Contract prices with unit price provisions. Unit price provisions are for OWNER convenience in adjusting extended prices based on quantity adjustments resulting from OWNER initiated Change Orders. The extended prices shall be full compensation for furnishing all labor, materials, tools, equipment, plant supplies, superintendence, insurance, incidentals, services, overhead, and profit necessary to complete the construction of the various items of work. It is not the intent to itemize each and every labor, material, or incidental requirement. Any requirement, explicit or implied, as determined by the OWNER for Project completion and not specifically listed on the CONTRACTOR's Bidding Schedule shall be included in items with which they are considered subsidiary.

1.2 QUANTITIES AND MEASUREMENTS

1.2.1 Quantities

All quantities of work stated on the CONTRACTOR's Bidding Schedule are nominal estimates, computed by OWNER, based on the Contract Documents. CONTRACTOR shall verify these quantities by preparing his own estimates. In any case, prices stated shall reflect all work required by the Contract Documents. No quantity adjustment shall be made for work performed outside the specified lines and grades, nor work completed within its specified tolerance.

1.2.2 Measurements

Only conventional measurements (length, area, and/or volume) shall be made to compute the quantities of work stated on the CONTRACTOR's Bidding Schedule. Weight, load size/counts, and production rate/time shall not be valid measurement techniques.

1.2.3 Contract Adjustments

The OWNER reserves the right to adjust the quantities of work stated on the CONTRACTOR's Bidding Schedule as it deems appropriate. Adjustments must be in form of a Change Order to the Contract.

1.3 LUMP SUM PAYMENT ITEMS

Payment items for the work of this contract for which contract lump sum payments will be made are listed in the Bidding Schedule and described below. All costs for items of work, which are not specifically mentioned to be included in a particular lump sum or unit price payment item, shall be included in the listed lump sum item most closely associated with the work involved. The lump sum price and payment made for each item listed shall constitute full compensation for furnishing all plant, labor, materials, and equipment, and performing any associated CONTRACTOR quality
control, environmental protection, meeting safety requirements, tests and reports, and for performing all work required for which separate payment is not otherwise provided. Lump Sum payment items are as follows.

- 1.3.1 Mobilization and Demobilization
- 1.3.1.1 Payment

Prices stated on the CONTRACTOR's Bidding Schedule for Mobilization/ Demobilization shall not exceed ten percent (10%) of the Total Base Price. Payment for mobilization will not exceed seventy percent (70%) of the amount stated for Mobilization/Demobilization. This lump sum amount shall include all costs in connection with the mobilization and demobilization of all plant and equipment necessary to perform the work.

1.3.1.2 Unit of Measure

Unit of measure: lump sum (LS).

1.3.2 Surveying

1.3.2.1 Payment

Payment will be made for costs associated with all required surveying, including pre and post-placement surveys, interim surveys, and construction surveys.

1.3.2.2 Unit of Measure

Unit of measure: lump sum (LS).

1.4 UNIT PRICE PAYMENT ITEMS

Payment items for the work of this contract on which the contract unit price payments will be made are listed in the Bidding Schedule and described below. The unit price and payment made for each item listed shall constitute full compensation for furnishing all plant, labor, materials, and equipment, and performing any associated CONTRACTOR quality control, environmental protection, meeting safety requirements, tests and reports, and for performing all work required for each of the unit price items. Unit Price payment items are as follows.

- 1.4.1 Bedding Material
- 1.4.1.1 Payment

Payment will be made for costs associated with furnishing and installing bedding material as specified.

1.4.1.2 Measurement

Bedding material will be measured in accordance with the provision of Specification 35 31 19 Stone, Channel, Shoreline/Coastal Protections for Structures.

1.4.2 Graded Rock Riprap (GRR)

1.4.2.1 Payment

Payment will be made for costs associated with furnishing and installing graded rock riprap as specified.

1.4.2.2 Measurement

Graded rock riprap will be measured in accordance with the provision of Specification 35 31 19 Stone, Channel, Shoreline/Coastal Protections for Structures.

1.5 LUMP SUM/PROGRESS PAYMENTS

Lump Sum work items listed on the CONTRACTOR'S Proposal Form will be paid for according to the estimated percentage of work completed for each item. This amount shall be full compensation for completed in-place work. The OWNER will be the sole judge and make the final decision as to the percentage complete of each item and the monetary amount for progress payments to the CONTRACTOR.

1.6 PAYMENT SUBSTANTIATION

All progress payments shall be substantiated by topographic/bathymetric surveys, plots, and quantity computations in accordance with Section 02 00 00 Construction Surveying.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

The OWNER may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections.

Units of weights and measures used on all submittals are to be the same as those used in the contract drawings.

Each submittal is to be complete and in sufficient detail to allow ready determination of compliance with contract requirements.

CONTRACTOR to check and reviewed all items prior to submittal and stamp, sign, and date indicating action taken. Proposed deviations from the contract requirements are to be clearly identified. Include within submittals items such as: CONTRACTOR's, manufacturer's, subcontractor's, or fabricator's shop and installation drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; certifications; warranties; installation procedures; and other such required submittals.

Submittals requiring OWNER's review are to be scheduled and notification of OWNER's review obtained prior to the acquisition of the material or equipment covered thereby. Pick up and dispose of samples not incorporated into the work in accordance with manufacturer's Material Safety Data Sheets (MSDS) and in compliance with existing laws and regulations.

1.2 DEFINITIONS

1.2.1 Submittal Descriptions (SD)

Submittal requirements are specified in the technical sections. Submittals are identified by Submittal Description (SD) numbers and titles as follows:

SD-01 Preconstruction Submittals

Submittals which are required prior to start of construction (work), issuance of contract notice to proceed by OWNER, or commencing work on site. These include schedules, tabular list of data, or tabular list including location, features, or other pertinent information regarding products, materials, equipment, or components to be used in the work.

Certificates of insurance

Surety bonds

List of proposed Subcontractors

List of proposed products

Construction Progress Schedule

Network Analysis Schedule (NAS)

Submittal register

Schedule of prices

Health and safety plan

Work plan

Quality Control(QC) plan

Environmental protection plan

SD-02 Shop Drawings

Drawings, diagrams and schedules specifically prepared to illustrate some portion of the work.

Diagrams and instructions from a manufacturer or fabricator for use in producing the product and as aids to the CONTRACTOR for integrating the product or system into the project.

Drawings prepared by or for the CONTRACTOR to show how multiple systems and interdisciplinary work will be coordinated.

SD-03 Product Data

Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions and brochures illustrating size, physical appearance and other characteristics of materials, systems or equipment for some portion of the work.

Samples of warranty language when the contract requires extended product warranties.

SD-04 Samples

Fabricated or unfabricated physical examples of materials, equipment or workmanship that illustrate functional and aesthetic characteristics of a material or product and establish standards by which the work can be judged.

Color samples from the manufacturer's standard line (or custom color samples if specified) to be used for the project.

Field samples and mock-ups constructed on the project site establish standards by which the ensuing work can be judged. Includes assemblies or portions of assemblies which are to be incorporated into the project and those which will be removed at conclusion of the work.

SD-05 Design Data

Design calculations, mix designs, analyses or other data pertaining to a part of work.

Design submittals, design substantiation submittals and extensions of design submittals.

SD-06 Test Reports

Report signed by authorized official of testing laboratory that a material, product or system identical to the material, product or system to be provided has been tested in accord with specified requirements.

Report which includes findings of a test required to be performed by the CONTRACTOR on an actual portion of the work or prototype prepared for the project before shipment to job site.

Report which includes finding of a test made at the job site or on sample taken from the job site, on portion of work during or after installation.

Investigation reports.

Daily logs and checklists.

Final acceptance test and operational test procedure.

SD-07 Certificates

Statements printed on the manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements. Must be dated after award of project contract and clearly name the project.

Document required of CONTRACTOR, or of a manufacturer, supplier, installer or Subcontractor through CONTRACTOR, the purpose of which is to further quality of orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel qualifications.

Confined space entry permits.

Text of posted operating instructions.

SD-08 Manufacturer's Instructions

Preprinted material describing installation of a product, system or material, including special notices and (MSDS)concerning impedances, hazards and safety precautions.

SD-09 Manufacturer's Field Reports

Documentation of the testing and verification actions taken by manufacturer's representative at the job site, in the vicinity of the job site, or on a sample taken from the job site, on a portion of the work, during or after installation, to confirm compliance with manufacturer's standards or instructions. The documentation must be signed by an authorized official of a testing laboratory or agency and must state the test results; and indicate whether the material, product, or system has passed or failed the test.

Factory test reports.

SD-11 Closeout Submittals

Documentation to record compliance with technical or administrative requirements or to establish an administrative mechanism.

Special requirements necessary to properly close out a construction contract. For example, Record Drawings and as-built drawings.

1.2.2 Reviewing Authority

Office or designated person authorized to review submittal(s).

1.2.3 Work

As used in this section, on- and off-site construction required by contract documents, including labor necessary to produce submittals, except those SD-01 Pre-Construction Submittals noted above, construction, materials, products, equipment, and systems incorporated or to be incorporated in such construction.

1.3 SUBMITTALS

Submit the following in accordance with this section.

SD-01 Preconstruction Submittals

Submittal Register (OWNER will provide. Refer to Exhibit A at end of this specification.)

1.4 PREPARATION

1.4.1 Transmittal Form

Transmit submittals with transmittal form prescribed and supplied by OWNER and standard for project. On the transmittal form identify CONTRACTOR, indicate date of submittal, and include information prescribed by transmittal form and required in paragraph entitled, "Identifying Submittals," of this section.

1.4.2 Identifying Submittals

When submittals are provided by a Subcontractor, the Prime CONTRACTOR shall prepare, review and stamp with CONTRACTOR's review all specified submittals prior to submitting to OWNER.

Identify submittals with the following information permanently adhered to or noted on each separate component of each submittal and noted on transmittal form. Mark each copy of each submittal identically, with the following:

- a. Project title and location.
- b. Construction contract number.
- c. Date of the drawings and revisions.
- d. Name, address, and telephone number of subcontractor, supplier, manufacturer and any other subcontractor associated with the submittal.

- e. Section number of the specification section by which submittal is required.
- f. Submittal description (SD) number of each component of submittal.
- g. When a resubmission, add alphabetic suffix on submittal description, for example, submittal 18 would become 18A, to indicate resubmission.
- h. Product identification and location in project.
- 1.4.3 Format for SD-02 Shop Drawings

Shop drawings are not to be less than 8 1/2 by 11 inches nor more than 30 by 42 inches, except for full size patterns or templates. Prepare drawings to accurate size, with scale indicated, unless other form is required. Drawings are to be suitable for reproduction and be of a quality to produce clear, distinct lines and letters with dark lines on a white background.

Present 8 1/2 by 11 inches sized shop drawings as part of the bound volume for submittals required by section. Present larger drawings in sets.

Include on each drawing the drawing title, number, date, and revision numbers and dates, in addition to information required in paragraph entitled, "Identifying Submittals," of this section.

Number drawings in a logical sequence. Each drawing is to bear the number of the submittal in a uniform location adjacent to the title block. Place the OWNER contract number in the margin, immediately below the title block, for each drawing.

Dimension drawings, except diagrams and schematic drawings; prepare drawings demonstrating interface with other trades to scale. Use the same unit of measure for shop drawings as indicated on the contract drawings. Identify materials and products for work shown.

1.4.4 Format of SD-03 Product Data and SD-08 Manufacturer's Instructions

Present product data submittals for each section as a complete, bound volume. Include table of contents, listing page and catalog item numbers for product data.

Indicate, by prominent notation, each product which is being submitted; indicate specification section number and paragraph number to which it pertains.

Supplement product data with material prepared for project to satisfy submittal requirements for which product data does not exist. Identify this material as developed specifically for project, with information and format as required for submission of SD-07 Certificates.

Include the manufacturer's name, trade name, place of manufacture, and catalog model or number on product data. Also include applicable federal, military, industry and technical society publication references. Should manufacturer's data require supplemental information for clarification, submit as specified for SD-07 Certificates.

Where equipment or materials are specified to conform to industry and technical society reference standards of the organizations such as American National Standards Institute (ANSI), ASTM International (ASTM), National

Brownsville Navigation District Oil Dock No. 6 Bulkhead Repair

Electrical Manufacturer's Association (NEMA), Underwriters Laboratories (UL), and Association of Edison Illuminating Companies (AEIC), submit proof of such compliance. The label or listing by the specified organization will be acceptable evidence of compliance. In lieu of the label or listing, submit a certificate from an independent testing organization, competent to perform testing, and reviewed by the OWNER. State on the certificate that the item has been tested in accordance with the specified organization's test methods and that the item complies with the specified organization's reference standard.

Collect required data submittals for each specific material, product, unit of work, or system into a single submittal and marked for choices, options, and portions applicable to the submittal. Mark each copy of the product data identically. Partial submittals will not be accepted for expedition of construction effort.

Submit manufacturer's instructions prior to installation.

1.4.5 Format of SD-04 Samples

Furnish samples in sizes below, unless otherwise specified in respective specification section or unless the manufacturer has prepackaged samples of approximately same size as specified:

- a. Sample of Equipment or Device: Full size.
- b. Sample of Materials Less Than 2 by 3 inches: Built up to 8 1/2 by 11 inches.
- c. Sample of Materials Exceeding 8 1/2 by 11 inches: Cut down to 8 1/2 by 11 inches and adequate to indicate color, texture, and material variations.
- d. Sample of Linear Devices or Materials: 10 inch length or length to be supplied, if less than 10 inches. Examples of linear devices or materials are expansion joint fillers and anchor rod sleeves.
- e. Sample of Non-Solid Materials: Pint. Examples of non-solid materials are sand and paint.
- f. Color Selection Samples: 2 by 4 inches. Where samples are specified for selection of color, finish, pattern, or texture, submit the full set of available choices for the material or product specified. Sizes and quantities of samples are to represent their respective standard unit.
- g. Sample Panel: 4 by 4 feet.
- h. Sample Installation: 100 square feet.

Samples Showing Range of Variation: Where variations in color, finish, pattern, or texture are unavoidable due to nature of the materials, submit sets of samples of not less than three units showing extremes and middle of range. Mark each unit to describe its relation to the range of the variation.

Reusable Samples: Incorporate returned samples into work only if so specified or indicated. Incorporated samples are to be in undamaged condition at time of use.

Recording of Sample Installation: Note and preserve the notation of area constituting sample installation but remove notation at final clean up of project.

When color, texture or pattern is specified by naming a particular manufacturer and style, include one sample of that manufacturer and style, for comparison.

1.4.6 Format of SD-05 Design Data and SD-07 Certificates

Provide design data and certificates on 8 1/2 by 11 inches paper. Provide a bound volume for submittals containing numerous pages.

1.4.7 Format of SD-06 Test Reports and SD-09 Manufacturer's Field Reports

Provide reports on 8 1/2 by 11 inches paper in a complete bound volume.

Indicate by prominent notation, each report in the submittal. Indicate specification number and paragraph number to which it pertains.

1.4.8 Format of SD-01 Preconstruction Submittals and SD-11 Closeout Submittals

When submittal includes a document which is to be used in project or become part of project record, other than as a submittal, do not apply CONTRACTOR's review stamp to document, but to a separate sheet accompanying document.

1.4.9 Electronic File Format

Provide submittals in electronic format, with the exception of material samples required for SD-04 Sample items. Compile the submittal file as a single, complete document, to include the Transmittal Form described within. Name the electronic submittal file specifically according to its contents, and coordinate the file name convention with the OWNER. Electronic files must be of sufficient quality that all information is legible. Use PDF as the electronic format, unless otherwise specified or directed by the OWNER. Generate PDF files from original documents with bookmarks so that the text included in the PDF file is searchable and can be copied. If documents are scanned, optical character resolution (OCR) routines are required. Index and bookmark files exceeding 30 pages to allow efficient navigation of the file. When required, the electronic file must include a valid electronic signature or a scan of a signature.

E-mail electronic submittal documents smaller than 10 MB to an e-mail address as directed by the OWNER. Provide electronic documents of 10MB on an optical disc or through an electronic file sharing system.

1.5 QUANTITY OF SUBMITTALS

- 1.5.1 Number of Samples SD-04 Samples
 - a. Submit two samples, or two sets of samples showing range of variation, of each required item. One reviewed sample or set of samples will be retained by the OWNER and one will be returned to CONTRACTOR.
 - b. Submit one sample panel or provide one sample installation where directed. Include components listed in technical section or as

directed.

- c. Submit one sample installation, where directed.
- d. Submit one sample of non-solid materials.

1.6 INFORMATION ONLY SUBMITTALS

Normally submittals for information only will not be returned. Response from the OWNER is not required on information only submittals. The OWNER reserves the right to require the CONTRACTOR to resubmit any item found not to comply with the contract. This does not relieve the CONTRACTOR from the obligation to furnish material conforming to the plans and specifications.

1.7 VARIATIONS

Variations from contract requirements require review from the OWNER.

1.7.1 Considering Variations

Discussion with OWNER prior to submission will help ensure functional and quality requirements are met and minimize rejections and re-submittals.

Specifically point out variations from contract requirements in transmittal letters. Failure to point out deviations may result in the OWNER requiring rejection and removal of such work at no additional cost to the OWNER.

1.7.2 Proposing Variations

When proposing variation, deliver written request to the OWNER, with documentation of the nature and features of the variation and why the variation is desirable and beneficial to OWNER. If lower cost is a benefit, also include an estimate of the cost savings. In addition to documentation required for variation, include the submittals required for the item. Clearly mark the proposed variation in all documentation.

Set forth in writing the reason for any deviations and annotate such deviations on the submittal. The OWNER reserves the right to rescind inadvertent review of submittals containing unnoted deviations.

1.7.3 Warranting That Variations Are Compatible

When delivering a variation for review, CONTRACTOR, including its Designer(s) of Record, warrants that this contract has been reviewed to establish that the variation, if incorporated, will be compatible with other elements of work.

1.7.4 Review Schedule Is Modified

In addition to normal submittal review period, a period of 10 working days will be allowed for consideration by the OWNER of submittals with variations.

1.8 SUBMITTAL REGISTER AND DATABASE

Prepare and maintain submittal register, as the work progresses. A submittal register showing items of equipment and materials for which submittals are required by the specifications is provided as an attachment. This list may not be all inclusive and additional submittals may be required.

The CONTRACTOR is to track all submittals by maintaining a complete list, including completion of all data columns, including dates on which submittals are received and returned by the OWNER.

The CONTRACTOR is required to maintain the submittal register and submit it to the OWNER for review monthly. The reviewed submittal register will serve as a scheduling document for submittals and will be used to control submittal actions throughout the contract period. Coordinate the submit dates and need dates with dates in the CONTRACTOR prepared progress schedule. Submit monthly or until all submittals have been satisfactorily completed, updates to the submittal register showing the CONTRACTOR action codes and actual dates with OWNER action codes. Revise the submittal register when the progress schedule is revised and submit both for OWNER review.

1.8.1 Use of Submittal Register

Submit submittal register with QC plan and project schedule. Verify that all submittals required for project are listed and add missing submittals.

1.8.2 Copies Delivered to the OWNER

Deliver one copy of submittal register updated by CONTRACTOR to OWNER with each invoice request.

1.9 SCHEDULING

Schedule and submit concurrently submittals covering component items forming a system or items that are interrelated. Include certifications to be submitted with the pertinent drawings at the same time. No delay damages or time extensions will be allowed for time lost in late submittals.

- a. Coordinate scheduling, sequencing, preparing and processing of submittals with performance of work so that work will not be delayed by submittal processing. Allow for potential resubmittal of requirements.
- b. Submittals called for by the contract documents will be listed on the register. If a submittal is called for but does not pertain to the contract work, the CONTRACTOR is to include the submittal in the register and annotate it "N/A" with a brief explanation. Review by the OWNER does not relieve the CONTRACTOR of supplying submittals required by the contract documents but which have been omitted from the register or marked "N/A."
- c. Re-submit register and annotate monthly by the CONTRACTOR with actual submission and review dates. When all items on the register have been fully reviewed by OWNER with no exception taken, no further re-submittal is required.
- d. Carefully control procurement operations to ensure that each individual submittal is made on or before the CONTRACTOR scheduled submittal date shown on the "Submittal Register."
- e. Except as specified otherwise, allow review period, beginning with receipt by OWNER, of 10 working days for submittals for OWNER's review. Period of review for submittals with OWNER begins when OWNER receives submittal from CONTRACTOR.

f. Period of review for each resubmittal is the same as for initial submittal.

Within 15 calendar days of notice to proceed, provide, for review by the OWNER, the following schedule of submittals:

- a. A schedule of shop drawings and technical submittals required by the specifications and drawings. Indicate the specification or drawing reference requiring the submittal; the material, item, or process for which the submittal is required; the "SD" number and identifying title of the submittal; the CONTRACTOR's anticipated submission date and the review need date.
- b. A separate schedule of other submittals required under the contract but not listed in the specifications or drawings. Schedule will indicate the contract requirement reference; the type or title of the submittal; the CONTRACTOR's anticipated submission date and the review need date if review is required.
- 1.9.1 Reviewing, Certifying, Approving Authority

The CONTRACTOR is responsible for checking and reviewing and certifying that submittals are in compliance with contract requirements.

1.9.2 Constraints

Conform to provisions of this section, unless explicitly stated otherwise for submittals listed or specified in this contract.

Submit complete submittals for each definable feature of work. Submit at the same time components of definable feature interrelated as a system.

When acceptability of a submittal is dependent on conditions, items, or materials included in separate subsequent submittals, submittal will be returned without review.

Review of a separate material, product, or component does not imply review of assembly in which item functions.

- 1.9.3 CONTRACTOR Responsibilities
 - a. Check and review each submittal; and check and coordinate each submittal with requirements of work and contract documents.
 - b. Ensure that material is clearly legible.
 - c. Stamp each sheet of each submittal with certifying statement or approving statement, except that data submitted in bound volume or on one sheet printed on two sides may be stamped on the front of the first sheet only. CONTRACTOR will certify submittals forwarded to OWNER with the following certifying statement:

"I hereby certify that the (equipment) (material) (article) shown and marked in this submittal is that proposed to be incorporated with contract Number [____], is in compliance with the contract drawings and specification, can be installed in the allocated spaces, and is submitted for OWNER review.

Certified by CONTRACTOR _____, Date ____" (Signature)

- d. Update submittal register as submittal actions occur and maintain the submittal register at project site until final review of all work by OWNER.
- e. Retain a copy of completed submittals at project site, including CONTRACTOR's copy of samples.
- 1.10 OWNER RESPONSIBILITIES

The OWNER will:

- a. Note date on which submittal was received from CONTRACTOR.
- b. Review submittals within scheduling period specified and only for general conformance with project design concepts and general compliance with contract documents.
- c. Identify returned submittals with one of the actions defined in paragraph entitled, "Review Notations," of this section and with markings appropriate for action indicated.

Upon completion of review of submittals, stamp and date reviewed submittals. Two copies of the reviewed submittal will be retained by the OWNER and three copies of the submittal will be returned to the CONTRACTOR. The OWNER may alternatively transmit the reviewed submittals to the CONTRACTOR electronically.

1.10.1 Review Notations

OWNER review will be completed within 10 calendar days after date of submission. Submittals will be returned to the CONTRACTOR with the following notations:

- a. Submittals marked "NO EXCEPTION TAKEN" authorize the CONTRACTOR to proceed with the work covered.
- b. Submittals marked "MAKE CORRECTIONS NOTED" authorize the CONTRACTOR to proceed with the work covered provided he makes the noted corrections.
- c. Submittals marked "REVISE AND RESUBMIT" indicate noncompliance with the contract requirements or design concept, or that submittal is incomplete. Resubmit with appropriate changes. No work shall proceed for this item until resubmittal is reviewed by OWNER.
- d. Submittals marked "REJECTED" will indicate submittal has been previously reviewed, is not required, does not have evidence of being reviewed and reviewed by CONTRACTOR, or is not complete. A submittal marked "REJECTED" will be returned with an explanation of the reason it is not reviewed. Resubmit submittals returned for lack of review by CONTRACTOR or for being incomplete, with appropriate action, coordination, or change.

1.11 REJECTED SUBMITTALS

CONTRACTOR shall make corrections required by the OWNER. If corrections are made to shop drawings, corrections shall be noted by clouding all

corrections or changes. It will be assumed that, if not clouded, no revisions have been made and no "acceptance" is given to unclouded revisions.

If changes are necessary to submittals, the CONTRACTOR shall make such revisions and submission of the submittals. No item of work requiring a submittal change is to be accomplished until the changed submittals are reviewed.

1.12 REVIEWED SUBMITTALS

The OWNER's review of submittals (i.e. submittals marked "NO EXCEPTION TAKEN") is not to be construed as a complete check, and indicates only that the general method of construction, materials, detailing and other information are satisfactory and meet the requirements of design plans and specifications.

OWNER's review will not relieve the CONTRACTOR of the responsibility for any error which may exist, as the CONTRACTOR under the CONTRACTOR Quality Control (CQC) requirements of this contract is responsible for dimensions, quantities, the design of adequate connections and details, and the satisfactory construction of all work.

After submittals have been reviewed by the OWNER, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

1.13 REVIEWED SAMPLES

Review of a sample is only for the characteristics or use named in such review and is not be construed to change or modify any contract requirements. Before submitting samples, the CONTRACTOR to assure that the materials or equipment will be available in quantities required in the project. No change or substitution will be permitted after a sample has been reviewed.

Match the reviewed samples for materials and equipment incorporated in the work. If requested, reviewed samples, including those which may be damaged in testing, will be returned to the CONTRACTOR, at his expense, upon completion of the contract. Samples not reviewed will also be returned to the CONTRACTOR at its expense, if so requested.

Failure of any materials to pass the specified tests will be sufficient cause for refusal to consider, under this contract, any further samples of the same brand or make of that material. OWNER reserves the right to reject any material or equipment which previously has proved unsatisfactory in service.

Samples of various materials or equipment delivered on the site or in place may be taken by the OWNER for testing. Samples failing to meet contract requirements will automatically void previous reviews. CONTRACTOR to replace such materials or equipment to meet contract requirements.

Review of the CONTRACTOR's samples by the OWNER does not relieve the CONTRACTOR of his responsibilities under the contract.

1.14 WITHHOLDING OF PAYMENT

Payment for materials incorporated in the work will not be made if required

reviews by OWNER have not been obtained.

- 1.15 PROGRESS SCHEDULE
- 1.15.1 Bar Chart
 - a. Submit the progress chart, for review by OWNER, at the Preconstruction Conference in one reproducible and 4 copies.
 - b. Prepare the progress chart in the form of a bar chart utilizing form "Construction Progress Chart" or comparable format acceptable to the OWNER.
 - c. Include no less than the following information on the progress chart:
 - (1) Break out by major headings for primary work activity.
 - (2) A line item break out under each major heading sufficient to track the progress of the work.
 - (3) A line item showing contract finalization task which includes punch list, clean-up and demolition, and final construction drawings.
 - (4) A materials bar and a separate labor bar for each line item. Both bars will show the scheduled percentage complete for any given date within the contract performance period. Labor bar will also show the number of men (man-load) expected to be working on any given date within the contract performance period.
 - (5) The estimated cost and percentage weight of total contract cost for each materials and labor bar on the chart.
 - (6) Separate line items for mobilization and drawing submittal and review. (These items are to show no associated costs.)
 - Update the progress schedule in one reproduction and 4 copies every 30 calendar days throughout the contract performance period.
 Alternatively, CONTRACTOR has the option of submitting the project schedule electronically, with at least 2 copies in hard-copy format.
- 1.15.2 Project Network Analysis

Submit the initial progress schedule within 21 calendar days of notice to proceed. Schedule is to be updated and resubmitted monthly beginning 7 calendar days after return of the reviewed initial schedule. Updating to entail complete revision of the graphic and data displays incorporating changes in scheduled dates and performance periods. Redlined updates will only be acceptable for use as weekly status reviews.

CONTRACTOR to provide a single point contact from his on-site organization as his Schedule Specialist. Schedule Specialist is to have the responsibility of updating and coordinating the schedule with actual job conditions. Schedule Specialist to participate in weekly status meetings and present current information on the status of purchase orders, shop drawings, off-site fabrication, materials deliveries, Subcontractor activities, anticipated needs for OWNER furnished equipment, and any problem which may impact the contract performance period. Include the following in the project network analysis:

- a. Graphically display with the standard network or arrow diagram capable of illustrating the required data. Drafting to be computer generated on standard 24 by 36 inch (nominal size) drafting sheets or on small 11 by 17 inch minimum sheets with separate overview and detail breakouts. Provide a project network analysis that is legible with a clear, consistent method for continuations and detail referencing. Clearly delineate the critical path on the display. Clearly indicate the contract milestone date on the project network analysis graphic display.
- b. Data is to be presented as a separate printout on paper or, where feasible, may be printed on the same sheet as the graphic display. Data is to be organized in a logical coherent display capable of periodic updating.
- c. Include within the data verbal activity descriptions with a numerical ordering system cross referenced to the graphic display. Additionally, costs (broken down into separate materials and costs), duration, early start date, early finish date, late start date, late finish date, and float are to be detailed for each activity. A running total of the percent completion based on completed activity costs versus total contract cost is to be indicated. A system for indicating scheduled versus actual activity dates and durations is also to be provided.
- d. Sufficient detail to facilitate the CONTRACTOR's control of the job and to allow the OWNER to readily follow progress for portions of the work should be shown within the schedule.
- 1.16 STATUS REPORT ON MATERIALS ORDERS

Within 20 calendar days after notice to proceed, submit, for review by the OWNER, an initial material status report on all materials orders. This report will be updated and re-submitted every 30 calendar days as the status on material orders changes.

Report to include list, in chronological order by need date, materials orders necessary for completion of the contract. The following information will be required for each material order listed:

- a. Material name, supplier, and invoice number.
- b. Bar chart line item or CPM activity number affected by the order.
- c. Delivery date needed to allow directly and indirectly related work to be completed within the contract performance period.
- d. Current delivery date agreed on by supplier.
- e. When item d exceeds item c, the effect that delayed delivery date will have on contract completion date.
- f. When item d exceeds item c, a summary of efforts made by the CONTRACTOR to expedite the delayed delivery date to bring it in line with the needed delivery date, including efforts made to place the order (or subcontract) with other suppliers.

Brownsville Navigation District Oil Dock No. 6 Bulkhead Repair

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 78 00

CLOSEOUT SUBMITTALS 05/19

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. ARMY CORPS OF ENGINEERS (USACE)

ERDC/ITL TR-12-1 (2015) A/E/C Graphics Standard, Release 2.0

1.2 DEFINITIONS

1.2.1 As-Built Drawings

As-built drawings are the marked-up drawings, maintained by the Contractor on-site, that depict actual conditions and deviations from the Contract Documents. These deviations and additions may result from coordination required by, but not limited to: contract modifications; official responses to submitted Requests for Information (RFI's); direction from the OWNER; and differing site conditions. Maintain the as-builts throughout construction as red-lined PDF files. These files serve as the basis for the creation of the record drawings by others.

1.3 SUBMITTALS

OWNER review is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-11 Closeout Submittals

As-Built Drawings; G As-Built Record of Materials Final Reviewed Shop Drawings; G Construction Contract Specifications; G

PART 2 PRODUCTS

2.1 PDF AS-BUILT FILES

Provide electronic PDF "plots" of all contract drawings sheets associated with the as-built drawing submittal. Compile and organize the PDF set to match the contract drawings.

2.2 REDLINES AND MARKUPS

Provide PDFs of the current working redlines and/or markups complying with the as-builts drawing and markup requirements contained in this specification.

PART 3 EXECUTION

3.1 AS-BUILT DRAWINGS

Provide and maintain two black line print copies of the PDF contract drawings for As-Built Drawings. Maintain the as-builts throughout construction as red-lined PDF files. Submit As-Built Drawings 30 days prior to Beneficial Occupancy Date (BOD).

3.1.1 Markup Guidelines

Make comments and markup the drawings complete without reference to letters, memos, or materials that are not part of the As-Built drawing. Show what was changed, how it was changed, where item(s) were relocated and change related details. These working as-built markup prints must be neat, legible and accurate as follows:

- a. Use base colors of red, green, and blue. Color code for changes as follows:
 - (1) Special (Blue) Items requiring special information, coordination, or special detailing or detailing notes.
 - (2) Deletions (Red) Over-strike deleted graphic items (lines), lettering in notes and leaders.
 - (3) Additions (Green) Added items, lettering in notes and leaders.
- b. Provide a legend if colors other than the "base" colors of red, green, and blue are used.
- c. Add and denote any additional equipment or material facilities, service lines, incorporated under As-Built Revisions if not already shown in legend.
- d. Use frequent written explanations on markup drawings to describe changes. Do not totally rely on graphic means to convey the revision.
- e. Use legible lettering and precise and clear digital values when marking prints. Clarify ambiguities concerning the nature and application of change involved.
- f. Wherever a revision is made, also make changes to related section views, details, legend, profiles, plans and elevation views, schedules, notes and call out designations, and mark accordingly to avoid conflicting data on all other sheets.
- g. For deletions, cross out all features, data and captions that relate to that revision.
- h. For changes on small-scale drawings and in restricted areas, provide large-scale inserts, with leaders to the applicable location.

- i. Indicate one of the following when attaching a print or sketch to a markup print:
 - 1) Add an entire drawing to contract drawings
 - 2) Change the contract drawing to show
 - 3) Provided for reference only to further detail the initial design.
- j. Incorporate all shop and fabrication drawings into the markup drawings.
- 3.1.2 As-Built Drawings Content

Revise As-Built Drawings in accordance with ERDC/ITL TR-12-1. Keep these working as-built markup drawings current on a weekly basis and at least one set available on the jobsite at all times. Changes from the contract drawings which are made during construction or additional information which might be uncovered in the course of construction must be accurately and neatly recorded as they occur by means of details and notes. Submit the working as-built markup drawings for approval prior to submission of each monthly pay estimate. Show on the as-built drawings, but not limited to, the following information:

- a. The actual location, kinds and sizes of all sub-surface utility lines encountered. In order that the location of these lines and appurtenances may be determined in the event the surface openings or indicators become covered over or obscured, show by offset dimensions to two permanently fixed surface features the end of each run including each change in direction on the As-Built drawings. Locate valves, splice boxes and similar appurtenances by dimensioning along the utility run from a reference point. Also record the average depth below the surface of each run.
- b. The location and dimensions of any changes to the bulkhead structure.
- c. Correct grade, elevations, cross section, or alignment of roads, earthwork, structures or utilities if any changes were made from contract plans.
- d. Changes in details of design.
- e. The topography, invert elevations and grades of drainage installed or affected as part of the project construction.
- f. Changes or Revisions which result from the final inspection.
- g. If OWNER property is used as a spoil area, furnish a contour map of the final spoil area elevations.
- h. Actual location of anchors, construction and control joints, etc., in concrete.
- i. Unusual or uncharted obstructions that are encountered in the contract work area during construction.
- j. Location, extent, thickness, and size of stone protection particularly where it will be normally submerged by water.

3.2 FINAL REVIEWED SHOP DRAWINGS

Submit final reviewed shop drawings 30 days after transfer of the completed facility.

3.3 CONSTRUCTION CONTRACT SPECIFICATIONS

Submit final PDF file record construction contract specifications, including revisions thereto, 30 days after transfer of the completed facility.

-- End of Section --

DIVISION 02 – EXISTING CONDITIONS

SECTION 02 00 00

CONSTRUCTION SURVEYING 08/15

PART 1 GENERAL

1.1 SCOPE OF WORK

The work includes furnishing materials, labor, and equipment for topographic and hydrographic surveying work items in accordance with these specifications and applicable drawings.

1.2 SUBMITTALS

Submittals to the OWNER under this section include the following:

SD-01 Preconstruction Submittals

Name of Registered Professional Land Surveyor

Survey Plan

Survey Notification

SD-02 Drawings

Initial Survey Drawings

Interim Survey Drawings

SD-11 Closeout Submittals

Final Survey Drawings

1.3 QUALITY ASSURANCE

1.3.1 General

Prior to commencing surveying activities, CONTRACTOR shall provide OWNER a plan that coordinates surveying activities with construction sequence. the plan shall also describe surveying methods, equipment, and accuracy. Minimum vertical and horizontal accuracies for all surveying methods shall b ± 1.5 ; and 1 ft RMS, respectively. GPS-based systems shall not be applied without establishing local base station.

1.3.2 Surveying Plots

All survey plots submitted to OWNER shall be sealed by a professional land surveyor registered in the State of Texas. Prior to commencing surveying activities, CONTRACTOR shall provide name and affiliation of professional surveyor to be used on project.

1.4 SURVEY NOTIFICATION

The CONTRACTOR shall notify OWNER in writing at least three (3) days prior to the commencement of surveying activities so that OWNER may have the

opportunity to accompany the survey crew and witness the work.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.1 GENERAL

The CONTRACTOR shall provide initial, interim, and final surveys for measurement and acceptance of work items. Plots showing initial and interim/final lines and grades shall accompany monthly payment requisitions.

3.2 SURVEY PLOTS

All construction surveys submitted to the OWNER shall be in the form of plan-view and cross-section plots. Survey plots shall be prepared in AutoCAD. All survey data shall be referenced to the project datums shown on the drawings. All plots shall contain title blocks and clearly display the following information:

- 1. Project name
- 2. Professional Land Surveyor's seal, signature, and business affiliation
- 3. Date(s) surveys were performed
- 4. Location and description of survey control
- 5. Vertical and horizontal datums
- 6. Sheet names and numbers
- Name of CONTRACTOR
 Drawing scale(s)
- 9. All cross sections shall show required construction template tolerances

For final survey (reference paragraph 3.5) plots shall comprise a well organized, stand-alone set of drawings that do not include any outdated or superseded information that may have been previously submitted. Final plots shall clearly show final cross-sections superimposed over initial cross sections.

3.3 SURVEY TRANSECTS

Unless more stringent recruitments are specified in other specification sections, survey shots shall be taken along each 25 ft. station within the limits of construction shown on the drawings. Survey shots along transects shall be taken at all significant grade breaks and at maximum horizontal spacing of 5 ft on center. Refer to Specification 35 31 19 for hydrographic surveying requirement.

3.4 INITIAL SURVEY

- A. An initial survey shall be performed to document existing grade prior to graded riprap placement as shown on the drawings.
- B. Results of the initial survey shall be submitted to OWNER at least seven (7) days prior to commencement of any material placement activities. The initial survey shall be conducted within a single one week period.

3.5 FINAL SURVEY

Final surveys shall be performed to substantiate progress payments, verify placement limits of bedding materials and riprap and document conditions of the completed work. Final surveys shall be completed within 30 days of substantial completion. CONTRACTOR is also encouraged to perform additional surveys to document work between required 50 ft interval transects to verify structure conforms to the placement limits. Refer to acceptance criteria in Specification Section 35 21 19 Stone, Channel, Shoreline/Coastal Protection for Structures.

Final survey drawings shall be submitted to the OWNER.

3.6 SURVEY EVALUATION

The OWNER reserves the right to suspend work for up to ten (10) calendar days upon completion of surveying by the CONTRACTOR to review survey results/findings and, if applicable, provide direction regarding interference or discrepancies encountered. Said suspension of work shall not suspend the contract time nor be construed as Standby Time.

-- End of Section --

SECTION 02 41 00

DEMOLITION

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 145	(1991; R 2012) Standard Specification for
	Classification of Soils and Soil-Aggregate
	Mixtures for Highway Construction Purposes
AASHTO T 180	(2010) Standard Method of Test for

Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE/SAFE)

ASSE/SAFE A10.6	(2016)	Safety	and	Health	Prog	gram
	Require	ements	for 1	Demoliti	on (Operations

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1 (2014) Safety and Health Requirements Manual

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 61 National Emission Standards for Hazardous Air Pollutants

1.2 GENERAL REQUIREMENTS

Do not begin demolition until authorization is received from the OWNER. The work of this section is to be performed in a manner that maximizes salvage and recycling of materials. The work includes demolition, salvage of identified items and materials, and removal of resulting rubbish and debris. Remove rubbish and debris from OWNER's property daily, unless otherwise directed. Store materials that cannot be removed daily in areas specified by the OWNER. In the interest of occupational safety and health, perform the work in accordance with EM 385-1-1, Section 23, Demolition, and other applicable Sections.

1.3 SUBMITTALS

The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-11 Closeout Submittals

Receipts

Receipts or bills of lading, as specified.

1.4 REGULATORY AND SAFETY REQUIREMENTS

Comply with federal, state, and local hauling and disposal regulations. In addition to the requirements of the "Contract Clauses," conform to the safety requirements contained in ASSE/SAFE A10.6.

1.4.1 Notifications

1.4.1.1 General Requirements

Furnish timely notification of demolition to Federal, State, regional, and local authorities in accordance with 40 CFR 61, Subpart M. Notify the OWNER in writing 10 working days prior to the commencement of work in accordance with 40 CFR 61, Subpart M.

1.5 DUST AND DEBRIS CONTROL

Prevent the spread of dust and debris and avoid the creation of a nuisance or hazard in the surrounding area. Do not use water if it results in hazardous or objectionable conditions such as, but not limited to, flooding, or pollution.

1.6 PROTECTION

1.6.1 Traffic Control Signs

Where pedestrian and driver safety is endangered in the area of removal work, use traffic barricades with flashing lights. Anchor barricades in a manner to prevent displacement by wind. Notify the OWNER prior to beginning such work.

1.6.2 Existing Conditions Documentation

Before beginning any demolition work, survey the site and examine the drawings and specifications to determine the extent of the work. Record existing conditions in the presence of the OWNER showing the condition of structures and other facilities adjacent to areas of alteration or removal. Electronic photographs will be acceptable as a record of existing conditions.

1.6.3 Items to Remain in Place

Take necessary precautions to avoid damage to existing items to remain in place, to be reused, or to remain the property of the OWNER. Repair or replace damaged items as approved by the OWNER. Coordinate the work of this section with all other work indicated.

1.6.4 Existing Construction Limits and Protection

Do not disturb existing construction beyond the extent indicated or necessary for installation of new construction. Provide protective measures to control accumulation and migration of dust and dirt in all work areas. Remove debris from work areas daily.

1.6.5 Utility Service

Maintain existing utilities indicated to stay in service and protect against damage during demolition operations.

1.6.6 Protection of Personnel

Before, during and after the demolition work the CONTRACTOR shall continuously evaluate the condition of the structures being demolished and take immediate action to protect all personnel working in and around the project site. No area, section, or component of any structural element will be allowed to be left standing without sufficient bracing, shoring, or lateral support to prevent collapse or failure while workmen remove debris or perform other work in the immediate area.

1.7 BURNING

The use of burning at the project site for the disposal of refuse and debris will not be permitted.

1.8 RELOCATIONS

Perform the removal and reinstallation of relocated items as indicated with workmen skilled in the trades involved. Items to be relocated which are damaged by the CONTRACTOR shall be repaired or replaced with new undamaged items as approved by the OWNER.

1.9 USE OF EXPLOSIVES

Use of explosives will not be permitted.

PART 2 PRODUCTS

2.1 FILL MATERIAL

Comply with excavating, backfilling, and compacting procedures for soils used as backfill material to fill voids, depressions or excavations resulting from demolition of structures.

Fill material must conform to the definition of satisfactory soil material as defined in AASHTO M 145, Soil Classification Groups A-1, A-2-4, A-2-5 and A-3. In addition, fill material must be free from roots and other organic matter, trash, debris, frozen materials, and stones larger than 2 inches in any dimension.

Proposed fill material must be sampled and tested by an approved soil testing laboratory, as follows:

Soil classification AASHTO M 145

Moisture-density relations AASHTO T 180, Method B or D

PART 3 EXECUTION

3.1 EXISTING FACILITIES TO BE REMOVED

3.1.1 Paving and Slabs

Remove concrete and asphaltic concrete paving and slabs as indicated.

Pavement and slabs designated to be recycled and utilized in this project shall be moved, ground and stored as directed by the OWNER. Pavement and slabs not to be used in this project shall be removed from the site at CONTRACTOR's expense.

3.1.2 Concrete

Salvage removed concrete.

3.2 CONCURRENT EARTH-MOVING OPERATIONS

Do not begin excavation, filling, and other earth-moving operations that are sequential to demolition or deconstruction work in areas occupied by structures to be demolished or deconstructed until all demolition and deconstruction in the area has been completed and debris removed. Fill holes and other hazardous openings.

3.3 DISPOSITION OF MATERIAL

3.3.1 Title to Materials

Except for salvaged items specified in related Sections and contract drawings, and for materials or equipment scheduled for salvage, all materials and equipment removed and not reused or salvaged, shall become the property of the CONTRACTOR and shall be removed from OWNER's property. Title to materials resulting from demolition, and materials to be removed, is vested in the CONTRACTOR upon approval by the OWNER of the CONTRACTOR's demolition, and removal procedures, and authorization by the OWNER to begin demolition and deconstruction. The OWNER will not be responsible for the condition or loss of, or damage to, such property after contract award. Showing for sale or selling materials and equipment on site is prohibited.

3.3.2 Reuse of Materials and Equipment

Remove and store materials indicated on Contract Drawings to be reused or relocated to prevent damage, and reinstall as the work progresses.

3.3.3 Salvaged Materials

Remove materials that are indicated and specified to be removed by the CONTRACTOR and that are to remain the property of the OWNER, and deliver to a storage site, as directed within the work site.

a. Remove salvaged items to remain the property of the OWNER in a manner to prevent damage, and packed or crated to protect the items from damage while in storage. Items damaged during removal or storage must be repaired or replaced.

3.3.4 Unsalvageable and Non-Recyclable Material

Dispose of unsalvageable and non-recyclable noncombustible material offsite. Dispose of unsalvageable and non-recyclable combustible material.

3.4 CLEANUP

Remove debris and rubbish from excavations. Remove and transport the debris and rubbish in a manner that prevents spillage on streets or adjacent areas. Apply local regulations regarding hauling and disposal.

3.5 DISPOSAL OF REMOVED MATERIALS

3.5.1 Regulation of Removed Materials

Dispose of debris, rubbish, scrap, and other nonsalvageable materials resulting from removal operations with all applicable federal, state and local regulations as contractually specified.

3.5.2 Burning

Burning of materials will not be permitted.

3.5.3 Removal from OWNER's Property

Transport waste materials removed from demolished structures, except waste soil, from property for legal disposal. Dispose of waste soil as directed.

-- End of Section --

DIVISION 03 – CONCRETE

SECTION 03 31 29

MARINE CONCRETE

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN CONCRETE INSTITUTE INTERNATIONAL (ACI)

ACI	117	(2010; Errata 2011) Specifications for Tolerances for Concrete Construction and Materials and Commentary
ACI	121R	(2008) Guide for Concrete Construction Quality Systems in Conformance with ISO 9001
ACI	201.2R	(2008) Guide to Durable Concrete
ACI	211.1	(1991; R 2009) Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete
ACI	214R	(2011) Evaluation of Strength Test Results of Concrete
ACI	301	(2010; Errata 2015) Specifications for Structural Concrete
ACI	304.2R	(1996; R 2008) Placing Concrete by Pumping Methods
ACI	304R	(2000; R 2009) Guide for Measuring, Mixing, Transporting, and Placing Concrete
ACI	305R	(2010) Guide to Hot Weather Concreting
ACI	306.1	(1990; R 2002) Standard Specification for Cold Weather Concreting
ACI	308R	(2001; R 2008) Guide to Curing Concrete
ACI	309R	(2005) Guide for Consolidation of Concrete
ACI	311.4R	(2005) Guide for Concrete Inspection
ACI	318M	(2019) Building Code Requirements for Structural Concrete & Commentary
ACI	347	(2004; Errata 2008; Errata 2012) Guide to Formwork for Concrete
ACI	SP-15	(2011) Field Reference Manual: Standard

Brownsville Navigation District Oil Dock No. 6 Bulkhead Repair	10243356
	Specifications for Structural Concrete ACI 301-05 with Selected ACI References
ACI SP-66	(2004) ACI Detailing Manual
AMERICAN ASSOCIATION OF (AASHTO)	STATE HIGHWAY AND TRANSPORTATION OFFICIALS
AASHTO M 182	(2005; R 2012) Standard Specification for Burlap Cloth Made from Jute or Kenaf and Cotton Mats
AMERICAN WELDING SOCIET	Y (AWS)
AWS D1.4/D1.4M	(2011) Structural Welding Code - Reinforcing Steel
ASTM INTERNATIONAL (AST	M)
ASTM A496/A496M	(2007) Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement
ASTM A615/A615M	(2015) Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A706/A706M	(2014) Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM A82/A82M	(2007) Standard Specification for Steel Wire, Plain, for Concrete Reinforcement
ASTM A934/A934M	(2013) Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars
ASTM C1017/C1017M	(2013) Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete
ASTM C1064/C1064M	(2011) Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete
ASTM C1077	(2015) Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation
ASTM C1107/C1107M	(2014a) Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
ASTM C1157/C1157M	(2011) Standard Specification for Hydraulic Cement
ASTM C1260	(2014) Standard Test Method for Potential Alkali Reactivity of Aggregates

Brownsville Navigation District Oil Dock No. 6 Bulkhead Repair	10243356
	(Mortar-Bar Method)
ASTM C143/C143M	(2012) Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C150/C150M	(2012) Standard Specification for Portland Cement
ASTM C1567	(2013) Standard Test Method for Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method)
ASTM C157/C157M	(2008; R 2014; E 2014) Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete
ASTM C171	(2007) Standard Specification for Sheet Materials for Curing Concrete
ASTM C172	(2010) Standard Practice for Sampling Freshly Mixed Concrete
ASTM C173/C173M	(2014) Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C231	(2008c) Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C260	(2006) Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C295	(2008) Petrographic Examination of Aggregates for Concrete
ASTM C309	(2011) Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C31/C31M	(2012) Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C33/C33M	(2013) Standard Specification for Concrete Aggregates
ASTM C39/C39M	(2015a) Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C42/C42M	(2013) Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
ASTM C494/C494M	(2013) Standard Specification for Chemical Admixtures for Concrete
ASTM C595/C595M	(2014) Standard Specification for Blended

Brownsville Navigation District Oil Dock No. 6 Bulkhead Repair	10243356
	Hydraulic Cements
ASTM C597	(2009) Pulse Velocity Through Concrete
ASTM C618	(2012a) Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C805/C805M	(2013a) Rebound Number of Hardened Concrete
ASTM C881/C881M	(2014) Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete
ASTM C920	(2014a) Standard Specification for Elastomeric Joint Sealants
ASTM C94/C94M	(2015) Standard Specification for Ready-Mixed Concrete
ASTM D1179	(2010) Fluoride Ion in Water
ASTM D1190	(1997) Standard Specification for Concrete Joint Sealer, Hot-Applied Elastic Type
ASTM D1339	(1984) Sulfite Ion in Water
ASTM D1751	(2004; E 2013; R 2013) Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
ASTM D1752	(2004a; R 2013) Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion
ASTM D3867	(2009) Nitrite-Nitrate in Water
ASTM D512	(2012) Chloride Ion in Water
ASTM D516	(2011) Sulfate Ion in Water
U.S. GENERAL SERVICES A	DMINISTRATION (GSA)
FS SS-S-1614	(Rev A; Am 1) Sealants, Joint,Jet-Fuel-Resistant, Hot-Applied, for Portland Cement and Tar Concrete Pavements
FS SS-S-200	(Rev E; Am 1; Notice 1) Sealant, Joint, Two-Component, Jet-Blast-Resistant, Cold-Applied, for Portland Cement Concrete Pavement
1 0 000000	

1.2 DEFINITIONS

a. "Blending size" is an aggregate that complies with the quality requirements in ASTM C33/C33M and paragraph entitled "Aggregates" and as modified herein and can be blended with coarse and fine aggregate to

produce a well graded combined grading.

- b. "Cementitious material" as used herein shall include portland cement and any pozzolanic material such as fly ash, natural pozzolans, ground granulated blast-furnace slag and silica fume.
- c. "Design strength" (f'c) is the specified compressive strength of concrete to meet structural design criteria.
- d. "Marine concrete" is that concrete that will be in contact with or subject to submersion, tidal variations, splash, or spray from water in navigable waterways.
- e. "Mixture proportioning" is a description of the proportions of a concrete mixture that were selected to enable it to meet the performance durability requirements, constructability requirements, and the initial and life-cycle cost goals.
- f. "Mixture proportions" is the concrete supplier's by-mass proportions to replicate the mixture design.
- g. "Pozzolan" is a siliceous or siliceous and aluminous material, which in itself possesses little or no cementitious value but will, in finely divided form and in the presence of moisture, chemically react with calcium hydroxide at ordinary temperatures to form compounds possessing cementitious properties.
- h. "Field test strength" (fcr) is the required compressive strength of concrete to meet structural and durability criteria. Determine (fcr) during mixture proportioning process.
- 1.3 SUBMITTALS

The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Placement and consolidation

Finishing

Curing

Placement under water

SD-02 Shop Drawings

Reinforcing steel

Formwork

Construction joints

Reproductions of contract drawings are unacceptable.

SD-03 Product Data

Materials for curing concrete
10243356

Joint sealants

Joint filler

Epoxy bonding compound

Epoxy coatings

Non-shrink grout

Preformed joint filler

Reinforcement supports

SD-05 Design Data

Mixture design

SD-06 Test Reports

Concrete mixture proportions

Fly ash

Aggregates

Admixtures

Cement

Water

Reinforcement

SD-07 Certificates

Curing concrete elements

Form removal schedule

Concrete placement and consolidation

Quality assurance

Mixture designs

1.4 MODIFICATION OF REFERENCES

Accomplish work in accordance with ACI publications except as modified herein. Consider the advisory or recommended provisions to be mandatory, as though the word "shall" had been substituted for the words "should" or "could" or "may," wherever they appear.

1.5 DELIVERY, STORAGE, AND HANDLING

Do not deliver concrete until vapor barrier, forms, reinforcement, embedded items, and chamfer strips are in place and ready for concrete placement. ACI 301 and ASTM A934/A934M for job site storage of materials. Store

reinforcement of different sizes and shapes in separate piles or racks raised above the ground. Protect materials from contaminants such as grease, oil, and dirt. Ensure materials can be accurately identified after bundles are broken and tags removed.

1.6 CONCRETE

1.6.1 Concrete Mixture Design

At least 30 days prior to concrete placement, submit proportions for a concrete mixture for each strength and type of concrete. Submit a complete list of materials including type; brand; source and amount of cement, aggregate, fly ash, corrosion inhibitors; and applicable reference specifications. Submit additional data regarding concrete aggregates if the source of aggregate changes. Submittal shall clearly indicate where each mixture will be used when more than one mix design is submitted. The test results for aggregate fly ash and other constituents shall have been within 6 months of submittal date. Obtain acknowledgement of receipt prior to concrete placement. The mixture shall be prepared by an accredited laboratory experienced in this field and under the direction of a licensed/registered civil ENGINEER, who shall sign all reports and designs. Refer to subpart 2.1.2 for tests which must be performed to support submitted mix designs.

1.6.1.1 Concrete Durability Performance

To ensure durability, include minimum supplementary cementitious materials as indicated in 2.1.2.e.

1.6.2 Drawings

1.6.2.1 Reinforcing Steel

ACI SP-66. Provide bending and cutting diagrams, assembly diagrams, splicing placement and laps of bars, shapes, dimensions, and details of bar reinforcing, accessories, and concrete cover. Do not scale dimensions from structural drawings to determine lengths of reinforcing bars. Only complete drawings will be accepted. Do not copy or reproduce design drawings.

1.6.2.2 Formwork

ACI 347. Include design calculations indicating arrangement of forms, sizes and grades of supports (lumber), panels, and related components. Indicate placement schedule, construction, and location and method of forming control joints. Include locations of inserts, pipework, conduit, sleeves, and other embedded items. Furnish drawings and descriptions of shoring and reshoring methods proposed for slabs, beams, and other horizontal concrete members.

1.6.3 Certificates

1.6.3.1 Curing Concrete Elements

Submit proposed materials and methods for curing concrete elements.

1.6.3.2 Form Removal Schedule

Submit schedule for form removal indicating element and minimum length of

time for form removal. Submit technical literature of forming material or liner, form release agent, form ties, and gasketing to prevent leakage at form and construction joints. Provide a full description of materials and methods to be used to patch form-tie holes.

1.6.3.3 Concrete Placement and Consolidation

- a. Submit technical literature for equipment and methods proposed for use in placing concrete. Include pumping or conveying equipment including type, size and material for pipe, valve characteristics, and the maximum length and height concrete will be pumped. No adjustments shall be made to the mixture design to facilitate pumping.
- b. Submit technical literature for equipment and methods proposed for vibrating and compacting concrete. Submittal shall include technical literature describing the equipment including vibrator diameter, length, frequency, amplitude, centrifugal force, and manufacturer's description of the radius of influence under load. Where flat work is to be cast, provide similar information relative to the proposed compacting screed or other method to ensure dense placement.

1.6.3.4 Quality Assurance

Develop and submit for approval a quality control plan in accordance with the guidelines of ACI 121R and as specified herein. The plan shall include plans for the concrete supplier, the reinforcing steel supplier, and installer and address aspects of the mix design, materials, and workmanship that may affect the ultimate performance of the structure. Maintain a copy of ACI SP-15 and CRSI Manual of Practice at the project site.

1.6.3.5 Mixture Designs

Provide a detailed report of materials and methods used, test results, and the field test strength (fcr) for marine concrete required to meet structural and durability requirements.

- 1.6.4 Test Reports
- 1.6.4.1 Concrete Mixture Proportions
 - a. Submit copies of test reports by independent test labs conforming to ASTM C1077 showing that the mixture has been successfully tested to produce concrete with the properties specified and that mixture will be suitable for the job conditions. Test reports shall be submitted along with the concrete mixture proportions. Obtain approval before concrete placement.
 - b. Fully describe the processes and methodology whereby mixture proportions were developed and tested and how proportions will be adjusted during progress of the work to achieve, as closely as possible, the designated levels of relevant properties.

1.6.4.2 Fly Ash and Natural Pozzolan

Submit test results in accordance with ASTM C618. Submit test results performed within 6 months of submittal date.

1.6.4.3 Aggregates

Submit test results for aggregate quality in accordance with ASTM C33/C33M, and the combined gradation curve proposed for use in the work and used in the mixture qualification, and ASTM C295 for results of petrographic examination. Where there is potential for alkali-silica reaction, provide results of tests conducted in accordance with ASTM C1260. Submit results of all tests during progress of the work in tabular and graphical form as noted above, describing the cumulative combined aggregate grading and the percent of the combined aggregate retained on each sieve.

1.6.4.4 Admixtures

Submit test results in accordance with ASTM C494/C494M and ASTM C1017/C1017M for concrete admixtures, ASTM C260 for air-entraining agent, and manufacturer's literature and test reports for corrosion inhibitor and anti-washout admixture. Submitted data shall be based upon tests performed within 6 months of submittal.

1.6.4.5 Cement

Submit test results in accordance with ASTM C150/C150M portland cement and/or ASTM C595/C595M and ASTM C1157/C1157M for blended cement. Submit current mil data.

1.6.4.6 Water

Submit test results in accordance with ASTM D512 and ASTM D516.

- PART 2 PRODUCTS
- 2.1 CONCRETE
- 2.1.1 Strength

ACI 201.2R and ACI 211.1. For structural elements to be exposed in a marine environment, adjust the concrete 28-day design strength to produce concrete of minimum design strength (f'c) of 5000 psi.

The minimum required average compressive strength (f'cr) shall exceed the specified design strength (f'c) as per ACI 301.

Special Note: The compressive strength resulting from concrete mixtures meeting the project durability requirements may exceed the required structural compressive strength.

2.1.2 CONTRACTOR-Furnished Mixture Proportions

- a. Strength. Strength requirements shall be based on 28-day compressive strength determined on 6 by 12 inch cylindrical specimens in accordance with ASTM C39/C39M. The specified compressive strength of the concrete (f'c) for each portion of the structure shall meet the requirements in the contract documents.
- b. The mixture proportions and Water-Cementitious Materials Ratio for marine concrete shall be developed by the CONTRACTOR to produce the design strength (f'c) and to provide durability, workability, and mixture consistency to facilitate placement, consolidation into the forms and around reinforcement without segregation or bleeding. The

requirements for durability consideration specified in Table 1 and subparagraph "g", below, shall be incorporated in the mixture proportions.

Concrete Element	Maximum W/C	Minimum Cementitious Material W/CM	Minimum Portland Cement 1b/CY	Calcium Nitrite Corrosion Inhibitor gal/CY	Fibers 1b/CY
Shoreline Bulhead Cap, Stage II (Above Stage I Cap)	0.40	675	505	None	1.5
Concrete for Civil Sitework and other Concrete	0.45	607	505	None	1.5

- c. One mechanism of material deterioration that results in cracking is the formation of expansive compounds formed either by aggregate reactivity to cement alkali or by chemical reactions between elements of seawater and the hydrated cement paste. As such, the selection of aggregates (coarse and fine) shall present a low risk to producing expansive by-products due to chemical reactions. Maximum allowable expansion is 0.08 percent at 14 days per ASTM C1260. If this is not met, then maximum allowable expansion for the proposed concrete mixture/s shall be 0.08 percent at 14 days per ASTM C1567. All aggregate sources shall be tested. Also, provide documentation that the aggregate has no history of chemical deterioration in concrete. All data shall be no more than 90 days old at the time of submittal.
- d. Shrinkage Limits of Mixture Designs. Drying shrinkage of concrete for mixture design trial batches at 21 days of age shall not exceed 0.04 percent based on the averaged results from three or more specimens constituting a test set; however, the results from any individual specimen from the trial batches which are less than the shrinkage value obtained by subtracting 0.009 percent shrinkage from the average shall be discarded and a new average established. Test procedures and test specimens shall conform to the following:

The "Drying Shrinkage" specimen shall be fabricated, cured, dried and measured in the manner outlined in ASTM C157/C157M and modified as follows:

Specimens shall be removed from molds at an age of 23 hours plus or minus 1 hour after trial batching, shall be placed immediately in lime-saturated water at 73 degrees F plus or minus 1 degrees F for at least 30 minutes, and shall be measured within 30 minutes thereafter to determine original length, then submerged in lime-saturated water at 73 degrees F plus or minus 3 degrees F. Measurement to determine expansion expressed as a percentage of original length shall be made at age 7 days. This length at age 7 days shall be the base length for drying shrinkage calculations. Specimens then shall be stored immediately in a humidity control room maintained at 73 degrees F plus or minus 3 degrees F and 50 percent plus or minus 4 percent relative humidity for the remainder of the test.

Measurement to determine shrinkage as a percentage of base length shall be made and reported separately for concrete age of 7, 14, 21, and 49 days.

- e. Supplemental Cementitious Materials Content. The concrete mixture shall contain a minimum amount of Type F fly ash indicated in Table 1, not to exceed 35% of cement by weight.
- f. Slump. The concrete mixture shall be proportioned to have, at the point of deposit, a maximum slump of 4 inches as determined by ASTM C143/C143M. Where an ASTM C494/C494M, Type F or G admixture is used, the slump after the addition of the admixture shall be no less than 6 inches nor greater than 8 inches. Slump tolerances shall comply with the requirements of ACI 117. Caution is required when using this admixture for pavement areas that require finishing. Formwork shall be specifically designed to withstand additional pressures that may be associated with these or similar admixtures.
- g. Total Chloride Ion Content. Concrete shall be tested for total water soluble chloride ion content.

2.2 MATERIALS

2.2.1 Cement

ASTM C150/C150M, Type II is appropriate for exposure to seawater to resist "moderate sulfate attack" and shall have a tricalcium aluminate (C3A) content of 6 to 8 percent. A maximum cement-alkali content of 0.60 percent Na_2O (sodium oxide)equivalent is to avoid deterioration caused by ASR. The use of Type I cement is not acceptable in a marine environment. Cements marked Type I/II may be used provided that they comply with all criteria for ASTM C150/C150M Type II. Use one manufacturer for each type of cement and fly ash.

2.2.1.1 Fly Ash

ASTM C618, Type F, except that the maximum allowable loss on ignition shall be 6 percent and total alkalis (sum of sodium and potassium oxides) should not exceed 3 percent.

2.2.2 Water

Water shall comply with the requirements of ASTM C94/C94M and the chloride and sulfate limits in accordance with ASTM D512 and ASTM D516. Mixing water shall not contain more than 500 parts per million of chlorides as Cl and not more than 1000 parts per million of sulfates as SO_4 . Water shall be free from injurious amounts of oils, acids, alkalies, salts, and organic materials. Where water from reprocessed concrete is proposed for use in the work, submit results of tests to verify that the treatment has negated adverse effects of deleterious materials.

2.2.3 Aggregates

ASTM C33/C33M, except as modified herein.

- a. The combined aggregates in the mixture (coarse, fine, and blending sizes) shall be well graded from the coarsest to the finest with not more than 18 percent nor less than 8 percent, unless otherwise permitted, of the combined aggregate retained on any individual sieve with the exceptions that the No. 50 may have less than 8 percent retained, sieves finer than No. 50 shall have less than 8 percent retained, and the coarsest sieve may have less than 8 percent retained. Use blending sizes where necessary, to provide a well graded combined aggregate. Reports of individual aggregates shall include standard concrete aggregate sieve sizes including 1-1/2 inches, one inch, 3/4 inch, 1/2 inch, 3/8 inch, No. 4, No. 8, No. 16, No. 30, No. 50, and No. 100.
- b. Provide aggregates for exposed concrete from one source. Aggregate reactivity shall be limited per paragraph 2.1.2. Provide aggregate containing no deleterious material properties as identified by ASTM C295.
- c. Where a size designation is indicated, that designation indicates the nominal maximum size of the coarse aggregate.
- d. Current data is required. Current data means data shall be not more than 180 days from the date of concrete mixture submittal.
- e. Marine aggregate may be used when conforming to ASTM C33/C33M and if it originates from the up-current side of the land mass and it has been washed by the fresh water so that the total chloride and sulfate content of the concrete mixture does not exceed the limits defined herein.
- f. Fibers. Fillibrated polypropylene fiber shall comply with ASTM D7508/D7508M, ASTM C1116/C116M Section 4.13 Type III and Note 2 and the requirements of ICC ES AC32 Sections 3.11 and 3.12.
- 2.2.4 Nonshrink Grout

ASTM C1107/C1107M.

2.2.5 Admixtures

- a. Provide chemical admixtures that comply with the requirements shown below and in accordance with manufacturer's recommendations, and appropriate for the climatic conditions and the construction needs. Do not use calcium chloride or admixtures containing chlorides from other than impurities from admixture ingredients.
- b. Provide maximum concentrations of corrosion-inducing chemicals as shown in Table 2 below. For concrete that may be in contact with prestressing steel tendons, the concentration shall not exceed 60 percent of the limits given in Table 2. For the concentration in grout for prestressing ducts, do not exceed 25 percent of the limits in Table 2.

Chemical*	Limits, Percent**	Test Method	
Chlorides	0.10	ASTM D512	
Fluorides	0.10	ASTM D1179	
Sulphites	0.13	ASTM D1339	
Nitrates	0.17	ASTM D3867	

Table 2 - Limits on Corrosion-Inducing Chemicals

* Limits refer to water-soluble chemicals

** Limits are expressed as a percentage of the mass of the total cementitious materials.

c. The total alkali content shall not increase the total sodium-oxide equivalent alkali content of the concrete by more than 0.5 lb/yd3.

2.2.5.1 Air Entraining Admixture

Provide air entraining admixtures conforming to ASTM C260. Provide the admixture of such a type and dosage that the total air content in the hardened concrete can be readily maintained at 5.5 percent plus/minus 1.5 percent. Variation outside these ranges shall not be reason to reject the concrete batch.

2.2.5.2 Accelerating

ASTM C494/C494M, Type C.

2.2.5.3 Retarding

ASTM C494/C494M, Type B, D, or G.

2.2.5.4 Water Reducing

ASTM C494/C494M, Type A, E, or F.

2.2.5.5 High Range Water Reducer (HRWR)

ASTM C494/C494M, Type F, and ASTM C1017/C1017M.

2.2.6 Materials for Forms

Provide wood, plywood, or steel. Use plywood or steel forms where a smooth form finish is required. Lumber shall be square edged or tongue-and-groove boards, free of raised grain, knotholes, or other surface defects. Plywood: PS-1, B-B concrete form panels or better. Steel form surfaces shall not contain irregularities, dents, or sags.

2.2.6.1 Form Ties and Form-Facing Material

- a. Provide a form tie system that does not leave mild steel after break-off or removal any closer than 2 inches from the exposed surface. Do not use wire alone. Form ties and accessories shall not reduce the effective cover of the reinforcement.
- b. Form-facing material shall be structural plywood or other material that can absorb air trapped in pockets between the form and the concrete and

some of the high water-cementitious materials ratio surface paste. Maximum use is three times. Provide forms with a form treatment to prevent bond of the concrete to the form.

- c. As an alternate to using an absorptive wood form contact face as a form liner, use a Controlled Permeability Formliner in strict accordance with the manufacturer's recommendations.
- 2.2.7 Reinforcement
- 2.2.7.1 Reinforcing Bars

ACI 301 unless otherwise specified. Provide reinforcing steel meeting the requirements of ASTM A615/A615M grade as shown on contract drawings. Provide reinforcing bars that meet the requirements of ASTM A706/A706M, grade 60, where indicated on the contract documents.

2.2.7.2 Mechanical Reinforcing Bar Connectors

ACI 301. Provide 125 percent minimum yield strength of the reinforcement bar.

2.2.7.3 Wire

ASTM A82/A82M or ASTM A496/A496M.

- 2.2.8 Materials for Curing Concrete
- 2.2.8.1 Impervious Sheeting

ASTM C171; waterproof paper, clear or white polyethylene sheeting, or polyethylene-coated burlap.

2.2.8.2 Pervious Sheeting

AASHTO M 182.

2.2.8.3 Liquid Membrane-Forming Compound

ASTM C309, white-pigmented, Type 2, Class B.

2.2.9 Liquid Chemical Sealer-Hardener Compound

Provide magnesium fluosilicate compound which when mixed with water seals and hardens the surface of the concrete. Do not use on exterior slabs exposed to freezing conditions. Compound shall not reduce the adhesion of resilient flooring, tile, paint, roofing, waterproofing, or other material applied to concrete.

2.2.10 Expansion/Contraction Joint Filler

ASTM D1751 or ASTM D1752, 1/2 inch thick, or as indicated on project drawings.

- 2.2.11 Joint Sealants
- 2.2.11.1 Horizontal Surfaces, 3 Percent Slope, Maximum

ASTM D1190 or ASTM C920, Type M, Class 25, Use T.

2.2.11.2 Vertical Surfaces Greater Than 3 Percent Slope

ASTM C920, Type M, Grade NS, Class 25, Use T. FS SS-S-1614, FS SS-S-200, no saq.

2.2.12 Epoxy Bonding Compound

ASTM C881/C881M. Provide Type I for bonding hardened concrete to hardened concrete; Type II for bonding freshly mixed concrete to hardened concrete; and Type III as a binder in epoxy mortar or concrete, or for use in bonding skid-resistant materials to hardened concrete. Provide Grade 1 or 2 for horizontal surfaces and Grade 3 for vertical surfaces. Provide Class A if placement temperature is below 40 degrees F; Class B if placement temperature is between 40 and 60 degrees F; or Class C if placement temperature is above 60 degrees F.

- PART 3 EXECUTION
- 3.1 FORMS
 - a. ACI 301. Concrete for footings may be placed in excavations without forms upon inspection and approval by the OWNER. Excavation width shall be a minimum of 4 inches greater than indicated. Set forms mortar-tight and true to line and grade. Chamfer above grade exposed joints, edges, and external corners of concrete 0.75 inch unless otherwise indicated. Forms submerged in water shall be tight enough to prevent water flow through them.
 - b. Provide formwork with clean-out openings to permit inspection and removal of debris. Formwork shall be gasketed or otherwise rendered sufficiently tight to prevent leakage of paste or grout under heavy, high-frequency vibration. Use a release agent that does not cause surface dusting. Limit reuse of plywood to no more than three times. Reuse may be further limited by the OWNER if it is found that the pores of the plywood are clogged with paste to the degree that the wood does not absorb the air or the high water-cementitious materials ratio concrete surface.
 - c. Patch form tie holes with a nonshrink patching material in accordance with the manufacturer's recommendations and subject to approval.
 - d. Provide form tolerances that represent the most restrictive requirements from ACI 117, Chapters 8 and 11. Formwork shall produce concrete surfaces that are consistent with the concrete's final use. Faces to receive fender elements shall not vary from a theoretical vertical plane by more than 1/8 inch.

Surfaces to receive armor, mooring hardware, or other hardware shall be consistent with the minimum grout thickness requirements. Joint armor elements shall be cast-in-place.

3.1.1 Coating

Before concrete placement, coat the contact surfaces of forms with a nonstaining mineral oil, nonstaining form coating compound, or two coats of nitrocellulose lacquer. Do not use mineral oil on forms for surfaces to which adhesive, paint, or other finish material is to be applied.

3.1.2 Removal of Forms and Supports

After placing concrete, forms shall remain in place for the time periods specified in ACI 347, except for concrete placed underwater, forms shall remain in place 48 hours. Prevent concrete damage during form removal.

3.1.2.1 Special Requirements for Reduced Time Period

Forms may be removed earlier than specified if ASTM C39/C39M test results of field-cured samples from a representative portion of the structure or other approved and calibrated non-destructive testing techniques show that the concrete has reached a minimum of 85 percent of the design strength.

3.2 PLACING REINFORCEMENT AND MISCELLANEOUS MATERIALS

ACI 301. Remove rust, scale, oil, grease, clay, or foreign substances from reinforcing that would reduce the epoxy coating bond from reinforcing. Do not tack weld. Inspect placed steel reinforcing for coating cleanness prior to placing concrete. Remove all debris, dust, or foreign matter.

3.2.1 Reinforcement Supports

Place reinforcement and secure with noncorrodible chairs, spacers, or metal hangers. Support reinforcement on the ground with concrete or other noncorrodible material, having a compressive strength equal to or greater than the concrete being placed and having a permeability equal or less than the concrete being placed.

3.2.2 Splicing

As indicated. For splices not indicated, ACI 301. Do not splice at points of maximum stress. Overlap welded wire fabric the spacing of the cross wires, plus 2 inches. If welds are specified and ASTM A706/A706M rebar is provided, weld in accordance with AWS D1.4/D1.4M.

3.2.3 Future Bonding

Plug exposed, threaded, mechanical reinforcement bar connectors with a greased bolt. Bolt threads shall match the connector. Countersink the connector in the concrete. Calk the depression after the bolt is installed.

3.2.4 Cover

Uniform, high quality concrete cover over the steel reinforcement is critically important for long-term durability. The cover to the principal reinforcing bars shall be as shown on contract drawings, but not less than 2 times the nominal maximum aggregate size nor less than 1.5 times the effective diameter of the reinforcing bars. ACI 117 shall be used for tolerances of concrete cover.

3.2.5 Setting Miscellaneous Material and Prestress Anchorages

Place and secure anchors, bolts, pipe sleeves, conduits, and other such items in position before concrete placement. Plumb anchor bolts and check location and elevation. Temporarily fill voids in sleeves with readily removable material to prevent the entry of concrete. Electrically isolate exposed steel work and its anchor systems from the primary steel reinforcement with at least 2 inches of concrete. Coat exposed steel work to reduce corrosion. Take particular care to ensure against corrosion on edges and horizontal surfaces. Use epoxy coatings for protection of carbon steel plates and fittings.

3.2.6 Construction Joints

Locate joints to least impair strength. Continue reinforcement across joints unless otherwise indicated. Final joint locations are subject to OWNER approval or substantiating calculations from the CONTRACTOR.

3.2.7 Expansion Joints and Contraction Joints

Provide expansion joint at edges of interior floor slabs on grade abutting vertical surfaces, and as indicated. Make expansion joints 1/2 inch wide unless indicated otherwise. Fill expansion joints not exposed to weather with preformed joint filler material. Completely fill joints exposed to weather with joint filler material and joint sealant. Do not extend reinforcement or other embedded metal items bonded to the concrete through any expansion joint unless an expansion sleeve is used. Place contraction joints, either formed or saw cut or cut with a jointing tool, to the indicated depth after the surface has been finished. Sawed joints shall be completed within 4 to 12 hours after concrete placement. Protect joints from intrusion of foreign matter.

3.2.8 Pits and Trenches

Place bottoms and walls monolithically or provide waterstops and keys. Place concrete in such a manner that provides uniform bearing/seating of pit and trench covers and other hardware.

3.3 BATCHING, MEASURING, MIXING, AND TRANSPORTING CONCRETE

ASTM C94/C94M, ACI 301, and ACI 304R, except as modified herein. Batching equipment shall be such that the concrete ingredients are consistently measured within the following tolerances: 1 percent for cement and water, 2 percent for aggregate, and 3 percent for admixtures. Furnish mandatory batch tickets imprinted with mix identification, batch size, batch design and measured weights, moisture in the aggregates, amount of water to be added in the field which does not exceed the W/C of the mix design, and time batched for each load of ready mix concrete. When a pozzolan is batched cumulatively with the cement, it shall be batched after the cement has entered the weight hopper.

3.3.1 Measuring

Make measurements at intervals as specified in paragraphs entitled "Sampling" and "Testing."

Adjust batch proportions to replicate the mixture design using methods provided in the approved quality assurance plan. Base the adjustments on results of tests of materials at the batch plant for use in the work. Maintain a full record of adjustments and the basis for each.

3.3.2 Mixing

ASTM C94/C94M and ACI 301. Machine mix concrete. Begin mixing within 30 minutes after the cement has been added to the aggregates. Place concrete within 90 minutes of either addition of mixing water to cement and aggregates or addition of cement to aggregates if the air temperature is less than 85 degrees F. Reduce mixing time and place concrete within 60

minutes if the air temperature is greater than 85 degrees F except as follows: if set retarding admixture is used and slump requirements can be met, limit for placing concrete may remain at 90 minutes. Dissolve admixtures in the mixing water and mix in the drum to uniformly distribute the admixture throughout the batch.

3.3.3 Transporting

Transport concrete from the mixer to the forms as rapidly as practicable. Prevent segregation or loss of ingredients. Clean transporting equipment thoroughly before each batch. Do not use aluminum pipe or chutes. Remove concrete which has segregated in transporting and dispose of as directed.

3.4 PLACING CONCRETE

Place concrete as soon as practicable after the forms and the reinforcement have been inspected and approved. Do not place concrete when weather conditions prevent proper placement and consolidation; in uncovered areas during periods of precipitation; or in standing water. Prior to placing concrete, remove dirt, construction debris, water, snow, and ice from within the forms. Deposit concrete as close as practicable to the final position in the forms. Do not exceed a free vertical drop of 3 feet from the point of discharge. Place concrete in one continuous operation from one end of the structure towards the other or lifts for vertical construction. Position grade stakes on 20 foot centers maximum for exterior slabs. NO CONCRETE SHALL BE PLACED WITHIN 100 FEET OF PILE DRIVING OPERATIONS OR EARTH COMPACTION OPERATIONS.

3.4.1 Vibration

Comply with the requirements of ACI 309R and ASTM A934/A934M using vibrators with a minimum frequency of 9000 vibrations per minute (VPM). Use only high cycle or high frequency vibrators. Motor-in-head 60 cycle vibrators may not be used. For walls and deep beams, use a minimum of two vibrators with the first to melt down the mixture and the second to thoroughly consolidate the mass. Provide a spare vibrator at the casting site whenever concrete is placed. Place concrete in 18 inch maximum vertical lifts. Insert and withdraw vibrators approximately18 inches apart. Penetrate at least 8 inches into the previously placed lift with the vibrator when more than one lift is required. Extract the vibrator using a series of up and down motions to drive the trapped air out of the concrete and from between the concrete and the forms.

For slab construction use vibrating screeds designed to consolidate the full depth of the concrete. Where beams and slabs intersect, use an internal vibrator to consolidate the beam. Do not vibrate concrete placed under water in accordance with subpart 3.4.5.

3.4.2 Pumping

ACI 304R and ACI 304.2R. Pumping shall not result in separation or loss of materials nor cause interruptions sufficient to permit loss of plasticity between successive increments. Loss of slump in pumping equipment shall not exceed 2 inches. Do not use pipe made of aluminum or aluminum alloy. Avoid rapid changes in pipe sizes. Limit maximum size of coarse aggregate to 33 percent of the diameter of the pipe. Maximum size of well rounded aggregate shall be limited to 40 percent of the pipe diameter. Take samples for testing at both the point of delivery to the pump and at the discharge end.

3.4.3 Cold Weather

ACI 306.1. Do not allow concrete temperature to decrease below 50 degrees F. Obtain approval prior to placing concrete when ambient temperature is below 40 degrees F or when concrete is likely to be subjected to freezing temperatures within 24 hours. Cover concrete and provide sufficient heat to maintain 50 degrees F minimum adjacent to both the formwork and the structure while curing. Limit the rate of cooling to 5 degrees F in any one hour and 50 degrees F per 24 hours after heat application.

3.4.4 Hot Weather

ACI 305R. Maintain required concrete temperature using Figure 2.1.5, "Effect of Concrete Temperatures, Relative Humidity, and Wind Velocity on the Rate of Evaporation of Surface Moisture From Concrete" in ACI 305R to prevent the evaporation rate from exceeding 0.2 pound of water per square foot of exposed concrete per hour. Cool ingredients before mixing or use other suitable means to control concrete temperature and prevent rapid drying of newly placed concrete. Shade the fresh concrete as soon as possible after placing. Start curing when the surface of the fresh concrete is sufficiently hard to permit curing without damage. If the evaporation rate exceeds 0.1 pound of water per square foot per hour, foq spray the exposed concrete surfaces until active moist curing is applied.Provide water hoses, pipes, spraying equipment, and water hauling equipment, where job site is remote to water source, to maintain a moist concrete surface throughout the curing period. Provide burlap cover or other suitable, permeable material with fog spray or continuous wetting of the concrete when weather conditions prevent the use of either liquid membrane curing compound or impervious sheets. For vertical surfaces, protect forms from direct sunlight and add water to top of structure once concrete is set.

3.5 SURFACE FINISHES

3.5.1 Defects

Repair formed surfaces by removing minor honeycombs, pits greater than one square inch surface area or 0.25 inch maximum depth, or otherwise defective areas. Provide edges perpendicular to the surface and patch with nonshrink grout. Patch tie holes and defects when the forms are removed. Concrete with extensive honeycomb including exposed steel reinforcement, cold joints, entrapped debris, separated aggregate, or other defects which affect the serviceability or structural strength will be rejected, unless correction of defects is approved. Obtain approval of corrective action prior to repair. The surface of the concrete shall not vary more than the allowable tolerances of subparts 3.1.d and 3.2.8. Exposed surfaces shall be uniform in appearance and finished to a smooth form finish unless otherwise indicated.

3.5.2 Not Against Forms (Top of Walls)

Finish surfaces not otherwise specified with wood floats to even surfaces, and match adjacent finishes.

3.5.3 Formed Surfaces

3.5.3.1 Tolerances

ACI 117 and as indicated in subparts 3.1.d and 3.2.8.

3.5.3.2 As-Cast Rough Form

Provide for surfaces not exposed to view. Patch holes and defects and level abrupt irregularities. Remove or rub off fins and other projections exceeding 0.25 inch in height.

3.5.3.3 As-Cast Form

Provide form facing material producing a smooth, hard, uniform texture on the concrete. Arrange facing material in an orderly and symmetrical manner and keep seams to a practical minimum. Support forms as necessary to meet required tolerances. Material with raised grain, torn surfaces, worn edges, patches, dents, or other defects which will impair the texture of the concrete surface shall not be used. Patch tie holes and defects and completely remove fins.

3.5.4 Surface Finish

Provide concrete indicated with a surface finish as follows in Table 3:

Table 3 - Surface Finishes

Concrete	Surface
Element	Finish
Bulkhead Cap, Stage II	Trowel

3.6 FINISHES FOR HORIZONTAL CONCRETE SURFACES

3.6.1 Finish

ACI 301. Place, consolidate, and immediately strike off concrete to obtain proper contour, grade, and elevation before bleedwater appears. Permit concrete to attain a set sufficient for floating and supporting the weight of the finisher and equipment. If bleedwater is present prior to floating the surface, drag excess water off or remove by absorption with porous materials. Do not use dry cement to absorb bleedwater.

3.6.1.1 Scratched

Use for surfaces intended to receive bonded applied cementitious applications. After the concrete has been placed, consolidated, struck off, and leveled, the surface shall be roughened with stiff brushes of rakes before final set.

3.6.1.2 Floated

After the concrete has been placed, consolidated, struck off, and leveled, do not work the concrete further, until ready for floating. Whether floating with a wood, magnesium, or composite hand float, with a bladed power trowel equipped with float shoes, or with a powered disc, float shall begin when the surface has stiffened sufficiently to permit the operation.

3.6.1.3 Broomed

Perform a floated finish, then draw a broom or burlap belt across the surface to produce a coarse scored texture. Permit surface to harden sufficiently to retain the scoring or ridges. Broom transverse to traffic or at right angles to the slope of the slab.

3.6.1.4 Pavement

Screed the concrete with a template advanced with a combined longitudinal and crosswise motion. Maintain a slight surplus of concrete ahead of the template. After screeding, float the concrete longitudinally. Use a straightedge to check slope and flatness; correct and refloat as necessary. Obtain final finish by a burlap drag. Drag a strip of clean, wet burlap from 3 to 10 feet wide and 2 feet longer than the pavement width across the slab . Produce a fine, granular, sandy textured surface without disfiguring marks. Round edges and joints with an edger having a radius of 1/8 inch.

3.6.1.5 Concrete Topping Placement

Remove dirt, laitance, and loose aggregate by means of a stiff wire broom. Keep the base wet for a period of 12 hours preceeding the application of the topping. Remove excess water prior to the topping placement. Do not allow temperature differential between the completed base and the topping to exceed 10 degrees F at the time of placing. Place the topping and finish by screeding level with bull float finish.

3.7 CURING AND PROTECTION

- a. ACI 301 and ACI 308R unless otherwise specified. Prevent concrete from drying by misting surface of concrete. Begin curing immediately following final set. Avoid damage to concrete from vibration created by blasting, pile driving, movement of equipment in the vicinity, disturbance of formwork or protruding reinforcement, by rain or running water, adverse weather conditions, and any other activity resulting in ground vibrations. Protect concrete from injurious action by sun, rain, flowing water, frost, mechanical injury, tire marks, and oil stains. Do not allow concrete to dry out from time of placement until the expiration of the specified curing period. Do not use membrane-forming compound on surfaces where appearance would be objectionable, on any surface to be painted, where coverings are to be bonded to the concrete , or on concrete to which other concrete is to be bonded. If forms are removed prior to the expiration of the curing period, provide another curing procedure specified herein for the remaining portion of the curing period. Provide moist curing for those areas receiving liquid chemical sealer-hardener or epoxy coating. For concrete slabs or wide beams containing silica fume, fog spray and install wind breaks to ensure 100 percent relative humidity until wet curing is started.
- b. Wet cure marine concrete using potable water for a minimum of 7 days. Pond water continuously on flat surfaces. Run misters and soaker hoses continuously to keep concrete surfaces completely saturated. Do not allow construction loads to exceed the superimposed load which the structural member, with necessary supplemental support, is capable of carrying safely and without damage.

3.7.1 Moist Curing

Remove water without erosion or damage to the structure.

3.7.1.1 Ponding or Immersion

Continually immerse the concrete throughout the curing period. Water shall not be 20 degrees F less than the temperature of the concrete. For temperatures between 40 and 50 degrees F, increase the curing period by 50 percent.

3.7.1.2 Fog Spraying or Sprinkling

Apply water uniformly and continuously throughout the curing period. For temperatures between 40 and 50 degrees F, increase the curing period by 50 percent.

3.7.1.3 Pervious Sheeting

Completely cover surface and edges of the concrete with two thicknesses of wet sheeting. Overlap sheeting 6 inches over adjacent sheeting. Sheeting shall be at least as long as the width of the surface to be cured. During application, do not drag the sheeting over the finished concrete nor over sheeting already placed. Wet sheeting thoroughly and keep continuously wet throughout the curing period.

3.7.1.4 Impervious Sheeting

Wet the entire exposed surface of the concrete thoroughly with a fine spray of water and cover with impervious sheeting throughout the curing period. Lay sheeting directly on the concrete surface and overlap edges 12 inches minimum. Provide sheeting not less than 18 inches wider than the concrete surface to be cured. Secure edges and transverse laps to form closed joints. Repair torn or damaged sheeting or provide new sheeting. Cover or wrap columns, walls, and other vertical structural elements from the top down with impervious sheeting; overlap and continuously tape sheeting joints; and introduce sufficient water to soak the entire surface prior to completely enclosing.

3.7.2 Curing Periods

Moist cure concrete using potable water for a minimum of 7 days. Begin curing immediately after placement. Protect concrete from premature drying, excessively hot temperatures, and mechanical injury; and maintain minimal moisture loss at a relatively constant temperature for the period necessary for hydration of the cement and hardening of the concrete. The materials and methods of curing shall be subject to approval by the OWNER.

3.8 FIELD QUALITY CONTROL

Field quality control is the responsibility of the CONTRACTOR. All plastic concrete properties are to be monitored and controlled to meet the CONTRACTOR's constructability demands. There are field quality control requirements for compressive strength and durability. These are also the responsibility of the CONTRACTOR. The cost of testing will be paid for by OWNER.

Acceptance criteria for cylinder compressive strength are provided in 3.8.3.3.

Acceptance criteria for durability are described for evaluated mixes in 3.8.1. Field concrete durability acceptance criteria is provided in 3.8.3.5.

3.8.1 Sampling

- a. ASTM C172. Collect samples of fresh concrete to perform tests specified. ASTM C31/C31M for making test specimens.
- b. At the discretion of the OWNER, samples will be collected from either the truck or the end of the tremmie pipe (for pumped concrete). Sample concrete on a random basis except where a batch appears to be deficient and the test can be used to verify the observed deviation. Identify samples so taken in a manner that they can be distinguished from other samples. Obtain six 6 by 12 inch for each 100 cubic yards, or fraction thereof, of each design mixture of concrete placed in any one day. If evidence exists that warrants additional testing or if tested concrete does not meet the minimum requirements set forth herein, increase testing frequencies to one test set per 50 CY.

3.8.2 Testing

3.8.2.1 Slump Tests

ASTM C143/C143M. Take concrete samples during concrete placement. The maximum slump may be increased as specified with the addition of an approved high range water reducing (HRWR) admixture provided that the water-cementitious ratio is not exceeded. Perform tests at commencement of concrete placement, when test cylinders are made, and for each batch (minimum) or every 10 cubic yards (maximum) of concrete.

3.8.2.2 Temperature Tests

- a. Test the concrete delivered and the concrete in the forms. Perform tests in hot or cold weather conditions below 50 degrees F and above 80 degrees F for each batch (minimum) or every 10 cubic yards (maximum) of concrete, until the specified temperature is obtained, and whenever test cylinders and slump tests are made.
- b. Determine temperature of each composite sample in accordance with ASTM C1064/C1064M. When the average of the highest and lowest temperature during the period from midnight to midnight is expected to drop below 40 degrees F for more than 3 successive days, concrete shall be delivered to meet the following minimum temperature at the time of placement:
 - (1) 55 degrees F for sections less than 12 inches in the least dimension
 - (2) 50 degrees F for sections 12 to 36 inches in the least dimension
 - (3) 45 degrees F for sections 36 to 72 inches in the least dimension
 - (4) 40 degrees F for sections greater than 72 inches in the least dimension
- c. The minimum requirements may be terminated when temperatures above 50 degrees F occur during more than half of any 24 hour duration. The temperature of concrete at time of placement shall not exceed 90

degrees F.

3.8.2.3 Compressive Strength Tests

ACI 214R tests for strength - conduct strength tests of concrete during construction in accordance with the following procedures:

- a. Mold and cure six 6 by 12 inch cylinders from each sample taken in accordance with ASTM C31/C31M. Prevent evaporation and loss of water from the specimen.
- b. Test cylinders in accordance with ASTM C39/C39M. Test one cylinder at 3 days, two cylinders at 7 days, two cylinders at 28 days, and hold one cylinder in reserve. The compressive strength test results for acceptance shall be the average of the compressive strengths from the two specimens tested at 28 days. If one specimen in a test shows evidence of improper sampling, molding or testing, discard the specimen and consider the strength of the remaining cylinder to be the test result. If both specimens in a test show any defects, the OWNER may allow the entire test to be discarded.
- c. If the average of any three consecutive strength test results is less than the specified strength (f'c) or the minimum test strength (fcr) for durability, whichever is higher, by more the 500 psi, take a minimum of three core samples in accordance with ASTM C42/C42M, from the in-place work represented by the low test results. Locations represented by erratic core strengths shall be retested. Remove concrete not meeting strength criteria and provide new acceptable concrete. Repair core holes with nonshrink grout. Match color and finish of adjacent concrete.
- d. Strength test reports shall include location in the work where the batch represented by a test was deposited, batch ticket number, time batched and sampled, slump, air content (where specified), mixture and ambient temperature, unit weight, and water added on the job. Reports of strength tests shall include detailed information of storage and curing of specimens prior to testing.
- e. Final reports shall be provided within 7 days of test completion.

3.8.2.4 Air Content

ASTM C173/C173M or ASTM C231 for normal weight concrete. Make air content tests on samples from the first three batches in the placement and until three consecutive batches have air contents within the range of the specified air content, at which time test every fifth batch. Maintain this test frequency until a batch is not within the specified range at which time resume testing of each batch until three consecutive batches have air contents within the specified range. Perform additional tests as necessary for control. Take air content tests from planned composite samples or from samples taken in accordance with ASTM C172 at the point of concrete placement.

3.8.2.5 Chloride Ion Concentration

ACI 318M. Determine water soluble chloride ion concentration. Perform test once for each mix design. The limits for average chloride ion content are provided in Table 4 below: Table 4 - Maximum Chloride Ion Content for Corrosion Protection

	Maximum water soluble
	chloride ion (C1) in concrete,
Type of Member	percent by weight of cement

Non prestressed concrete

0.10

3.8.2.6 Non-Destructive Tests

Non-destructive tests - use of the rebound hammer in accordance with ASTM C805/C805M, ASTM C597, or other non-destructive processes may be permitted by the OWNER in evaluating the uniformity and relative concrete strength in place, or for selecting areas to be cored.

Evaluate and validate test results conducted on properly calibrated equipment in accordance with standard ASTM procedures indicated.

3.8.3 Core Samples and Compressive Strength Testing

Obtain and test cores in accordance with ASTM C42/C42M.

If concrete in the structure is dry under service conditions, air dry cores (temperature 60 to 80 degrees F, relative humidity less than 60 percent) for 7 days before testing and test dry. Otherwise, test the cores, after moisture conditioning, in accordance with ASTM C42/C42M.

Acceptance criteria for cylinder compressive strength are provided in subpart 3.8.4 Acceptance of Concrete Strength.

Take at least three representative cores from each member or area of concrete in place that is considered potentially strength deficient. Impair the strength of the structure as little as possible. If, before testing, cores show evidence of having been damaged subsequent to or during removal from the structure, take replacement cores.

Fill core holes with low slump concrete or mortar of a strength equal to or greater than the original concrete.

The OWNER will evaluate and validate core tests in accordance with the specified procedures.

- 3.8.4 Acceptance of Concrete Strength
- 3.8.4.1 Standard Molded and Cured Strength Specimens

The acceptance of concrete strengths shall be based on averages of results from three consecutive compressive strength tests. When the averages of all sets of three consecutive compressive strength test results, equal or exceed the field test strength (fcr), and no individual strength test falls below fcr by more than 500 psi, the strength of the concrete is satisfactory. These criteria also apply when accelerated strength testing is specified unless another basis for acceptance is specified.

3.8.4.2 Non-Destructive Tests

Non-destructive tests may be used when permitted to evaluate concrete

where standard molded and cured cylinders have yielded results not meeting the criteria.

3.8.4.3 Core Tests

When the average compressive strengths of the representative cores are equal to at least 85 percent of the required field test strength (fcr), and if no single core is less than 75 percent of the required field test strength (fcr), the strength of concrete is satisfactory.

3.8.5 Inspection

ACI 311.4R. Inspect concrete placed under water with qualified ENGINEERs/divers. Provide a written report, sealed by a professional ENGINEER in the state of Texas that certifies the condition of the concrete to be in accordance with these specifications. Include existence and location(s) of voids, honeycombing, or other surface defects.

-- End of Section --

DIVISION 05 – METALS

SECTION 05 05 23

WELDING, STRUCTURAL

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC 360 (2010) Specification for Structural Steel Buildings

AMERICAN SOCIETY FOR NONDESTRUCTIVE TESTING (ASNT)

ASNT RP SNT-TC-1A (2006) Recommended Practice

AMERICAN WELDING SOCIETY (AWS)

AWS	A2.4	(2012) Standard Symbols for Welding, Brazing and Nondestructive Examination
AWS	D1.1/D1.1M	(2015) Structural Welding Code - Steel
AWS	D1.3/D1.3M	(2008; Errata 2008) Structural Welding Code - Sheet Steel
AWS	D1.4/D1.4M	(2011) Structural Welding Code - Reinforcing Steel
AWS	D14.1/D14.1M	(2005) Specification for Welding Industrial and Mill Cranes and Other Material Handling Equipment
AWS	Z49.1	(2012) Safety in Welding and Cutting and Allied Processes

ASTM INTERNATIONAL (ASTM)

ASTM E165	(2009) Standard Test Method for Liquid Penetrant Examination
ASTM E709	(2014) Standard Guide for Magnetic Particle Examination

1.2 SYSTEM DESCRIPTION

Conform the design of welded connections to AISC 360, unless otherwise indicated or specified. Material with welds will not be accepted unless the welding is specified or indicated on the drawings or otherwise reviewed. Perform welding as specified in this section, except where additional requirements are shown on the drawings or are specified in other sections. Do not commence welding until welding procedures, inspectors,

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nondestructive testing personnel, welders, welding operators, and tackers have been qualified and the submittals reviewed by the OWNER. Perform all testing at or near the work site. Each CONTRACTOR performing welding shall maintain records of the test results obtained in welding procedure, welder, welding operator, and tacker performance qualifications.

1.2.1 Pre-erection Conference

Hold a pre-erection conference prior to the start of the field welding, to bring all affected parties together and to gain a naturally clear understanding of the project and the Welding Procedure Specifications (WPS) (which the CONTRACTOR shall develop and submit for all welding, including welding done using pre-qualified procedures). Mandatory attendance is required by all CONTRACTOR's welding production and inspection personnel and appropriate OWNER's personnel. Include as items for discussion: responsibilities of various parties; welding procedures and processes to be followed; welding sequence (both within a joint and joint sequence within the building); inspection requirements and procedures, both visual and nondestructive testing; welding schedule; and other items deemed necessary by the attendees.

1.3 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Welding Procedure Qualifications

Welder, Welding Operator, and Tacker Qualification

Inspector Qualification

Previous Qualifications

Pre-qualified Procedures

Copies of the welding procedure specifications; the procedure qualification test records; and the welder, welding operator, or tacker qualification test records.

SD-06 Test Reports

Quality Control

Nondestructive Examination

A quality assurance plan and records of tests and inspections. Submit all records of nondestructive examination in accordance with paragraph "Acceptance Requirements".

SD-07 Certificates

Certified Welding Procedure Specifications (WPS)

Certified Procedure Qualification Records (PQR)

Certified Welder Performance Qualifications (WPQ)

Certificates in accordance with paragraph "Other Applications".

1.4 QUALITY ASSURANCE

Except for pre-qualified, in accordance with AWS D1.1/D1.1M and previously qualified procedures, each CONTRACTOR performing welding shall record in detail and qualify the welding procedure specification for any welding procedure followed in the fabrication of weldments. Conform welding procedure qualifications to AWS D1.1/D1.1M and to the specifications in this section. Submit for review copies of the welding procedure specification test for each type of welding which requires procedure qualification. Review of any procedure, however, does not relieve the CONTRACTOR of the sole responsibility for producing a finished structure meeting all the specified requirements. Submit this information on the forms in Annex M of AWS D1.1/D1.1M. Individually identify and clearly reference on the detail drawings and erection drawings all welding procedure specifications, or suitably key them to the contract drawings. In case of conflict between this specification and AWS D1.1/D1.1M, this specification governs.

1.4.1 General Requirements

To perform this work provide an organization certified in the following: American Institute of Steel Construction (AISC) Quality Certification Program Category.

a. For Structural Projects, provide documentation of the following:

1) Component Thickness 1/8 inch and greater: Qualification documents (WPS, PQR, and WPQ) in accordance with AWS D1.1/D1.1M.

2) Component Thickness Less than 1/8 inch: Qualification documents (WPS, PQR, and WPQ) in accordance with AWS D1.3/D1.3M.

3) Reinforcing Steel: Qualification documents (WPS, PWR, and WPQ) in accordance with AWS D1.4/D1.4M.

b. For other applications, provide documentation of the following:

1) Submit for review to the OWNER two copies of Certified Welding Procedure Specifications (WPS), and Certified Procedure Qualification Records (PQR) within 30 days prior to any welding.

2) Cranes: Qualification documents (WPS, PQR, and WPQ) in accordance with AWS D14.1/D14.1M.

3) Submit for review to the OWNER two copies of Certified Welder Performance Qualifications (WPQ) 30 days prior to any welding.

1.4.2 Previous Qualifications

Welding procedures previously qualified by test may be accepted for this contract without re-qualification if the following conditions are met:

a. Testing was performed by an reviewed testing laboratory, technical consultant, or the CONTRACTOR's reviewed quality control organization.

b. The qualified welding procedure conforms to the requirements of

this specification and is applicable to welding conditions encountered under this contract.

c. The welder, welding operator, and tacker qualification tests conform to the requirements of this specification and are applicable to welding conditions encountered under this contract.

1.4.3 Pre-qualified Procedures

Welding procedures which are considered pre-qualified as specified in AWS D1.1/D1.1M will be accepted without further qualification. Submit for review a listing or an annotated drawing to indicate the joints not pre-qualified. Procedure qualification is mandatory for these joints. Qualify the welding procedures and welders by tests prescribed in the applicable code or specification not withstanding the fact the code or specification may allow pre-qualified procedures.

1.4.4 Retests

If welding procedure fails to meet the requirements of AWS D1.1/D1.1M, revise and re-qualify the procedure specification, or at the CONTRACTOR's option, welding procedure may be retested in accordance with AWS D1.1/D1.1M. If the welding procedure is qualified through retesting, submit all test results, including those of test welds that failed to meet the requirements, with the welding procedure.

1.4.5 Welder, Welding Operator, and Tacker Qualification

Each welder, welding operator, and tacker assigned to work on this contract shall be qualified in accordance with the applicable requirements of AWS D1.1/D1.1M and as specified in this section. Welders, welding operators, and tackers who make acceptable procedure qualification test welds will be considered qualified for the welding procedure used.

1.4.5.1 Previous Personnel Qualifications

At the discretion of the OWNER, welders, welding operators, and tackers qualified by test within the previous 12 months may be accepted for this contract without re-qualification if all the following conditions are met:

a. Copies of the welding procedure specifications, the procedure qualification test records, and the welder, welding operator, and tacker qualification test records are submitted and reviewed in accordance with the specified requirements for detail drawings.

b. Testing was performed by an reviewed testing laboratory, technical consultant, or the CONTRACTOR's reviewed quality control organization.

c. The previously qualified welding procedure conforms to the requirements of this specification and is applicable to welding conditions encountered under this contract.

d. The welder, welding operator, and tacker qualification tests conform to the requirements of this specification and are applicable to welding conditions encountered under this contract.

1.4.5.2 Certificates

Before assigning any welder, welding operator, or tacker to work under this

contract, submit the names of the welders, welding operators, and tackers to be employed, and certification that each individual is qualified as specified. State in the certification the type of welding and positions for which the welder, welding operator, or tacker is qualified, the code and procedure under which the individual is qualified, the date qualified, and the name of the firm and person certifying the qualification tests. Keep the certification current, on file, and furnish 3 copies.

1.4.5.3 Renewal of Qualification

Re-qualification of a welder or welding operator is required under any of the following conditions:

a. It has been more than 6 months since the welder or welding operator has used the specific welding process for which he is qualified.

b. There is specific reason to question the welder or welding operator's ability to make welds that meet the requirements of these specifications.

c. The welder or welding operator was qualified by an employer other than those firms performing work under this contract, and a qualification test has not been taken within the past 12 months. Submit as evidence of conformance all records showing periods of employment, name of employer where welder, or welding operator, was last employed, and the process for which qualified.

d. A tacker who passes the qualification test is considered eligible to perform tack welding indefinitely in the positions and with the processes for which he/she is qualified, unless there is some specific reason to question the tacker's ability. In such a case, the tacker is required to pass the prescribed tack welding test.

1.4.6 Inspector Qualification

Inspector qualifications shall be in accordance with AWS D1.1/D1.1M. Qualify all nondestructive testing personnel in accordance with the requirements of ASNT RP SNT-TC-1A for Levels I or II in the applicable nondestructive testing method. The inspector may be supported by assistant welding inspectors who are not qualified to ASNT RP SNT-TC-1A, and assistant inspectors may perform specific inspection functions under the supervision of the qualified inspector.

1.4.7 Symbols and Safety

Symbols shall be in accordance with AWS A2.4, unless otherwise indicated. Safe welding practices and safety precautions during welding shall conform to AWS Z49.1.

PART 2 PRODUCTS

2.1 WELDING EQUIPMENT AND MATERIALS

Provide all welding equipment, electrodes, welding wire, and fluxes capable of producing satisfactory welds when used by a qualified welder or welding operator performing qualified welding procedures. All welding equipment and materials shall comply with the applicable requirements of AWS D1.1/D1.1M.

PART 3 EXECUTION

3.1 WELDING OPERATIONS

3.1.1 Requirements

Conform workmanship and techniques for welded construction to the requirements of AWS D1.1/D1.1M and AISC 360. When AWS D1.1/D1.1M and the AISC 360 specification conflict, the requirements of AWS D1.1/D1.1M govern.

- 3.1.2 Preparation of Material for Welding
- 3.1.2.1 Surface Cleaning Prior to Welding

Surface to be welded shall be free from loose scale, slag, rust, grease, paint and any other foreign material, except that mill scale which withstands vigorous wire brushing may remain.

3.1.2.2 Pre-erection Painting

Surfaces which are to be welded after erection may receive pre-erection painting. If painted before erection, the paint on surfaces adjacent to joints to be welded shall be thoroughly removed to expose clean steel for a distance of at least 2 inches on either side of the joint. Sealer beads shall be placed to seal all surfaces inaccessible for future field coating.

3.1.2.3 Cleaning of Surfaces after Welding

The surfaces upon completion of welding shall be cleaned of spatter, rust, loose scale, oil and dirt. Slag and flux deposits shall be cleaned from all welds. Prepare surface as required for coating system repair.

3.1.3 Identification

Identify all welds in one of the following ways:

a. Submit written records to indicate the location of welds made by each welder, welding operator, or tacker.

b. Identify all work performed by each welder, welding operator, or tacker with an assigned number, letter, or symbol to identify welds made by that individual. The OWNER may require welders, welding operators, and tackers to apply their symbol next to the weld by means of rubber stamp, felt-tipped marker with waterproof ink, or other methods that do not cause an indentation in the metal. Place the identification mark for seam welds adjacent to the weld at 3 foot intervals. Identification with die stamps or electric etchers is not allowed.

3.2 QUALITY CONTROL

Perform testing using an reviewed inspection or testing laboratory or technical consultant; or if reviewed, the CONTRACTOR's inspection and testing personnel may be used instead of the commercial inspection or testing laboratory or technical consultant. Perform visual and radiographic, dye penetrant inspections to determine conformance with paragraph STANDARDS OF ACCEPTANCE. Conform procedures and techniques for inspection with applicable requirements of AWS D1.1/D1.1M, ASTM E165, ASTM E709, except that in radiographic inspection only film types designated as "fine grain," or "extra fine," are acceptable.

3.3 STANDARDS OF ACCEPTANCE

Conform dimensional tolerances for welded construction, details of welds, and quality of welds with the applicable requirements of AWS D1.1/D1.1M and the contract drawings. All fillet and partial penetration groove welds shall be visually inspected. The minimum extent of nondestructive testing of full penetration groove welds shall be 100% of welds or joints, as indicated on the drawings.

Perform nondestructive testing by visual inspection, ultrasonic, dye penetrant or radiographic methods. All nondestructive testing shall be performed in accordance with applicable requirements of AWS D1.1/D1.1M. The following table shows the schedule of testing for various elements of this project:

Schedule of Testing (Minimum Requirements)			
Element		Test Type	Frequency
Other	Butt/CJP Weld	Ultrasonic or Radiographic	100%
Fabrications:	Fabrication	Non Destructive Testing	10%
Note: OWNER may elect to perform additional testing at their discretion. Refer to paragraph "OWNER INSPECTION AND TESTING."			

3.3.1 Nondestructive Examination

The welding is subject to inspection and tests in the mill, shop, and field. Inspection and tests in the mill or shop do not relieve the CONTRACTOR of the responsibility to furnish weldments of satisfactory quality. When materials or workmanship do not conform to the specification requirements, the OWNER reserves the right to reject material or workmanship or both at any time before final acceptance of the structure containing the weldment. Submit all records of nondestructive examination in accordance with paragraph "Standard of Acceptance"

3.3.2 Nondestructive Testing

The minimum extent of nondestructive testing shall be random 10 percent of welds or joints with 1 work week, here in referred to as a sample group. Test locations shall be selected by the OWNER. If 10 percent or more of the welds tested are proven defective, then the number of welds to be tested in the sample group shall be increased from 10 percent to 15 percents. If 10 percent or more or all the tested welds to this sample group are proven defective in the opinion of the OWNER/OWNER's Representative, then all the welds in that sample group shall be tested.

3.3.3 Destructive Tests

Make all repairs when metallographic specimens are removed from any part of a structure. Employ only qualified welders or welding operators, and use the proper joints and welding procedures, including peening or heat treatment if required, to develop the full strength of the members and joints cut and to relieve residual stress.

3.4 OWNER INSPECTION AND TESTING

In addition to the inspection and tests performed by the CONTRACTOR for quality control, the OWNER will perform inspection and testing for acceptance to the extent determined by the OWNER. The costs of such inspection and testing will be borne by the CONTRACTOR if unsatisfactory welds are discovered, or by the OWNER if the welds are satisfactory. The work may be performed by the OWNER's own forces or under a separate contract for inspection and testing. The OWNER reserves the right to perform supplemental nondestructive and destructive tests to determine compliance with paragraph STANDARDS OF ACCEPTANCE.

3.5 CORRECTIONS AND REPAIRS

If inspection or testing indicates defects in the weld joints, repair defective welds using a qualified welder or welding operator as applicable. Conduct corrections in accordance with the requirements of AWS D1.1/D1.1M and the specifications. Repair all defects in accordance with the reviewed procedures. Repair defects discovered between passes before additional weld material is deposited. Wherever a defect is removed and repair by welding is not required, blend the affected area into the surrounding surface to eliminate sharp notches, crevices, or corners. After a defect is thought to have been removed, and before re-welding, examine the area by suitable methods to ensure that the defect has been eliminated. Repaired welds shall meet the inspection requirements for the original welds. Any indication of a defect is regarded as a defect, unless re-evaluation by nondestructive methods or by surface conditioning shows that no unacceptable defect is present.

-- End of Section --

SECTION 05 12 00

STRUCTURAL STEEL

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC 317	(1992; Reprint 1999) ASD Manual of Steel Construction, Vol II: Connections		
AISC 325	(2011) Steel Construction Manual		
AISC 326	(2009) Detailing for Steel Construction		
AISC 348	(2000) Structural Joints Using ASTM A325 or A490 Bolts		
AISC 350	(2005) Load and Resistance Factor Design (LRFD)Specification for Structural Steel Buildings		
AMERICAN WELDING SOCIETY (AWS)			
AWS A2.4	(2012) Standard Symbols for Welding, Brazing and Nondestructive Examination		
AWS D1.1/D1.1M	(2015) Structural Welding Code - Steel		
ASME INTERNATIONAL (ASM	Ξ)		
ASME B46.1	(2009) Surface Texture, Surface Roughness, Waviness and Lay		
ASTM INTERNATIONAL (ASTM	1)		
ASTM A123/A123M	(2013) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products		
ASTM A153/A153M	(2009) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware		
ASTM A307	(2014) Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength		
ASTM A325	(2014) Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength		

Brownsville Navigation District Oil Dock No. 6 Bulkhead Repair	10243356
ASTM A36/A36M	(2014) Standard Specification for Carbon Structural Steel
ASTM A563	(2007a; R2014) Standard Specification for Carbon and Alloy Steel Nuts
ASTM A6/A6M	(2014) Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling
ASTM A780	(2001; R 2006) Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
ASTM C1107/C1107M	(2014a) Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
ASTM C827	(2001a; R 2005) Change in Height at Early Ages of Cylindrical Specimens from Cementitious Mixtures
ASTM F1554	(2007a; E 2011) Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength
ASTM F436	(2011) Hardened Steel Washers
ASTM F844	(2007a; R 2013) Washers, Steel, Plain (Flat), Unhardened for General Use

1.2 SYSTEM DESCRIPTION

Provide the structural steel system, including galvanizing, complete and ready for use. Structural steel systems including design, materials, installation, workmanship, fabrication, assembly, erection, inspection, quality control, and testing shall be provided in accordance with AISC 325 and AISC 317 except as modified in this contract.

1.3 MODIFICATIONS TO REFERENCES

Conform to AISC 317, AISC 348, and AISC 325, except as modified in this section.

1.4 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Pile Fabrication Drawings with Coating Limits

Erection Plan, including description of temporary supports

Fabrication drawings including description of connections

SD-03 Product Data

Welding electrodes and rods

Bolts, nuts, and washers

Non-Shrink Grout

SD-06 Test Reports

Bolts, nuts, and washers

Supply the certified manufacturer's mill reports which clearly show the applicable ASTM mechanical and chemical requirements together with the actual test results for the supplied fasteners.

Weld inspection reports

SD-07 Certificates

Steel

Bolts, nuts, and washers

Galvanizing

AISC Fabrication Plant Quality Certification

AISC Erector Quality Certification

Welding procedures and qualifications

1.5 AISC QUALITY CERTIFICATION

Work must be fabricated in an AISC Certified Fabrication Plant, Category Std. Submit AISC fabrication plant quality certification.

Work must be erected by an AISC Certified Erector, Category ASCE. Submit AISC erector quality certification.

1.6 QUALITY ASSURANCE

1.6.1 Fabrication Drawings Requirements

Submit fabrication drawings for approval prior to fabrication. Prepare in accordance with AISC 326, AISC 325 and AISC 317. Fabrication drawings shall not be reproductions of contract drawings. Include complete information for the fabrication and erection of the structure's components, including the location, type, and size of bolts, welds, member sizes and lengths, connection details, blocks, copes, and cuts. Use AWS A2.4 standard welding symbols. Lifting lugs, devices, and connections used for the successful installation of the structure shall be designed and sealed by a registered professional ENGINEER in the State of Texas and submitted for record purposes as part of the drawings. Member substitutions of details shown on the contract drawings shall be clearly highlighted on the fabrication drawings. Explain the reasons for any deviations from the contract drawings.

1.6.2 Certifications

1.6.2.1 Welding Procedures and Qualifications

Prior to welding, submit certification for each welder stating the type of welding and positions qualified for, the code and procedure qualified under, date qualified, and the firm and individual certifying the qualification tests. If the qualification date of the welding operator is more than one-year old, the welding operator's qualification certificate shall be accompanied by a current certificate by the welder attesting to the fact that he has been engaged in welding since the date of certification, with no break in welding service greater than 6 months.

Conform to all requirements specified in AWS D1.1/D1.1M.

- PART 2 PRODUCTS
- 2.1 STEEL
- 2.1.1 Structural Steel

Angles, Channels and Plates, ASTM A36/A36M, unless noted otherwise on drawings. Square HSS sections, ASTM A500 Grade B.

2.1.2 Anchor Rods for Bulkheads

ASTM A615/A615M, Grade 75.

2.2 BOLTS, NUTS, AND WASHERS

Provide the following unless indicated otherwise.

- 2.2.1 Structural Steel
- 2.2.1.1 Bolts

ASTM A307, Grade A; ASTM A325, Type 1, as specified. The bolt heads and the nuts of the supplied fasteners must be marked with the manufacturer's identification mark, the strength grade and type specified by ASTM specifications. Fasteners shall be zinc-coated by the hot-dip process in accordance with ASTM A153/A153M, Class C.

2.2.1.2 Nuts

ASTM A563, Grade and Style for applicable ASTM bolt standard recommended. Nuts shall be zinc-coated by the hot-dip process in accordance with ASTM A153/A153M, Class C.

2.2.1.3 Washers

ASTM F844 washers for ASTM A307 bolts, and ASTM F436 washers for ASTM A325 bolts. Washers shall be zinc-coated by the hot-dip process in accordance with ASTM A153/A153M, Class C.

2.2.1.4 Galvanized Fastener Assemblies

Galvanized fastener assemblies shall be used for all exposed connections. Galvanized fastener assemblies shall be kept together as a unit as shipped by the supplier. Galvanized nuts shall be lubricated with the manufacturer's lubricant, or relubricated at the site and retested with the provided bolts as an assembly.

2.2.1.5 Fastener Assemblies Storage

Fastener assemblies shall be stored so that they are readily identifiable, have proper markings, and have proper documentation in accordance with project requirements. Keep fastener lots separate and identifiable until time for installation.

2.2.2 Foundation Anchorage

2.2.2.1 Anchor Bolts

ASTM F1554, Grade 36, unless otherwise specified. Hot dip galvanize in accordance with ASTM A153/A153M, Class C.

2.2.2.2 Anchor Nuts

ASTM A563, Grade A, hex style, hot dip galvanize in accordance with ASTM A153/A153M, Class C.

2.2.2.3 Anchor Washers

ASTM F844, hot dip galvanize in accordance with ASTM A153/A153M, Class C.

- 2.3 STRUCTURAL STEEL ACCESSORIES
- 2.3.1 Welding Electrodes and Rods

AWS D1.1/D1.1M.

2.3.2 Non-Shrink Grout

ASTM C1107/C1107M, with no ASTM C827 shrinkage. Grout shall be nonmetallic.

2.4 GALVANIZING

ASTM A123/A123M or ASTM A153/A153M, as applicable, unless specified otherwise, hot dip galvanize after fabrication where practicable.

2.5 FABRICATION

2.5.1 Markings

Prior to erection, members shall be identified by a painted erection mark. Connecting parts assembled in the shop for reaming holes in field connections shall be match marked with scratch and notch marks. Do not locate erection markings on areas to be welded. Do not locate match markings in areas that will decrease member strength or cause stress concentrations.

2.6 DRAINAGE HOLES

Adequate drainage holes shall be drilled to eliminate water traps. Hole diameter shall be 1/2 inch and location shall be indicated on the detail drawings. Hole size and location shall not affect the structural integrity.

PART 3 EXECUTION

3.1 FABRICATION

Fabrication shall be in accordance with the applicable provisions of AISC 325. Fabrication and assembly shall be done in the shop to the greatest extent possible.

Compression joints depending on contact bearing shall have a surface roughness not in excess of 500 micro inch as determined by ASME B46.1, and ends shall be square within the tolerances for milled ends specified in ASTM A6/A6M.

Shop splices of members between field splices will be permitted only where indicated on the Contract Drawings. Splices not indicated require the approval of the OWNER.

3.2 ERECTION

Erection of structural steel, shall be in accordance with the applicable provisions of AISC 325. Erection plan shall be reviewed, stamped and sealed by a licensed structural ENGINEER.

Provide for drainage in structural steel. After final positioning of steel members, provide full bearing under base plates and bearing plates using nonshrink grout. Place nonshrink grout in accordance with the manufacturer's instructions.

3.2.1 Storage

Material shall be stored out of contact with the ground in such manner and location as will minimize deterioration.

3.3 CONNECTIONS

Except as modified in this section, connections not detailed shall be designed in accordance with AISC 350. Build connections into existing work. Do not tighten anchor bolts set in concrete with impact torque wrenches. Punch, subpunch and ream, or drill bolt holes perpendicular to the surface of the member. Holes shall not be cut or enlarged by burning. Bolts, nuts, and washers shall be clean of dirt and rust, and lubricated immediately prior to installation.

3.3.1 Common Grade Bolts

ASTM A307 bolts shall be tightened to a "snug tight" fit. "Snug tight" is the tightness that exists when plies in a joint are in firm contact. If firm contact of joint plies cannot be obtained with a few impacts of an impact wrench, or the full effort of a man using a spud wrench, contact the OWNER for further instructions.

3.3.2 High-Strength Bolts

Verify that adequate lubrication is present on all fasteners to be installed. ASTM A325 fastener assemblies shall be installed in connection holes and brought to a snug tight fit. Snug the joint so that the "snug tight" condition is achieved, using a systematic approach. Start with the most rigid part of the joint and proceed toward the free edges. Snugging may be accomplished using a spud wrench, impact wrench, or any other
suitable installation wrench which brings the plies together into firm contact.

3.4 GAS CUTTING

Use of gas-cutting torch in the field for correcting fabrication errors will not be permitted on any major member in the structural framing. Use of a gas cutting torch will be permitted on minor members not under stress only after approval has been obtained from the OWNER.

3.5 WELDING

Welding must be in accordance with AWS D1.1/D1.1M. Refer to Section 05 05 23 STRUCTURAL WELDING.

3.5.1 Removal of Temporary Welds, Run-Off Plates, and Backing Strips

Remove only from finished areas.

3.6 GALVANIZING REPAIR

Provide as indicated or specified. Galvanize after fabrication where practicable. Repair damage to galvanized coatings using ASTM A780 zinc rich paint for galvanizing damaged by handling, transporting, cutting, welding, or bolting. Do not heat surfaces to which repair paint has been applied.

3.7 FIELD QUALITY CONTROL

Perform field tests, and provide labor, equipment, and incidentals required for testing. The OWNER shall be given weld inspection reports which include defective welds, bolts, nuts, and washers within 7 working days of the date of weld inspection.

- 3.7.1 Welds
- 3.7.1.1 Visual Inspection

Refer to Section 05 05 23 WELDING, STRUCTURAL.

3.7.1.2 Nondestructive Testing

Refer to Section 05 05 23 WELDING, STRUCTURAL.

- 3.7.2 High-Strength Bolts
- 3.7.2.1 Inspection

Inspection procedures shall be in accordance with AISC 348, Section 9. Confirm and report to the OWNER that the materials meet the project specification and that they are properly stored. Confirm that the faying surfaces have been properly prepared before the connections are assembled. Observe the specified job site testing and calibration, and confirm that the procedure to be used provides the required tension.

The CONTRACTOR shall inspect proper preparation, size, gaging location, and acceptability of welds; identification marking; operation and current characteristics of welding sets in use; and calibration of torque wrenches for high-strength bolts.

The CONTRACTOR shall inspect high-strength bolted connections in accordance with AISC 317.

-- End of Section --

SECTION 05 50 14

STRUCTURAL METAL FABRICATIONS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M (2015) Structural Welding Code - Steel

AWS D1.2/D1.2M (2014) Structural Welding Code - Aluminum

ASME INTERNATIONAL (ASME)

ASME B4.1

(1967; R 2009) Preferred Limits and Fits for Cylindrical Parts

ASTM INTERNATIONAL (ASTM)

ASTM A325	(2014) Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
ASTM A490	(2014a) Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength
ASTM A514/A514M	(2014) Standard Specification for High-Yield-Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding
ASTM E165	(2009) Standard Test Method for Liquid Penetrant Examination
ASTM E709	(2014) Standard Guide for Magnetic Particle Examination

1.2 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Detail Drawings

Detail drawings for metalwork and machine work, prior to fabrication.

SD-03 Product Data

Welding of Structural Steel

Schedules of welding procedures for steel structures, prior to commencing fabrication.

Materials Orders

Copies of purchase orders, mill orders, shop orders and work orders for materials, prior to the use of the materials in the work.

Materials List

Materials list for fabricated items, at the time of submittal of detail drawings.

SD-06 Test Reports

Tests, Inspections, and Verifications

Certified test reports for materials with all materials delivered to the site.

SD-07 Certificates

Qualification of Welders and Welding Operators

Certifications for welders and welding operators prior to commencing fabrication.

Application Qualification for Steel Studs

Certified reports for the application qualification for steel studs prior to commencing fabrication.

1.3 QUALITY ASSURANCE

1.3.1 Qualification of Welders and Welding Operators

Certify that the qualification of welders and welding operators and tack welders who will perform structural steel welding have been qualified for the particular type of work to be done in accordance with the requirements of AWS D1.1/D1.1M, Section 4, prior to commencing fabrication. List the qualified welders by name and specify the code and procedures under which qualified and the date of qualification within the certification. Prior qualification will be accepted if welders have performed satisfactory work under the code for which qualified within the preceding three months. Welders are required to repeat the qualifying tests when their work indicates a reasonable doubt as to proficiency. Those passing the requalification tests will be recertified. Those not passing will be disqualified until passing. CONTRACTOR incurs all expenses in connection with qualification and requalification.

1.3.2 Detail Drawings

Include within the detail drawings catalog cuts, templates, fabrication and assembly details and type, grade and class of material as appropriate. Elements of fabricated items inadvertently omitted on contract drawings shall be detailed by the fabricator and indicated on the detail drawings.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Materials Orders

Furnish 2 copies of purchase orders, mill orders, shop orders and work orders for all materials orders and items used in the work. Where mill tests are required, purchase orders include the test site address and the name of the testing agency.

2.1.2 Materials List

Furnish a list of the materials to be used in the fabrication of each item.

2.2 FABRICATION

2.2.1 Structural Fabrication

Material shall be straight before being laid off or worked. Perform straightening, if necessary, by methods that will not impair the metal. Sharp kinks or bends will be cause for rejection of the material. Material with welds will not be accepted except where welding is definitely specified, indicated or otherwise approved. Make bends using approved dies, press brakes or bending rolls. Where heating is required, take precautions to avoid overheating the metal and allow it to cool in a manner that will not impair the original properties of the metal. Proposed flame cutting of material, other than structural steel, will be subject to approval and shall be indicated on detail drawings. Shearing shall be accurate and all portions of the work neatly finished. Corners shall be square and true unless otherwise shown. Re-entrant cuts shall be filleted to a minimum radius of 3/4 inch unless otherwise approved. Provide finished members free of twists, bends and open joints. Bolts, nuts and screws shall be tight.

2.2.1.1 Dimensional Tolerances for Structural Work

Measure dimensions using an approved calibrated steel tape of approximately the same temperature as the material being measured. The overall dimensions of an assembled structural unit shall be within the tolerances indicated on the drawings or as specified in the particular section of these specifications for the item of work. Where tolerances are not specified in other sections of these specifications or shown, an allowable variation of 1/32 inch is permissible in the overall length of component members with both ends milled; component members without milled ends shall not deviate from the dimensions shown by more than 1/16 inch for members 30 feet or less in length, and by more than 1/8 inch for members over 30 feet in length.

2.2.1.2 Structural Steel Fabrication

Structural steel may be cut by mechanically guided or hand-guided torches, provided an accurate profile with a surface that is smooth and free from cracks and notches is obtained. Prepare surfaces and edges in accordance with AWS D1.1/D1.1M, Subsection 3.2. Where structural steel is not to be welded, chipping or grinding will not be required except as necessary to remove slag and sharp edges of mechanically guided or hand-guided cuts not exposed to view. Chip, grind or machine to sound metal hand-guided cuts

which are to be exposed or visible.

2.2.2 Welding

2.2.2.1 Welding of Structural Steel

- a. Welding Procedures for Structural Steel- Reunify welding procedures for structural steel as described in AWS D1.1/D1.1M, Subsection 3.1 or qualify by test as prescribed in AWS D2.2/D1.1M, Section 4. Properly documented evidence of compliance with all requirements of these specifications for previous qualification tests shall establish a welding procedure as prequalified. For welding procedures qualified by test, the test welding and specimen testing will be witnessed and the test report document signed by the OWNER. Approval of any welding procedure will not relieve the CONTRACTOR of the responsibility for producing a finished structure meeting all requirements of these specifications. The CONTRACTOR will be directed or authorized to make any changes in previously approved welding procedures that are deemed necessary or desirable by the OWNER. List the qualified welders by name and specify the code and procedures under which qualified and the date of qualification within the certification. Prior qualification will be accepted if welders have performed satisfactory work under the code for which qualified within the preceding three months. Welders are required to repeat the qualifying tests when their work indicates a reasonable doubt as to proficiency. Those passing the requalification test will be recertified. Those not passing will be disqualified until passing. CONTRACTOR incurs all expenses in connection with qualification and requalification. Submit a complete schedule of welding procedures for each steel structure to be welded. The schedule shall conform to the requirements specified in the provisions AWS D1.1/D1.1M, Sections 2, 3, 4, 6, 7 and applicable portions of Section 8. Provide within the schedule detailed procedure specifications and tables or diagrams showing the procedures to be used for each required joint. Include in the welding procedures filler metal, preheat, interpass temperature and stress-relief heat treatment requirements. Each welding procedure shall be clearly identified as being prequalified or required to be qualified by tests. Welding procedures shall show types and locations of welds designated or in the specifications to receive non-destructive examination.
- b. Welding Process Perform welding of structural steel by an electric arc welding process using a method which excludes the atmosphere from the molten metal and conforms to the the applicable provisions of AWS D1.1/D1.1M. Minimize residual stresses, distortion and shrinkage from welding.

c. Welding Techniques

(1) Filler Metal- The electrode, electrode-flux combination and grade of weld metal shall conform to the appropriate AWS specification for the base metal and welding process being used or be as shown where a specific choice of AWS specification allowables is required. Include the AWS designation of the electrodes to be used in the schedule of welding procedures. Use only low hydrogen electrodes for manual shielded metal-arc welding regardless of the thickness of the steel. Use a controlled temperature storage oven at the job site as prescribed by ASW D1.1/D1.1M, Subsection 3.5 to maintain low moisture of low hydrogen electrodes. (2) Preheat and Interpass Temperature- Perform preheating as required by AWS D1./D1.1M, Subsection 3.5 or as otherwise specified except that the temperature of the base metal shall be at least 70 degrees F. Slowly and uniformly preheat the weldments by approved means to the prescribed temperature, held at that temperature until the welding is completed and then permitted to cool slowly in still air.

(3) Stress-Relief Heat Treatment - Where stress relief heat treatment is specified or shown, perform in accordance with the requirements of ASWS D1.1/D1.1M , Subsection 5.8 unless otherwise authorized or directed.

d. Workmanship- Perform welding workmanship in accordance with ASWS D1.1/D1.1M , Section 3 and other applicable requirements of these specifications.

(1) Preparation of Base metal-Prior to welding inspect surfaces to be welded to ensure compliance with ASWS D1.1/D1.1M , Subsection 3.2.

(2) Temporary Welds - make temporary welds, required for fabrication and erection, under the controlled conditions prescribed for permanent work. Make temporary welds using low -hydrogen welding electrodes and by welders qualified for permanent work as specified in these specifications. Conduct preheating for temporary welds as required by ASWS D1.1/D1.1M for permanent welds except that the minimum temperature shall be 120 degrees F in any case. In making temporary welds, arcs shall not be struck in other than weld locations. Remove each temporary weld and grind flush with adjacent surfaces after serving its purpose.

(3) Tack Welds- Subject tack welds that are to be incorporated into the permanent work to the same quality requirements as the permanent welds; clean and thoroughly fuse them with permanent welds. Perform preheating as specified above for temporary welds. Multiple-pass tack welds shall have cascaded ends. Remove defective tack welds before permanent welding.

2.2.3 Bolted Connections

2.2.3.1 Bolted Structural Steel Connections

Provide bolts, nuts and washers of the type specified or indicated. Equip all nuts with washers except for high strength bolts. Use beveled washers where bearing faces have a slope of more than 1:20 with respect to a plane normal to the bolt axis. Where the use of high strength bolts is specified or indicated, the materials, workmanship and installation shall conform to the applicable provisions of ASTM A325 or ASTM A490.

a. Bolt holes shall be accurately located, smooth, perpendicular to the member and cylindrical.

b. Holes for regular bolts shall be drilled or subdrilled and reamed in the shop and not be more than 1/16 inch larger than the diameter of the bolt.

c. Holes for fitted bolts shall be match-reamed or drilled in the shop. Remove burrs resulting from reaming. Keep bolt threads entirely outside of the holes. The body diameter of bolts shall have tolerances as recommended by ASME B4.1 for the class of fit specified. Place fitted bolts in reamed holes by selective assembly to provide an LN-2 fit.

d. Holes for high strength bolts shall not have diameters more than 1/16 inch larger than bolt diameters. If the thickness of the material is not greater than the diameter of the bolts, the holes may be punched. If the thickness of the material is greater than the diameter of the bolts the holes may be drilled full size or subpunched or subdrilled at least 1/8 inch smaller than the diameter of the bolts and then reamed to full size. Poor matching of holes will be cause for rejection. Drifting occurring during assembly shall not distort the metal or enlarge the holes. Reaming to a larger diameter of the next standard size bolt will be allowed for slight mismatching.

2.3 TESTS, INSPECTIONS, AND VERIFICATIONS

Perform material tests and analyses certified by an approved laboratory to demonstrate that materials are in conformity with the specifications. These tests and analyses shall be performed and certified at the CONTRACTOR's expense. Perform tests, inspections, and verifications conforming to the requirements of the particular sections of these specifications for the respective items of work unless otherwise specified or authorized. Conduct tests in the presence of the OWNER if so required. Furnish specimens and samples for additional independent tests and analyses upon request by the OWNER. Properly label specimens and samples and prepare for shipment.

2.3.1 Nondestructive Testing

When doubt exists as to the soundness of any material part, such part may be subjected to any form of nondestructive testing determined by the OWNER. This may include ultrasonic, magnaflux, dye penetrant, x-ray, gamma ray or any other test that will thoroughly investigate the part in question. The cost of such investigation will be borne by the OWNER. Any defects will be cause for rejection; replace and retest rejected parts at the CONTRACTOR's expense.

2.3.2 Tests of Structural Units

The details for tests of structural units shall conform to the requirements of the particular sections of these specifications covering these items. Assemble each complete machinery and structural unit and test them in the shop, in the presence of the OWNER, unless otherwise directed. Waiving of tests will not relieve the CONTRACTOR of responsibility for any fault in operation, workmanship or material that occurs before the completion of the contract or guarantee. After being installed at the site, each complete structural unit shall be operated through a sufficient number of complete cycles to demonstrate to the satisfaction of the OWNER that it meets the specified operational requirements in all respects.

2.3.3 Inspection of Structural Steel Welding

Nondestructive examination of designated welds will be required. Supplemental examination of any joint or coupon cut from any location in any joint may be required.

2.3.3.1 Visual Examination

Visually examine all completed welds. Clean and carefully examine for

insufficient throat or leg sizes, cracks, undercutting, overlap, excessive convexity or reinforcement and other surface defects to ensure compliance with the requirements of AWS D1.1/D1.1M, Section 6, subsection 6.9, Part C.

2.3.3.2 Nondestructive Examination

Perform as designated or described in the sections of these specifications, the nondestructive examination of shop and field welds covering the particular items of work.

a. Testing Agency - The nondestructive examination of welds and the evaluation of examination tests as to the acceptability of the welds shall be performed by a testing agency adequately equipped and competent to perform such services or by the CONTRACTOR using suitable equipment and qualified personnel. In either case, written approval of the examination procedures is required and the examination tests shall be made in the presence of the OWNER. The evaluation of examination tests are subject to the approval and all records become the property of the OWNER.

b. Examination Procedures - Conform to the following requirements.

(1) Ultrasonic Testing - Making, evaluating and reporting ultrasonic testing of welds shall conform to the requirements of AWS D1.1/D1.1M, Section 6, Part C. Provide ultrasonic equipment capable of making a permanent record of the test indications. Make a record of each weld tested.

(2) Radiographic Testing - Making, evaluating and reporting radiographic testing of welds shall conform to the requirements of AWS D1.1/D1.1M, Section 6, Parts C and E.

(3) Magnetic Particle Inspection - Magnetic particle inspection of welds shall conform to the applicable provisions of ASTM E709.

(4) Dye Penetrant Inspection - Perform dye penetrant inspection of welds conforming to the applicable provisions of ASTM E165.

c. Acceptability of Welds - Welds will be unacceptable if shown to have defects prohibited by AWS D1.1/D1.1M, or possess any degree of incomplete fusion, inadequate penetration or undercutting.

2.3.3.3 Test Coupons

The OWNER reserves the right to require the CONTRACTOR to remove coupons from completed work when doubt as to soundness cannot be resolved by nondestructive examination. Should tests of any two coupons cut from the work of any welder show strengths less than that specified for the base metal it will be considered evidence of negligence or incompetence and such welder will be removed from the work. When coupons are removed from any part of a structure, repair the members cut in a neat manner with joints of the proper type to develop the full strength of the members. Repaired joints shall be peened as approved or directed to relieve residual stress. The expense for removing and testing coupons, repairing cut members and the nondestructive examination of repairs shall be borne by the OWNER or the CONTRACTOR in accordance with the Contract Clauses INSPECTION AND ACCEPTANCE.

2.3.3.4 Supplemental Examination

When the soundness of any weld is suspected of being deficient due to faulty welding or stresses that might occur during shipment or erection, the OWNER reserves the right to perform nondestructive supplemental examinations before final acceptance. The cost of such inspection will be borne by the OWNER.

2.3.4 Structural Steel Welding Repairs

Repair defective welds in the structural steel welding repairs in accordance with AWS D1.1/D1.1M, Subsection 3.7. Remove defective weld metal to sound metal by use of air carbon-arc or oxygen gouging. Do not use oxygen gouging on ASTM A514/A514M steel. Thoroughly clean surfaces before welding. Retest welds that have been repaired by the same methods used in the original inspection. Except for the repair of members cut to remove test coupons and found to have acceptable welds costs of repairs and retesting will be borne by the CONTRACTOR.

2.3.5 Inspection and Testing of Steel Stud Welding

Perform fabrication and verification inspection and testing of steel stud welding conforming to the requirements of AWS D1.1/D1.1M, Subsection 7.8 except as otherwise specified. The OWNER will serve as the verification inspector. One stud in every 100 and studs that do not show a full 360 degree weld flash, have been repaired by welding or whose reduction in length due to welding is less than normal shall be bent or torque tested as required by AWS D1.1/D1.1M, Subsection 7.8. If any of these studs fail, bend or torque test two additional studs. If either of the two additional studs fails, all of the studs represented by the tests will be rejected. Studs that crack under testing in either the weld, base metal or shank will be rejected and replaced by the CONTRACTOR at no additional cost.

PART 3 EXECUTION

3.1 INSTALLATION

Thoroughly clean all parts to be installed. Remove packing compounds, rust, dirt, grit and other foreign matter. Clean holes and grooves for lubrication. Examine enclosed chambers or passages to make sure that they are free from damaging materials. Where units or items are shipped as assemblies they will be inspected prior to installation. Disassembly, cleaning and lubrication will not be required except where necessary to place the assembly in a clean and properly lubricated condition. Do not use pipe wrenches, cold chisels or other tools likely to cause damage to the surfaces of rods, nuts or other parts used for assembling and tightening parts. Tighten bolts and screws firmly and uniformly but take care not to overstress the threads. When a half nut is used for locking a full nut place the half nut first followed by the full nut. Lubricate threads of all bolts except high strength bolts, nuts and screws with an approved lubricant before assembly. Coat threads of corrosion-resisting steel bolts and nuts with an approved antigalling compound. Driving and drifting bolts or keys will not be permitted.

3.1.1 Alignment and Setting

Accurately align each structural unit by the use of steel shims or other approved methods so that no binding in any moving parts or distortion of any member occurs before it is fastened in place. The alignment of all parts with respect to each other shall be true within the respective tolerances required. Set to the elevations shown.

3.1.2 Blocking and Wedges

Remove all blocking and wedges used during installation for the support of parts to be grouted in foundations before final grouting unless otherwise directed. Blocking and wedges left in the foundations with approval shall be of steel or iron.

3.1.3 Foundations and Grouting

Concreting of subbases and frames and the final grouting under parts shall be in accordance with the procedures as specified in Section 03 31 29 MARINE CONCRETE.

3.2 TESTS

3.2.1 Workmanship

Workmanship must be of the highest grade and in accordance with the best modern practices to conform with the specifications for the item of work being furnished.

3.2.2 Production Welding

Perform production welding conforming to the requirements of AWS D1.1/D1.1M or AWS D1.2/D1.2M, as applicable. Studs, on which pre-production testing is to be performed, shall be welded in the same general position as required on production items (flat, vertical, overhead or sloping). Test and production stud welding will be subjected to visual examination or inspection. If the reduction of the length of studs becomes less than normal as they are welded, stop welding immediately and do not resume until the cause has been corrected.

-- End of Section --

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

SECTION 07 92 00

JOINT SEALANTS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM C920

(2014a) Standard Specification for Elastomeric Joint Sealants

1.2 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Sealants

Primers

Bond breakers

Backer Rods

Manufacturer's descriptive data including storage requirements, shelf life, curing time, instructions for mixing and application, and primer data (if required). Provide a copy of the Material Safety Data Sheet for each solvent, primer or sealant material.

SD-07 Certificates

Sealant

Certificates of compliance stating that the materials conform to the specified requirements.

1.3 ENVIRONMENTAL CONDITIONS

Apply sealant when the ambient temperature is between 40 and 90 degrees F. If application temperature is stated as greater than 40 degrees F or less than 90 degrees F by the manufacturer, then follow manufacturer's requirements.

1.4 DELIVERY AND STORAGE

Deliver materials to the job site in unopened manufacturers' external shipping containers, with brand names, date of manufacture, color, and material designation clearly marked thereon. Label elastomeric sealant containers to identify type, class, grade, and use. Carefully handle and store materials to prevent inclusion of foreign materials. Always store materials within temperature limits provided by manufacturer. If storage temperature limits are not provided by the manufacturer, do not store in sustained temperatures exceeding 90 degrees F or less than 32 degrees F.

1.5 QUALITY ASSURANCE

1.5.1 Compatibility with Substrate

Verify that each of the sealants are compatible for use with joint substrates.

1.5.2 Joint Tolerance

Provide joint tolerances in accordance with manufacturer's printed instructions.

1.6 SPECIAL WARRANTY

Guarantee sealant joint against failure of sealant and against water penetration through each sealed joint for five years.

- PART 2 PRODUCTS
- 2.1 SEALANTS

Provide sealant that has been tested and found suitable for the substrates to which it will be applied.

2.1.1 Exterior Sealant

For joints in vertical surfaces, provide ASTM C920, Type S or M, Grade NS, Class 25, Use NT. For joints in horizontal surfaces, provide ASTM C920, Type S or M, Grade P, Class 25, Use T. Provide location(s) and color(s) of sealant as follows:

LOCATION CO	JLOR
a. Expansion and control joints. Ma	atch adjacent
su	urface color

 b. Interior face of expansion joints in Match adjacent exterior concrete or masonry walls where surface color metal expansion joint covers are not required.

2.1.2 Preformed Sealant

Provide preformed sealant of polybutylene or isoprene-butylene based pressure sensitive weather resistant tape or bead sealant capable of sealing out moisture, air and dust when installed as recommended by the manufacturer. At temperatures from minus 30 to plus 160 degrees F, the sealant must be non-bleeding and no loss of adhesion.

2.1.2.1 Foam Strip

Provide foam strip capable of sealing out moisture, air, and dust when installed and compressed as recommended by the manufacturer. Service temperature must be minus 40 to plus 275 degrees F. Furnish untreated strips with adhesive to hold them in place. Do not allow adhesive to stain

or bleed into adjacent finishes. Saturate treated strips with butylene waterproofing or impregnated with asphalt.

2.2 PRIMERS

Provide a nonstaining, quick-drying type and consistency recommended by the sealant manufacturer for the particular application.

2.3 BOND BREAKERS

Provide the type and consistency recommended by the sealant manufacturer to prevent adhesion of the sealant to backing or to bottom of the joint.

2.4 BACKER RODS

Provide polyethylene foams free from oil or other staining elements as recommended by sealant manufacturer. Provide 25 to 33 percent oversized backing for closed cell material, unless otherwise indicated. Make backer rod material compatible with sealant. Do not use oakum or other types of absorptive materials as backer rods.

2.5 CLEANING SOLVENTS

Provide type(s) recommended by the sealant manufacturer except for aluminum and bronze surfaces that will be in contact with sealant.

PART 3 EXECUTION

3.1 SURFACE PREPARATION

Clean surfaces from dirt, frost, moisture, grease, oil, wax, lacquer, paint, or other foreign matter that would tend to destroy or impair adhesion. Remove oil and grease with solvent. Surfaces must be wiped dry with clean cloths. When resealing an existing joint, remove existing caulk or sealant prior to applying new sealant. For surface types not listed below, contact sealant manufacturer for specific recommendations.

3.1.1 Concrete Surfaces

Where surfaces have been treated with curing compounds, oil, or other such materials, remove materials by sandblasting or wire brushing. Remove laitance, efflorescence and loose mortar from the joint cavity.

3.2 SEALANT PREPARATION

Do not add liquids, solvents, or powders to the sealant. Mix multicomponent elastomeric sealants in accordance with manufacturer's instructions.

3.3 APPLICATION

3.3.1 Joint Width-To-Depth Ratios

a. Acceptable Ratios:

JOINT WIDTH

JOINT DEPTH

Minimum Maximum

For wood, concrete, masonry,
or stone:

JOINT WIDTH	JOINT DEPTH				
	Minimum	Maximum			
1/4 inch (minimum) Over 1/4 inch to 1/2 inch	1/4 inch 1/4 inch	1/4 inch Equal to width			
Over 1/2 inch to 2 inch Over 2 inch.	1/2 inch (As recommen manufacturer	5/8 inch ded by sealant)			

b. Unacceptable Ratios: Where joints of acceptable width-to-depth ratios have not been provided, clean out joints to acceptable depths and grind or cut to acceptable widths without damage to the adjoining work. Grinding is not required on metal surfaces.

3.3.2 Masking Tape

Place masking tape on the finish surface on one or both sides of a joint cavity to protect adjacent finish surfaces from primer or sealant smears. Remove masking tape within 10 minutes after joint has been filled and tooled.

3.3.3 Backer Rods

Install backer rods dry and free of tears or holes. Tightly pack the back or bottom of joint cavities with backer rod material to provide a joint of the depth specified. Install backer rods in the following locations:

- a. Where indicated.
- b. Where backer rod is not indicated but joint cavities exceed the acceptable maximum depths specified in paragraph entitled, "Joint Width-to-Depth Ratios".

3.3.4 Primer

Immediately prior to application of the sealant, clean out loose particles from joints. Where recommended by sealant manufacturer, apply primer to joints in concrete masonry units, wood, and other porous surfaces in accordance with sealant manufacturer's instructions. Do not apply primer to exposed finish surfaces.

3.3.5 Bond Breaker

Provide bond breakers to the back or bottom of joint cavities, as recommended by the sealant manufacturer for each type of joint and sealant used, to prevent sealant from adhering to these surfaces. Carefully apply the bond breaker to avoid contamination of adjoining surfaces or breaking bond with surfaces other than those covered by the bond breaker.

3.3.6 Sealants

Provide a sealant compatible with the material(s) to which it is applied. Do not use a sealant that has exceeded shelf life or has jelled and can not be discharged in a continuous flow from the gun. Apply the sealant in accordance with the manufacturer's printed instructions with a gun having a nozzle that fits the joint width. Force sealant into joints to fill the joints solidly without air pockets. Tool sealant after application to ensure adhesion. Make sealant uniformly smooth and free of wrinkles. Upon completion of sealant application, roughen partially filled or unfilled joints, apply sealant, and tool smooth as specified. Apply sealer over the sealant when and as specified by the sealant manufacturer.

3.4 PROTECTION AND CLEANING

3.4.1 Protection

Protect areas adjacent to joints from sealant smears. Masking tape may be used for this purpose if removed 5 to 10 minutes after the joint is filled.

3.4.2 Final Cleaning

Upon completion of sealant application, remove remaining smears and stains and leave the work in a clean and neat condition.

- a. Masonry and Other Porous Surfaces: Immediately scrape off fresh sealant that has been smeared on masonry and rub clean with a solvent as recommended by the sealant manufacturer. Allow excess sealant to cure for 24 hour then remove by wire brushing or sanding.
- b. Metal and Other Non-Porous Surfaces: Remove excess sealant with a solvent-moistened cloth.
 - -- End of Section --

DIVISION 09 – FINISHES

SECTION 09 97 13.26

COATING OF STEEL WATERFRONT STRUCTURES, ZERO VOC, (SZC) SPLASH ZONE COATING 02/16

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D7091	(2013) Standard Practice for
	Nondestructive Measurement of Dry Film
	Thickness of Nonmagnetic Coatings Applied
	to Ferrous Metals and Nonmagnetic,
	Nondestructive Coatings Applied to
	Non-Ferrous Metals
ASTM E376	(2011) Measuring Coating Thickness by
	Magnetic Field or Eddy-Current
	magneere riera or hady carrene

(Electromagnetics) Test Methods

SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC PS 11.01	(1982	2;	Е	2004)	Black	: (or	Dark	Red)	Coal
	Tar 1	Еро	xy	r Poly	amide	Paint	ing	Syster	n

1.2 SUBMITTALS

The following shall be submitted in accordance with Section 01 33 0001 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Coal Tar Epoxy-Polyamide

Include Manufacturer's data sheet and MSDS sheets for the coating system.

SD-06 Test Reports

Field Tests

Coating Tests

Contractor shall submit test reports for the tests performed in shop and in the field to OWNER FOR review. At least 10 days prior to coating, submit sample QC/Inspection forms that indicate compliance with test requirements specified herein.

SD-07 Certificates

Coal Tar Epoxy-Polyamide

1.3 ENVIRONMENTAL CONDITIONS

Start work only when ambient and curing temperatures are within limits of coating manufacturer's recommendations and at least 5 degrees F above dew point temperature.

1.4 SAFETY AND HEALTH PRECAUTIONS

Materials listed in this section contain coal tar pitch volatiles, which are toxic. Follow safety procedures s recommended by manufacturer. Work in a well ventilated area. Provide, and require workers to use, impervious clothing, gloves, face shields (8inch minimum), and other appropriate protective clothing necessary to prevent eye and skin contact with coating materials. Keep coatings away from heat, sparks, and flame.

- PART 2 PRODUCTS
- 2.1 COATING SYSTEM

Provide catalyst component for coating specific resin component. Use thinners which are compatible with the coating.

Field coating shall be of the same type and manufacturer as used in shop coating.

- 2.1.1 Coating
- 2.1.1.1 Coal Tar Epoxy-Polyamide
 - a. System: SSPC PS 11.01
 - b. Primer: SSPC Paint 16, Black

PART 3 EXECUTION

- 3.1 CLEANING AND PREPARATION OF SURFACES
- 3.1.1 Solvent Cleaning

SSPC SP1. Remove visible oil, grease, and drawing and cutting compounds by solvent cleaning.

3.1.2 Blast Cleaning

SSPC SP 10. After solvent cleaning, complete surface preparation by near-white blast cleaning. Remove residual dust from blasted surface by blowing with dry, oil-free air, vacuuming, or sweeping. Provide surface profile of at least 1 2/3-mil thickness.

3.2 PROPORTIONING AND MIXING OF COATING SYSTEM

3.2.1 Proportioning of Coal Tar Epoxy-Polyamide System

Coal tar epoxy-polyamide consists of a two-component system. Component A contains a refined coal tar pitch, polyamide resin, and a polyamine promoter to accelerate curing rate. Component B is an epoxy resin. Mix both components in a ratio of 4 parts of Component A to 1 part of Component B by volume. Do not thin coatings when doing so will result in total volatile

organic compounds exceeding limits enacted by local air pollution control districts. When thinning is allowed and is necessary for proper application, use xylene or the coating manufacturer's recommended thinner, to a maximum of 1//2 gallon to a 5-gallon batch.

3.2.2 Mixing of Coal Tar Epoxy-Polyamide System

Power stir components to a smooth, uniform consistency. Stir coating periodically during induction period. Follow coating manufacturer's requirements for induction time and pot life of mixed batches.

3.3 COATING APPLICATION

3.3.1 General

Apply primer coating to dry surfaces not more than 4 hours after near-white blast cleaning. Apply coats of each system so that finished surfaces are free from runs, sags, brush marks and variations in color.

All welds shall be sand-blasted as specified herein. The weld should then be stripe coated by brushing the material into the welds.

3.3.1.1 Application method for Coal Tar Epoxy-Polyamide System

Unless otherwise specified by manufacturer's recommendations, do not allow drying time between coats to exceed 72 hours. Under conditions of sunlight or elevated ambient temperatures of 90 degrees F or greater, limit intercoat drying period to a maximum of 12 hours. Second coat shall be applied while first coat is still 'tacky'. Application shall meet minimum requirements of the manufacturer and these specifications. Notify OWNER of conflicts between these specifications and manufacturer's recommendations.

3.3.2 Repairs of Defects

Repair detected coating holidays, thin areas, and exposed areas damaged prior to of during installation by surface treatment and application of additional coating or by manufacturer's recommendations. Allow a period of at least 72 hours to pass following final coat before placing in underground service.

3.3.2.1 Repair Procedure for All Coating Systems

- a. All coating surfaces damaged by handling, cutting, and welding or in any other way damaged must be carefully and fully repaired in accordance with these specifications and the coating manufacturer's recommendations.
- b. The damaged coating area and the bordering area 2 inches outside the damaged area shall be removed by cutting a neat, uniform perimeter with a wood chisel laid back at an angle or 45 degrees to the surface and by abrasive blasting with a needle or pencil gun (spot blast) to a near white metal SP-10. The adjacent undamaged area of coating shall be protected during blasting and subsequent coating operations.
- c. As soon as practical after preparing the surface, it shall be cleaned as previously described under surface preparation taking care not to over spray undamaged coating. Recoating shall begin immediately after cleaning and drying and shall be done according to 3.3.1.

Brownsville Navigation District Oil Dock No. 6 Bulkhead Repair

- d. All coatings not applied in accordance with the manufacturer's recommendations shall be repaired in accordance with the manufacturer's recommendations.
- 3.3.3 Two-Coat Coal Tar Epoxy-Polyamide System

Apply each coat at a dry film thickness of not less than 8 mils.

3.3.4 Dry Film Thickness

Provide total system minimum dry film thickness of 16 mils for coal tar epoxy-polyamide system. Measure using a magnetic gauge.

- 3.4 SURFACES TO BE COATED
- 3.4.1 Steel Waterfront Construction

All steel HSS sections shall be coated with a two-coat coal tar epoxy-polyamide system after fabrication.

- 3.5 FIELD TESTS
- 3.5.1 Dry Film Thickness

After repair of holidays, measure dry film thickness using a magnetic dry film thickness gage in accordance with ASTM D7091 and ASTM E376. Re-measure after an additional coat is applied, and add it to meet minimum thickness requirements.

-- End of Section --

SECTION 09 97 13.28

PROTECTION OF BURIED STEEL PIPING AND STEEL BULKHEAD TIE RODS

- PART 1 GENERAL
- 1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN WATER WORKS ASSOCIATION (AWWA)

- AWWA C209(2013) Cold-Applied Tape Coatings for the
Exterior of Special Sections, Connections
and Fitting for Steel Water PipelinesAWWA C213(2015) Fusion-Bonded Epoxy Coating for the
- AWWA C213 (2015) Fusion-Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines
- AWWA C214(2014) Tape Coating Systems for the
Exterior of Steel Water Pipelines

NACE INTERNATIONAL (NACE)

NACE RP0274

(2004) High Voltage Electrical Inspection of Pipeline Coatings

U.S. DEPARTMENT OF DEFENSE (DOD)

MIL-I-631 (1961; Rev D; Am 6 1987) Insulation, Electrical, Synthetic-Resin Composition, Nonrigid

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

FS L-C-530	(Rev C; Notice 1) Coating, Pipe,
	Thermoplastic Resin

1.2 DEFINITIONS

1.2.1 Coating

A continuous, uniformly thick layer formed on a surface by the mechanical application of a liquid, mastic, powdered, or extruded film material. Some types of application require elevated temperatures.

1.2.2 Coating System

One or more coatings applied to a properly prepared steel surface. If only one coating, that coating is applied directly to the steel surface; if more than one coating, each coating is applied in one operation over the previously applied and cured coating. For some applications, the first coating is a primer. Coatings of a particular system function together as a collective entity to protect the steel surface from corrosion. Coating system may be either liquid or tape applied.

1.2.3 Tape

Prefabricated laminate of plastic film backing with a homogeneous sealant layer or a pressure-sensitive adhesive layer produced in sheets, pads, or rolls wound on hollow cores. Tape applications do not require elevated temperatures.

1.2.4 Tape Coating System

One or more layers of tape applied cold over a properly prepared and primed steel surface. Tape on the primed surface protects the steel surface from corrosion.

1.3 SUBMITTALS

The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Factory-applied coating system

Field-applied epoxy coating system

Thermosetting epoxy coating system

Polyethylene-Butyl Adhesive Coating System

Adhesive Thermoplastic Resin Coating System

Tape Coating System

Electrical-flaw detector

Mastics

Rock shield

SD-06 Test Reports

Inspector's certificate

Submit for each inspection and test.

Field-applied epoxy coating

SD-08 Manufacturer's Instructions

Field-applied epoxy coating system

Thermosetting epoxy coating system

Electrical-flaw detector

Mastics

Rock Shield

Brownsville Navigation District Oil Dock No. 6 Bulkhead Repair

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Tape Coating System (TCS)

Prefabricated tape with adhesive primer for bulkhead tie rods and turnbuckles and for use on pipe, couplings, damaged areas and fittings. The tape wrapping system shall conform to AWWA C209 and to MIL-I-631, Class I for fungus resistance, except that the fungus rating shall lie between zero and one for all specimens. The overall thickness of the tape wrap protection shall be not less than45 mils.

2.1.2 Adhesive Thermoplastic Resin Coating System (ATRCS)

Steel pipe factory-applied coating system conforming to FS L-C-530and coating manufacturer's instructions shall consist of a continuously extruded polyethylene coating, capable of withstanding operating temperatures up to 190 degrees F, applied on an adhesive undercoat.

2.1.3 Thermosetting Epoxy Coating System (TECS)

Factory-applied steel pipe system conforming to AWWA C213. Provide field-applied epoxy coating in accordance with manufacturer's recommendations and AWWA C213.

2.1.4 Polyethylene-Butyl Adhesive Coating System (PBACS)

Factory-applied steel pipe system of extruded butyl adhesive compound, 7 mils minimum thickness, covered with overlapping layers of extruded polyethylene wrapping, 38 mils minimum thickness, in accordance with AWWA C214.

2.1.5 Mastics

Apply a coating of manufacturer approved mastic protection to irregular surfaces. Mastic shall be compatible with coating system. Apply the tape system over mastic. Mastic layer thickness shall conform to coating manufacturer's recommendation.

2.1.6 Rock Shield

Provide rock shield over completed coating system as recommended by coating manufacturer.

- PART 3 EXECUTION
- 3.1 INSTALLATION
- 3.1.1 TCS
- 3.1.1.1 Surface Preparation

Surfaces shall be clean and dry. Wire brush weld beads, and remove weld spatters. Remove heavy rust or mill scale with wire brush.

3.1.1.2 Application

Remove paper from Kraft paper-protected material before placing in final

position. Reinforce coating at sling points with roofing felt or other approved heavy shielding material, or handle with nylon or canvas slings. Apply polyvinylchloride-butyl rubber laminated tape or pressure-sensitive organic plastic tape and its adhesive primer by single machine operation.

- a. Pipe: Spirally wrap straight runs in one layer, lapping the tape as applied. Overlap shall conform to recommendations of the tape manufacturer. When an outerwrap is used, overlap of outerwrap shall bridge joints of the tape. Apply at each end of straight runs a double wrap of one full width of tape at right angles to the axis in such a manner so as to seal ends of spiral wrapping.
- b. Pipe Joints and Couplings and Damaged Areas of Coatings: Clean joint areas which are to be taped, of burrs and rust. Smooth down or cut away damaged coating when not firmly bonded to pipe. Spirally wrap with a two-layer wrapping system, overlapping coating surface at least 3 inches. Initially stretch tape sufficiently to conform to the surface to which it is applied, using one layer half-lapped for tape 2 inches or less in width or one layer lapped at least one inch for tape more than 2 inches wide. Apply a second layer, lapped as above, with tension as tape comes off roll, and press to conform to shape of component. For other irregular surfaces such as bolted flanges valve bodies where tape coating system containing mastics is to be provided, apply with brush.
- c. Tie Rods and Tie Rod Fittings: Spirally wrap with a two-layer coating system. Apply tape to tie rods by lapping each layer of tape using a half-lap for tape 2 inches or less in width or at least a one inch lap for tape more than 2 inches wide. For tie rod fittings, initially stretch tape sufficiently to conform to the surface to which it is applied, using one layer half-lapped for tape 2 inches or less in width or one layer lapped at least one inch for tape more than 2 inches wide. Apply a second layer, lapped as before, with a tension as tape comes off the roll, and press to conform to the shape of component.
- 3.1.2 Joints, and Other Irregular Surfaces For ATRCS

Prepare surface as described in paragraph entitled "TCS." Wrap tape as specified in paragraph entitled "TCS"; except, apply the tape half-lapped, and prime extruded polyethylene coating and adhesive undercoat surfaces to be tape wrapped with a compatible primer as recommended by the tape manufacturer and approved by the extruded polyethylene coating applicator for use on the polyethylene coating.

3.1.2.1 Damaged Areas

Repair damaged areas of the extruded polyethylene coating by tape wrapping as specified under the paragraph, entitled "Tape Coating System" except press residual material from the extruded polyethylene coating into the break, or trim off. Prime areas to be taped prior to applying half-lapped tape.

3.1.3 TECS

Install in accordance with the manufacturer's instructions and AWWA C213.

3.1.3.1 Joints

Clean both sides of weld area by wire brushing, and remove dust, moisture, and other contaminants. Apply primer recommended by coating manufacturer after cleaning of joints.

3.1.3.2 Damaged Areas

Remove damaged coating by abrading, filing, or wire brushing. Clean area to be repaired free of dust, moisture, and other contaminants. Cover with a primer and a coating recommended by coating manufacturer. Apply coating over cleaned surface, and extend approximately 3 inchesbeyond damaged area.

3.1.4 Joints and Other Irregular Surfaces For PBACS

Clean both sides of weld area by wire brushing, and remove dust, moisture, and other contaminants. Apply primer recommended by tape manufacturer and acceptable to coating manufacturer on cleaned area. Apply tape spirally with a 50-percent overlap in accordance with the tape manufacturer's instructions.

3.1.4.1 Damaged Areas

Remove rough or protruding polyethylene from damaged area by abrading, filing, or cutting the material. Clean area to be repaired free of dust, moisture, and other contaminants. Cover with tape recommended by coating manufacturer and primer recommended by tape manufacturer. Apply primer over cleaned surface, and extend approximately 3 inches beyond damaged area. Apply tape over primer, and extend one inch beyond damaged area. Apply additional primer over tape patch. Spirally wrap additional tape around pipe with a 50-percent overlap to cover tape patch, and extend a minimum of 2 inches beyond the edge of the patch.

3.2 FIELD QUALITY CONTROL

Conform to AWWA C214 and AWWA C213.

3.2.1 Field Inspection

Examine material surface preparation and application proceduresperformed in the field.

3.2.2 Field Test

Test the protective system for holes, voids, cracks, and other visually undetectable damage that may occur during handling and installation in accordance with NACE Standard NACE RP0274. In critical applications no holidays will be permitted. In non critical applications up to 3 holidays per linear feet of the pipe may be accepted. Test with an approved electrical-flaw detector in accordance with the detector manufacturer's printed instructions. Prepare inspector's certificate for each inspection and test. Repair areas where arcing occurs and retest.

-- End of Section --

DIVISION 31 – EARTHWORK

SECTION 31 00 00

EARTHWORK

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C600	(2010)	Ins	stallat	cion	of	Ductile-Iron	Water
	Mains	and	Their	Аррι	irte	enances	

ASTM INTERNATIONAL (ASTM)

ASTM C136	(2006) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM D1140	(2014) Amount of Material in Soils Finer than the No. 200 (75-micrometer) Sieve
ASTM D1556	(2007) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1557	(2012) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3) (2700 kN-m/m3)
ASTM D2434	(1968; R 2006) Permeability of Granular Soils (Constant Head)
ASTM D2487	(2011) Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D422	(1963; R 2007; E 2014; E 2014) Particle-Size Analysis of Soils
ASTM D4318	(2010; E 2014) Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D698	(2012; E 2014; E 2015) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA	600/4-79/020	(1983) Methods for Chemical Analysis of Water and Wastes
EPA	SW-846.3-3	(1999, Third Edition, Update III-A) Tes Methods for Evaluating Solid Waste:

Physical/Chemical Methods

1.2 DEFINITIONS

1.2.1 Satisfactory Materials

Satisfactory materials comprise any materials classified by ASTM D2487 as GW, GP, GM, GP-GM, GW-GM, GC, GP-GC, GM-GC, SW, SP, SM, SW-SM, SC, SW-SC, SP-SM, SP-SC, CL, ML, CL-ML, CH, MH. Satisfactory materials for grading comprise stones less than 8 inches, except for fill material for pavements and railroads which comprise stones less than 3 inches in any dimension.

1.2.2 Unsatisfactory Materials

Materials which do not comply with the requirements for satisfactory materials are unsatisfactory. Unsatisfactory materials also include man-made fills; trash; refuse; backfills from previous construction; and material classified as satisfactory which contains root and other organic matter or frozen material. Notify the OWNER when encountering any contaminated materials.

1.2.3 Cohesionless and Cohesive Materials

Cohesionless materials include materials classified in ASTM D2487 as GW, GP, SW, and SP. Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesionless only when the fines are nonplastic. Perform testing, required for classifying materials, in accordance with ASTM D4318, ASTM C136, ASTM D422, and ASTM D1140.

1.2.4 Degree of Compaction

Degree of compaction required, except as noted in the second sentence, is expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D1557 abbreviated as a percent of laboratory maximum density. Since ASTM D1557 applies only to soils that have 30 percent or less by weight of their particles retained on the 3/4 inch sieve, express the degree of compaction for material having more than 30 percent by weight of their particles retained on the 3/4 inch sieve as a percentage of the maximum density in accordance with AASHTO T 180 and corrected with AASHTO T 224. To maintain the same percentage of coarse material, use the "remove and replace" procedure as described in NOTE 8 of Paragraph 7.2 in AASHTO T 180.

1.2.5 Hard/Unyielding Materials

Hard/Unyielding materials comprise weathered rock, dense consolidated deposits, or conglomerate materials which are not included in the definition of "rock" with stones greater than 36 inches in any dimension or as defined by the pipe manufacturer, whichever is smaller. These materials usually require the use of heavy excavation equipment, ripper teeth, or jack hammers for removal.

1.2.6 Rock

Solid homogeneous interlocking crystalline material with firmly cemented, laminated, or foliated masses or conglomerate deposits, neither of which can be removed without systematic drilling and blasting, drilling and the use of expansion jacks or feather wedges, or the use of backhoe-mounted Brownsville Navigation District Oil Dock No. 6 Bulkhead Repair

pneumatic hole punchers or rock breakers; also large boulders, buried masonry, or concrete other than pavement exceeding 1/2 cubic yard in volume. Removal of hard material will not be considered rock excavation because of intermittent drilling and blasting that is performed merely to increase production.

1.2.7 Unstable Material

Unstable materials are too wet to properly support the utility pipe, conduit, or appurtenant structure.

- 1.2.8 Select Granular Material
- 1.2.8.1 General Requirements

Select granular material consist of materials classified as GW, GP, SW, SP, by ASTM D2487 where indicated. The liquid limit of such material must not exceed 35 percent when tested in accordance with ASTM D4318. The plasticity index must not be greater than 12 percent when tested in accordance with ASTM D4318, and not more than 35 percent by weight may be finer than No. 200 sieve when tested in accordance with ASTM D1140. Provide a minimum coefficient of permeability of 0.002 feet per minute when tested in accordance with ASTM D2434.

1.2.9 Initial Backfill Material

Initial backfill consists of select granular material or satisfactory materials free from rocks of such size as recommended by the pipe manufacturer.

1.2.10 Expansive Soils

Expansive soils are defined as soils that have a plasticity index equal to or greater than 15 when tested in accordance with ASTM D4318.

1.2.11 Nonfrost Susceptible (NFS) Material

Nonfrost susceptible material are a uniformly graded washed sand with less than 5 percent passing the No. 200 size sieve, and with not more than 3 percent by weight finer than 0.02 mm grain size.

1.2.12 Pile Supported Structure

As used herein, a structure where the foundation is pile supported.

1.3 SYSTEM DESCRIPTION

Subsurface soil boring logs are shown on the drawings. The subsoil investigation report may be examined at the OWNER'S office. These data represent the best subsurface information available; however, variations may exist in the subsurface between boring locations.

1.3.1 Classification of Excavation

No consideration will be given to the nature of the materials, and all excavation will be designated as unclassified excavation.

1.3.2 Dewatering Work Plan

Submit procedures for accomplishing dewatering work.

1.4 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Shoring

Dewatering Work Plan

Submit 15 days prior to starting work.

SD-03 Product Data

Utilization of Excavated Materials Rock Excavation Opening of any Excavation or Borrow Pit Shoulder Construction

Procedure and location for disposal of unused satisfactory material. . Notification of encountering rock in the project. Advance notice on the opening of excavation . Advance notice on shoulder construction for rigid pavements.

SD-06 Test Reports

Testing Borrow Site Testing

Within 24 hours of conclusion of physical tests, 4 copies of test results, including calibration curves and results of calibration tests. Results of testing at the borrow site.

SD-07 Certificates

Testing

Qualifications of the Corps validated commercial testing laboratory or the CONTRACTOR's validated testing facilities.

PART 2 PRODUCTS

2.1 REQUIREMENTS FOR OFFSITE SOILS

Test offsite soils brought in for use as backfill for Total Petroleum Hydrocarbons (TPH), Benzene, Toluene, Ethyl Benzene, and Xylene (BTEX) and full Toxicity Characteristic Leaching Procedure (TCLP) including ignitability, corrosivity and reactivity. Backfill shall contain a maximum of 100 parts per million (ppm) of total petroleum hydrocarbons (TPH) and a maximum of 10 ppm of the sum of Benzene, Toluene, Ethyl Benzene, and Xylene (BTEX) and shall pass the TCPL test. Determine TPH concentrations by using EPA 600/4-79/020 Method 418.1. Determine BTEX concentrations by using EPA SW-846.3-3 Method 5030/8020. Perform TCLP in accordance with EPA SW-846.3-3 Method 1311. Provide Borrow Site Testing for TPH, BTEX and TCLP from a composite sample of material from the borrow site, with at least one test from each borrow site. Do not bring material onsite until tests have been approved by the OWNER.

2.2 BURIED WARNING AND IDENTIFICATION TAPE

Provide polyethylene plastic and metallic core or metallic-faced, acid- and alkali-resistant, polyethylene plastic warning tape manufactured specifically for warning and identification of buried utility lines. Provide tape on rolls, 3 inch minimum width, color coded as specified below for the intended utility with warning and identification imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (intended service) LINE BELOW" or similar wording. Provide permanent color and printing, unaffected by moisture or soil.

Warning Tape Color Codes

Red:	Electric
Yellow:	Gas, Oil; Dangerous Materials
Orange:	Telephone and Other
	Communications
Blue:	Water Systems
Green:	Sewer Systems

2.2.1 Warning Tape for Metallic Piping

Provide acid and alkali-resistant polyethylene plastic tape conforming to the width, color, and printing requirements specified above, with a minimum thickness of 0.003 inch and a minimum strength of 1500 psi lengthwise, and 1250 psi crosswise, with a maximum 350 percent elongation.

2.2.2 Detectable Warning Tape for Non-Metallic Piping

Provide polyethylene plastic tape conforming to the width, color, and printing requirements specified above, with a minimum thickness of 0.004 inch, and a minimum strength of 1500 psi lengthwise and 1250 psi crosswise. Manufacture tape with integral wires, foil backing, or other means of enabling detection by a metal detector when tape is buried up to 3 feet deep. Encase metallic element of the tape in a protective jacket or provide with other means of corrosion protection.

2.3 DETECTION WIRE FOR NON-METALLIC PIPING

Insulate a single strand, solid copper detection wire with a minimum of 12 AWG.

2.4 MATERIAL FOR RIP-RAP

2.4.1 Bedding Material

Provide bedding material consisting of sand, gravel, or crushed rock, well graded, with a maximum particle size of 2 inch. Compose material of tough, durable particles. Allow fines passing the No. 200 standard sieve with a plasticity index less than six.

2.4.2 Grout

Provide durable grout composed of cement, water, an air-entraining

admixture, and sand mixed in proportions of one part portland cement to two parts of sand, sufficient water to produce a workable mixture, and an amount of admixture which will entrain sufficient air, as determined by the OWNER. Mix grout in a concrete mixer. Allow a sufficient mixing time to produce a mixture having a consistency permitting gravity flow into the interstices of the rip-rap with limited spading and brooming.

2.4.3 Rock

Provide rock fragments sufficiently durable to ensure permanence in the structure and the environment in which it is to be used. Use rock fragments free from cracks, seams, and other defects that would increase the risk of deterioration from natural causes. Provide fragments sized so that no individual fragment exceeds a weight of 150 pounds and that no more than 10 percent of the mixture, by weight, consists of fragments weighing 2 pounds or less each. Provide rock with a minimum specific gravity of 2.50. Do not permit the inclusion of more than trace 1 percent quantities of dirt, sand, clay, and rock fines.

PART 3 EXECUTION

3.1 GENERAL EXCAVATION

Perform excavation of every type of material encountered within the limits of the project to the lines, grades, and elevations indicated and as specified. Perform the grading in accordance with the typical sections shown and the tolerances specified in paragraph FINISHING, Section 3.16. Transport satisfactory excavated materials and place in fill or embankment within the limits of the work. Excavate unsatisfactory materials encountered within the limits of the work below grade and replace with satisfactory materials as directed. Include such excavated material and the satisfactory material ordered as replacement in excavation. Dispose surplus satisfactory excavated material not required for fill or embankment in areas approved for surplus material storage or designated waste areas. Dispose unsatisfactory excavated material in designated waste or spoil areas. During construction, perform excavation and fill in a manner and sequence that will provide proper drainage at all times. Excavate material required for fill or embankment in excess of that produced by excavation within the grading limits from other approved areas selected by the CONTRACTOR as specified.

3.1.1 Ditches, Gutters, and Channel Changes

Finish excavation of ditches, gutters, and channel changes by cutting accurately to the cross sections, grades, and elevations shown on Drawings. Do not excavate ditches and gutters below grades shown. Backfill the excessive open ditch or gutter excavation with satisfactory, thoroughly compacted, material or with suitable stone or cobble to grades shown. Dispose excavated material as shown or as directed, except in no case allow material be deposited a maximum 4 feet from edge of a ditch. Maintain excavations free from detrimental quantities of leaves, brush, sticks, trash, and other debris until final acceptance of the work.

3.1.2 Drainage Structures

Make excavations to the lines, grades, and elevations shown, or as directed. Provide trenches and foundation pits of sufficient size to permit the placement and removal of forms for the full length and width of structure footings and foundations as shown. Clean rock or other hard

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foundation material of loose debris and cut to a firm, level, stepped, or serrated surface. Remove loose disintegrated rock and thin strata. Do not disturb the bottom of the excavation when concrete or masonry is to be placed in an excavated area. Do not excavate to the final grade level until just before the concrete or masonry is to be placed. Where pile foundations are to be used, stop the excavation of each pit at an elevation 1 foot above the base of the footing, as specified, before piles are driven. After the pile driving has been completed, remove loose and displaced material and complete excavation, leaving a smooth, solid, undisturbed surface to receive the concrete or masonry.

3.1.3 Drainage

Provide for the collection and disposal of surface and subsurface water encountered during construction. Completely drain construction site during periods of construction to keep soil materials sufficiently dry. Construct storm drainage features (ponds/basins) at the earliest stages of site development, and throughout construction grade the construction area to provide positive surface water runoff away from the construction activity and provide temporary ditches, swales, and other drainage features and equipment as required to maintain dry soils. When unsuitable working platforms for equipment operation and unsuitable soil support for subsequent construction features develop, remove unsuitable material and provide new soil material as specified herein. It is the responsibility of the CONTRACTOR to assess the soil and ground water conditions presented by the plans and specifications and to employ necessary measures to permit construction to proceed.

3.1.4 Dewatering

Control groundwater flowing toward or into excavations to prevent sloughing of excavation slopes and walls, boils, uplift and heave in the excavation and to eliminate interference with orderly progress of construction. Do not permit French drains, sumps, ditches or trenches within 3 feet of the foundation of any structure, except with specific written approval, and after specific contractual provisions for restoration of the foundation area have been made. Take control measures by the time the excavation reaches the water level in order to maintain the integrity of the in situ material. While the excavation is open, maintain the water level continuously, at least one feet below the working level. Operate dewatering system continuously until required work is complete.

3.1.5 Trench Excavation Requirements

Excavate the trench as recommended by the manufacturer of the pipe to be installed. Slope trench walls below the top of the pipe, or make vertical, and of such width as recommended in the manufacturer's printed installation manual. Provide vertical trench walls where no manufacturer's printed installation manual is available. Shore trench walls more than five feet high, cut back to a stable slope, or provide with equivalent means of protection for employees who may be exposed to moving ground or cave in. Shore vertical trench walls more than five feet high. Excavate trench walls which are cut back to at least the angle of repose of the soil. Give special attention to slopes which may be adversely affected by weather or moisture content. Do not exceed the trench width below the pipe top of 24 inches plus pipe outside diameter (O.D.) for pipes of less than 24 inch inside diameter, and do not exceed 36 inch plus pipe outside diameter for sizes larger than 24 inch inside diameter. Where recommended trench widths are exceeded, provide redesign, stronger pipe, or special installation procedures by the CONTRACTOR. The CONTRACTOR is responsible for the cost of redesign, stronger pipe, or special installation procedures without any additional cost to the OWNER.

3.1.5.1 Bottom Preparation

Grade the bottoms of trenches accurately to provide uniform bearing and support for the bottom quadrant of each section of the pipe. Excavate bell holes to the necessary size at each joint or coupling to eliminate point bearing. Remove stones as recommended by the pipe manufacturer to avoid point bearing.

3.1.5.2 Removal of Unyielding Material

Where unyielding material is encountered in the bottom of the trench, remove such material and replace with suitable materials as provided in paragraph BACKFILLING AND COMPACTION, Section 3.10.

3.1.5.3 Removal of Unstable Material

Where unstable material is encountered in the bottom of the trench, remove such material to the depth directed and replace it to the proper grade with select granular material as provided in paragraph BACKFILLING AND COMPACTION. When removal of unstable material is required due to the CONTRACTOR's fault or neglect in performing the work, the CONTRACTOR is responsible for excavating the resulting material and replacing it without additional cost to the OWNER.

3.1.5.4 Excavation for Appurtenances

Provide excavation for manholes, catch-basins, inlets, or similar structures of sufficient size to permit the placement and removal of forms for the full length and width of structure footings and foundations as shown. Clean rock of loose debris and cut to a firm surface either level, stepped, or serrated, as shown or as directed. Remove loose disintegrated rock and thin strata. Specify removal of unstable material. When concrete or masonry is to be placed in an excavated area, take special care not to disturb the bottom of the excavation. Do not excavate to the final grade level until just before the concrete or masonry is to be placed.

3.1.5.5 Jacking, Boring, and Tunneling

Unless otherwise indicated, provide excavation by open cut except that sections of a trench may be jacked, bored, or tunneled if, in the opinion of the OWNER, the pipe, cable, or duct can be safely and properly installed and backfill can be properly compacted in such sections.

3.1.6 Underground Utilities

The CONTRACTOR is responsible for movement of construction machinery and equipment over pipes and utilities during construction. Perform work adjacent to non-OWNER utilities and pipelines as indicated in accordance with procedures outlined by utility and pipeline companies. Excavation made with power-driven equipment is not permitted within two feet of known utility or subsurface construction. For work immediately adjacent to or for excavations exposing a utility or other buried obstruction, excavate by hand. Start hand excavation on each side of the indicated obstruction and continue until the obstruction is uncovered or until clearance for the new grade is assured. Support uncovered lines or other existing work affected
by the contract excavation until approval for backfill is granted by the OWNER. Report damage to utility lines or subsurface construction immediately to the OWNER.

3.1.7 Structural Excavation

Ensure that footing subgrades have been inspected and approved by the OWNER prior to concrete placement. Excavate to bottom of pile cap prior to placing or driving piles, unless authorized otherwise by the OWNER. Backfill and compact over excavations and changes in grade due to pile driving operations to 95 percent of ASTM D698 maximum density

3.2 SELECTION OF BORROW MATERIAL

Select borrow material to meet the requirements and conditions of the particular fill or embankment for which it is to be used. Unless otherwise provided in the contract, the CONTRACTOR is responsible for obtaining the right to procure material, pay royalties and other charges involved, and bear the expense of developing the sources, including rights-of-way for hauling from the OWNERS. Unless specifically provided, do not obtain borrow within the limits of the project site without prior written approval. Consider necessary clearing, grubbing, and satisfactory drainage of borrow pits and the disposal of debris thereon related operations to the borrow excavation.

3.3 OPENING AND DRAINAGE OF EXCAVATION

Notify the OWNER sufficiently in advance of the opening of any excavation or borrow pit to permit elevations and measurements of the undisturbed ground surface to be taken. Except as otherwise permitted, excavate borrow pits and other excavation areas providing adequate drainage. Transport overburden and other spoil material to designated spoil areas or otherwise dispose of as directed. Ensure that excavation of any area, or dumping of spoil material, results in minimum detrimental effects on natural environmental conditions.

3.4 SHORING

3.4.1 General Requirements

Submit a Shoring and Sheeting plan for approval 15 days prior to starting work. Submit drawings and calculations, certified by a registered professional ENGINEER, describing the methods for shoring and sheeting of excavations. Finish shoring, including sheet piling, and install as necessary to protect workmen, banks, adjacent paving, structures, and utilities. Remove shoring, bracing, and sheeting as excavations are backfilled, in a manner to prevent caving.

3.4.2 Geotechnical ENGINEER

Hire a Professional Geotechnical ENGINEER to provide inspection of excavations and soil/groundwater conditions throughout construction. The Geotechnical ENGINEER is responsible for performing pre-construction and periodic site visits throughout construction to assess site conditions. The Geotechnical ENGINEER is responsible for updating the excavation, sheeting and dewatering plans as construction progresses to reflect changing conditions and submit an updated plan if necessary. Submit a monthly written report, informing the CONTRACTOR and OWNER of the status of the plan and an accounting of the CONTRACTOR's adherence to the plan addressing any present or potential problems. The OWNER is responsible for arranging meetings with the Geotechnical ENGINEER at any time throughout the contract duration.

3.5 GRADING AREAS

Where indicated, divide work into grading areas within which satisfactory excavated material will be placed in embankments, fills, and required backfills. Do not haul satisfactory material excavated in one grading area to another grading area except when so directed in writing. Place and grade stockpiles of satisfactory materials as specified. Keep stockpiles in a neat and well drained condition, giving due consideration to drainage at all times. Clear, grub, and seal by rubber-tired equipment, the ground surface at stockpile locations; separately stockpile excavated satisfactory and unsatisfactory materials. Protect stockpiles of satisfactory materials from contamination which may destroy the quality and fitness of the stockpiled material. If the CONTRACTOR fails to protect the stockpiles, and any material becomes unsatisfactory, remove and replace such material with satisfactory material from approved sources.

3.6 FINAL GRADE OF SURFACES TO SUPPORT CONCRETE

Do not excavate to final grade until just before concrete is to be placed. Only use excavation methods that will leave the foundation rock in a solid and unshattered condition. Roughen the level surfaces, and cut the sloped surfaces, as indicated, into rough steps or benches to provide a satisfactory bond. Protect shales from slaking and all surfaces from erosion resulting from ponding or water flow.

3.7 GROUND SURFACE PREPARATION

3.7.1 General Requirements

Remove and replace unsatisfactory material with satisfactory materials, as directed by the OWNER, in surfaces to receive fill or in excavated areas. Scarify the surface to a depth of 6 inch before the fill is started. Plow, step, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so that the fill material will bond with the existing material. When subgrades are less than the specified density, break up the ground surface to a minimum depth of 6 inch, pulverizing, and compacting to the specified density. When the subgrade is part fill and part excavation or natural ground, scarify the excavated or natural ground portion to a depth of 12 inch and compact it as specified for the adjacent fill.

3.8 UTILIZATION OF EXCAVATED MATERIALS

Dispose of unsatisfactory materials removed from excavations into designated waste disposal or spoil areas. Use satisfactory material removed from excavations, insofar as practicable, in the construction of fills, embankments, subgrades, shoulders, bedding (as backfill), and for similar purposes. Do not waste any satisfactory excavated material without specific written authorization. Dispose of satisfactory material, authorized to be wasted, in designated areas approved for surplus material storage or designated waste areas as directed. Clear and grub newly designated waste areas on OWNER-controlled land before disposal of waste material thereon. Stockpile and use coarse rock from excavations for constructing slopes or embankments adjacent to streams, or sides and bottoms of channels and for protecting against erosion. Do not dispose excavated material to obstruct the flow of any stream, endanger a partly finished structure, impair the efficiency or appearance of any structure, or be detrimental to the completed work in any way.

3.9 BURIED TAPE AND DETECTION WIRE

3.9.1 Buried Warning and Identification Tape

Provide buried utility lines with utility identification tape. Bury tape 12 inch below finished grade; under pavements and slabs, bury tape 6 inch below top of subgrade.

3.9.2 Buried Detection Wire

Bury detection wire directly above non-metallic piping at a distance not to exceed 12 inch above the top of pipe. Extend the wire continuously and unbroken, from manhole to manhole. Terminate the ends of the wire inside the manholes at each end of the pipe, with a minimum of 3 feet of wire, coiled, remaining accessible in each manhole. Furnish insulated wire over it's entire length. Install wires at manholes between the top of the corbel and the frame, and extend up through the chimney seal between the frame and the chimney seal. For force mains, terminate the wire in the valve pit at the pump station end of the pipe.

3.10 BACKFILLING AND COMPACTION

Place backfill adjacent to any and all types of structures, and compact to at least 90 percent laboratory maximum density for cohesive materials or 95 percent laboratory maximum density for cohesionless materials, to prevent wedging action or eccentric loading upon or against the structure. Prepare ground surface on which backfill is to be placed as specified in paragraph GROUND SURFACE PREPARATION. Provide compaction requirements for backfill materials in conformance with the applicable portions of paragraphs GROUND SURFACE PREPARATION. Finish compaction by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment.

3.10.1 Trench Backfill

Backfill trenches to the grade shown. Do not backfill the trench until all specified tests are performed.

3.10.1.1 Replacement of Unyielding Material

Replace unyielding material removed from the bottom of the trench with select granular material or initial backfill material.

3.10.1.2 Replacement of Unstable Material

Replace unstable material removed from the bottom of the trench or excavation with select granular material placed in layers not exceeding 6 inch loose thickness.

3.10.1.3 Bedding and Initial Backfill

Provide bedding of the type and thickness shown. Place initial backfill material and compact it with approved tampers to a height of at least one foot above the utility pipe or conduit. Bring up the backfill evenly on both sides of the pipe for the full length of the pipe. Take care to ensure thorough compaction of the fill under the haunches of the pipe.

Except as specified otherwise in the individual piping section, provide bedding for buried piping in accordance with AWWA C600, Type 4, except as specified herein. Compact backfill to top of pipe to 95 percent of ASTM D698 maximum density. Provide plastic piping with bedding to spring line of pipe. Provide materials as follows:

a. Class I: Angular, 0.25 to 1.5 inch, graded stone, including a number of fill materials that have regional significance such as coral, slag, cinders, crushed stone, and crushed shells.

b. Class II: Coarse sands and gravels with maximum particle size of 1.5 inch, including various graded sands and gravels containing small percentages of fines, generally granular and noncohesive, either wet or dry. Soil Types GW, GP, SW, and SP are included in this class as specified in ASTM D2487.

3.10.1.4 Final Backfill

Fill the remainder of the trench, except for special materials for roadways, railroads and airfields, with satisfactory material. Place backfill material and compact as follows:

a. Roadways: Place backfill up to the required elevation as specified. Do not permit water flooding or jetting methods of compaction.

b. Sidewalks, Turfed or Seeded Areas and Miscellaneous Areas: Deposit backfill in layers of a maximum of 12 inch loose thickness, and compact it to 85 percent maximum density for cohesive soils and 90 percent maximum density for cohesionless soils. Do not permit compaction by water flooding or jetting. Apply this requirement to all other areas not specifically designated above.

3.10.2 Backfill for Appurtenances

After the manhole, catchbasin, inlet, or similar structure has been constructed and the concrete has been allowed to cure for 7 days, place backfill in such a manner that the structure will not be damaged by the shock of falling earth. Deposit the backfill material, compact it as specified for final backfill, and bring up the backfill evenly on all sides of the structure to prevent eccentric loading and excessive stress.

3.11 SPECIAL REQUIREMENTS

Special requirements for both excavation and backfill relating to the specific utilities are as follows:

3.11.1 Gas Distribution

Excavate trenches to a depth that will provide a minimum 18 inch of cover in rock excavation and a minimum 24 inch of cover in other excavation.

3.11.2 Water Lines

Excavate trenches to a depth that provides a minimum cover of four feet from the existing ground surface, or from the indicated finished grade, whichever is lower, to the top of the pipe.

3.11.3 Electrical Distribution System

Provide a minimum cover of 24 inch from the finished grade to direct burial cable and conduit or duct line, unless otherwise indicated.

3.11.4 Cleaning

Clean inside of the pipeline casing of dirt, weld splatters, and other foreign matter which would interfere with insertion of the piped utilities by attaching a pipe cleaning plug to the boring rig and passing it through the pipe.

3.11.5 End Seals

After installation of piped utilities in pipeline casing, provide watertight end seals at each end of pipeline casing between pipeline casing and piping utilities. Provide watertight end seals as indicated.

3.11.6 Rip-Rap Construction

Construct rip-rap in the areas indicated. Trim and dress indicated areas to conform to cross sections, lines and grades shown within a tolerance of 0.1 foot.

3.11.6.1 Bedding Placement

Spread bedding material uniformly to a thickness of at least 3 inches on prepared subgrade as indicated.

3.11.6.2 Stone Placement

Place rock for rip-rap on prepared bedding material to produce a well graded mass with the minimum practicable percentage of voids in conformance with lines and grades indicated. Distribute larger rock fragments, with dimensions extending the full depth of the rip-rap throughout the entire mass and eliminate "pockets" of small rock fragments. Rearrange individual pieces by mechanical equipment or by hand as necessary to obtain the distribution of fragment sizes specified above. For grouted rip-rap, hand-place surface rock with open joints to facilitate grouting and do not fill smaller spaces between surface rock with finer material. Provide at least one "weep hole" through grouted rip-rap for every 50 square feet of finished surface. Provide weep holes with columns of bedding material, 4 inch in diameter, extending up to the rip-rap surface without grout.

3.11.6.3 Grouting

Prior to grouting, wet rip-rap surfaces. Grout rip-rap in successive longitudinal strips, approximately 10 feet in width, commencing at the lowest strip and working up the slope. Distribute grout to place of final deposit and work into place between stones with brooms, spades, trowels, or vibrating equipment. Take precautions to prevent grout from penetrating bedding layer. Protect and cure surface for a minimum of 7 days.

3.12 EMBANKMENTS

3.12.1 Earth Embankments

Construct earth embankments from satisfactory materials free of organic or frozen material and rocks with any dimension greater than 3 inches. Place

the material in successive horizontal layers of loose material not more than 12 inch in depth. Spread each layer uniformly on a soil surface that has been moistened or aerated as necessary, and scarified or otherwise broken up so that the fill will bond with the surface on which it is placed. After spreading, plow, disk, or otherwise brake up each layer; moisten or aerate as necessary; thoroughly mix; and compact to at least 90 percent laboratory maximum density for cohesive materials or 95 percent laboratory maximum density for cohesionless materials. Compaction requirements for the upper portion of earth embankments forming subgrade for pavements are identical with those requirements specified in paragraph SUBGRADE PREPARATION. Finish compaction by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment.

3.13 SUBGRADE PREPARATION

3.13.1 Proof Rolling

Finish proof rolling on an exposed subgrade free of surface water (wet conditions resulting from rainfall) which would promote degradation of an otherwise acceptable subgrade. Notify the OWNER a minimum of 3 days prior to proof rolling. Perform proof rolling in the presence of the OWNER. Undercut rutting or pumping of material to a depth of 12 inches and replace with select material.

3.13.2 Construction

Shape subgrade to line, grade, and cross section, and compact as specified. Include plowing, disking, and any moistening or aerating required to obtain specified compaction for this operation. Remove soft or otherwise unsatisfactory material and replace with satisfactory excavated material or other approved material as directed. Excavate rock encountered in the cut section to a depth of 6 inch below finished grade for the subgrade. Bring up low areas resulting from removal of unsatisfactory material or excavation of rock to required grade with satisfactory materials, and shape the entire subgrade to line, grade, and cross section and compact as specified. Deviations in elevation shall not exceed 0.05 feet.

3.13.3 Compaction

Finish compaction by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment. Except for paved areas, compact each layer of the embankment to at least 95 percent of laboratory maximum density.

3.13.3.1 Subgrade for Pavements

Compact subgrade for pavements to at least 95 percentage laboratory maximum density for the depth below the surface of the pavement shown. When more than one soil classification is present in the subgrade, thoroughly blend, reshape, and compact the top six inches of subgrade.

3.13.3.2 Subgrade for Shoulders

Compact subgrade for shoulders to at least 95 percentage laboratory maximum density for the full depth of the shoulder.

3.14 SHOULDER CONSTRUCTION

Construct shoulders of satisfactory excavated material or as otherwise shown or specified. Construct shoulders immediately after adjacent paving is complete. In the case of rigid pavements, do not construct shoulders until permission of the OWNER has been obtained. Compact the entire shoulder area to at least the percentage of maximum density as specified in paragraph SUBGRADE PREPARATION above, for specific ranges of depth below the surface of the shoulder. Finish compaction by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment. Finish shoulder construction in proper sequence in such a manner that adjacent ditches will be drained effectively and that no damage of any kind is done to the adjacent completed pavement. Align the completed shoulders true to grade and shaped to drain in conformity with the cross section shown.

3.15 FINISHING

Finish the surface of excavations, embankments, and subgrades to a smooth and compact surface in accordance with the lines, grades, and cross sections or elevations shown. Provide the degree of finish for graded areas within 0.1 foot of the grades and elevations indicated except that the degree of finish for subgrades specified in paragraph SUBGRADE PREPARATION. Finish gutters and ditches in a manner that will result in effective drainage. Finish the surface of areas to be turfed from settlement or washing to a smoothness suitable for the application of turfing materials. Repair graded, topsoiled, or backfilled areas prior to acceptance of the work, and re-established grades to the required elevations and slopes.

3.15.1 Subgrade and Embankments

During construction, keep embankments and excavations shaped and drained. Maintain ditches and drains along subgrade to drain effectively at all times. Do no disturb the finished subgrade by traffic or other operation. Protect and maintain the finished subgrade in a satisfactory condition until ballast, subbase, base, or pavement is placed. Do not permit the storage or stockpiling of materials on the finished subgrade. Do not lay subbase, base course, ballast, or pavement until the subgrade has been checked and approved, and in no case place subbase, base, surfacing, pavement, or ballast on a muddy, spongy, or frozen subgrade.

3.15.2 Capillary Water Barrier

Place a capillary water barrier under concrete floor and area-way slabs grade directly on the subgrade and compact with a minimum of two passes of a hand-operated plate-type vibratory compactor.

3.15.3 Grading Around Structures

Construct areas within 5 feet outside of each building and structure line true-to-grade, shape to drain, and maintain free of trash and debris until final inspection has been completed and the work has been accepted.

3.16 TESTING

Perform testing by a Corps validated commercial testing laboratory or the CONTRACTOR's validated testing facility. If the CONTRACTOR elects to establish testing facilities, do not permit work requiring testing until

the CONTRACTOR's facilities have been inspected, Corps validated and reviewed by the OWNER. Determine field in-place density in accordance with ASTM D1556. When test results indicate, as determined by the OWNER, that compaction is not as specified, remove the material, replace and recompact to meet specification requirements. Perform tests on recompacted areas to determine conformance with specification requirements. Appoint a registered professional civil ENGINEER to certify inspections and test results. These certifications shall state that the tests and observations were performed by or under the direct supervision of the ENGINEER and that the results are representative of the materials or conditions being certified by the tests. The following number of tests, if performed at the appropriate time, will be the minimum acceptable for each type operation.

3.16.1 Fill and Backfill Material Gradation

One test per 1,000 cubic yards stockpiled or in-place source material. Determine gradation of fill and backfill material in accordance with ASTM C136.

3.16.2 In-Place Densities

a. One test per 1,000 square feet, or fraction thereof, of each lift of fill or backfill areas compacted by other than hand-operated machines.

b. One test per 1,000 square feet, or fraction thereof, of each lift of fill or backfill areas compacted by hand-operated machines.

3.16.3 Moisture Contents

In the stockpile, excavation, or borrow areas, perform a minimum of two tests per day per type of material or source of material being placed during stable weather conditions. During unstable weather, perform tests as dictated by local conditions and approved by the OWNER.

3.16.4 Optimum Moisture and Laboratory Maximum Density

Perform tests for each type material or source of material to determine the optimum moisture and laboratory maximum density values. One representative test per 1,000 cubic yards of fill and backfill, or when any change in material occurs which may affect the optimum moisture content or laboratory maximum density.

3.16.5 Tolerance Tests for Subgrades

Perform continuous checks on the degree of finish specified in paragraph SUBGRADE PREPARATION during construction of the subgrades.

3.16.6 Displacement of Sewers

After other required tests have been performed and the trench backfill compacted to the finished grade surface, inspect the pipe to determine whether significant displacement has occurred. Conduct this inspection in the presence of the OWNER. Inspect pipe sizes larger than 36 inch, while inspecting smaller diameter pipe by shining a light or laser between manholes or manhole locations, or by the use of television cameras passed through the pipe. If, in the judgment of the OWNER, the interior of the pipe shows poor alignment or any other defects that would cause improper functioning of the system, replace or repair the defects as directed at no additional cost to the OWNER.

3.17 DISPOSITION OF SURPLUS MATERIAL

Provide surplus material or other soil material not required or suitable for filling or backfilling, and brush, refuse, stumps, roots, and timber as removed from OWNER's property as directed by the OWNER.

-- End of Section --

SECTION 31 05 22

GEOTEXTILES USED AS FILTERS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D123	(2015) Terminology Relating to Textiles
ASTM D4355	(2007) Deterioration of Geotextiles from Exposure to Light, Moisture and Heat in a Xenon-Arc Type Apparatus
ASTM D4491	(1999a; R 2014; E 2014) Water Permeability of Geotextiles by Permittivity
ASTM D4533	(2011) Trapezoid Tearing Strength of Geotextiles
ASTM D4632	(2008) Grab Breaking Load and Elongation of Geotextiles
ASTM D4751	(2012) Determining Apparent Opening Size of a Geotextile
ASTM D4833	(2007) Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
ASTM D4873	(2015) Identification, Storage, and Handling of Geosynthetic Rolls and Samples
ASTM D4884	(1996; R 2003) Strength of Sewn or Thermally Bonded Seams of Geotextiles

1.2 DELIVERY, STORAGE, AND HANDLING

TexDeliver only approved geotextile to the project site. All geotextile shall be labeled, shipped, stored, and handled in accordance with ASTM D4873. No hooks, tongs, or other sharp instruments shall be used for handling geotextile.t

PART 2 PRODUCTS

- 2.1 MATERIALS
- 2.1.1 Geotextile
- 2.1.1.1 General

Provide geotextile that is a non-woven pervious sheet of plastic yarn as defined by ASTM D123 matching or exceeding the minimum average roll values listed in TABLE 1. Strength values indicated in the table are for the weaker principal direction.

MI	NIMUM PHY	SICAL	REQUIREME	NTS FOR	DRAINAGE	GEOTEXTILE	
PROPERTY		UNITS	AC	CEPTABLE	VALUES	TEST	METHOD
TENSILE STRI	ENGTH	lb		200		ASTM	D4632
PUNCTURE		lb		110		ASTM	D4833
TRAPEZOID TI	EAR	lb		80		ASTM	D4533
APPARENT OPI SIZE	ENING U.	S. SIEV	VE	80		ASTM	D4751
PERMITTIVIT	Y	sec -1		1.1		ASTM	D4491
ULTRAVIOLET DEGRADATION	Pe	rcent	70	AT 500	Hrs	ASTM	D4355

a. The following products or ENGINEER approved equal may be used for HMAC paving components:

- 1. Ten Cate Mirafi 180N.
- 2. Propex Geotex 801.
- 3. US Fabrics US 205NW

2.1.1.2 Geotextile Fiber

Fibers used in the manufacturing of the geotextile shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight of polyolefins, polyesters, or polamides. Add stabilizers and/or inhibitors to the base polymer, if necessary to make the filaments resistant to deterioration caused by ultraviolet light and heat exposure. Reclaimed or recycled fibers or polymer shall not be added to the formulation. Geotextile shall be formed into a network such that the filaments or yarns retain dimensional stability relative to each other, including the edges. Finish the edges of the geotextile to prevent the outer fiber from pulling away from the geotextile.

2.1.2 Seams

If utilized, sew the seams of the geotextile with thread of a material meeting the chemical requirements given above for geotextile yarn or bond the seams by cementing or by heat. Attach the sheets of geotextile at the

factory or another approved location, if necessary, to form sections not less than 6 feet wide. Test seams in accordance with method ASTM D4884. The strength of the seam shall be not less than 90 percent of the required grab tensile strength of the unaged geotextile in any principal direction.

High strength thread should be used so that seam test conforms to ASTM D4884. The thread shall meet the chemical, ultraviolet, and physical requirements of the geotextile, and the color shall be different from that of the geotextile. The seam strength shall be equal to the strength required for the geotextile in the direction across the seam. Overlapping J-type seams are preferable over prayer-type seams as the overlapping geotextile reduces the chance of openings to occur at the seam. Use double sewing, specially for field seams, to provide a safety factor against undetected missed stitches.

2.1.3 Securing Pins

Geotextile may be secured to the embankment or foundation soil by pins to prevent movement prior to placement of pavement materials. Other appropriate means to prevent movement such as staples, sand bags, and stone may also be used. Insert securing pins through both strips of overlapped geotextile along the line passing through midpoints of the overlap. Remove securing pins as placement of pavement materials are placed to prevent tearing of geotextile or enlarging holes. Maximum spacing between securing pins depends on the steepness of the embankment slope. The maximum pins spacing shall be equal to or less than the values listed in TABLE 2. When windy conditions prevail at the construction site, increase the number of pins to secure the geotextile.

EMBANKMENT	SPACING, feet
STEEPER THAN 1V ON 3H	2
1V ON 3H TO 1V ON 4H	3
FLATTER THAN 1V ON 4H	5

TABLE 2 MAXIMUM SPACING FOR SECURING PINS

2.2 INSPECTIONS, VERIFICATIONS, AND TESTING

2.2.1 Manufacturing and Sampling

Geotextiles shall meet the requirements specified in TABLE 1. Perform conformance testing in accordance with the manufacturers approved quality control manual.

2.2.2 Site Verification and Testing

Test samples to verify that the geotextile meets the requirements specified in TABLE 1. Identify samples by manufacturers name, type of geotextile, lot number, roll number, and machine direction. Perform testing at an approved laboratory.

PART 3 EXECUTION

3.1 SURFACE PREPARATION

Prepare surface, on which the geotextile will be placed, to a relatively smooth surface condition in accordance with the applicable portion of this specification and shall be free from obstruction, debris, depressions, erosion feature, or vegetation. Remove any irregularities so as to ensure continuous, intimate contact of the geotextile with all the surface. Any loose material, soft or low density pockets of material, shall be removed; erosion features such as rills, gullies etc. shall be graded out of the surface before geotextile placement.

3.2 INSTALLATION OF THE GEOTEXTILE

3.2.1 General

Place the geotextile in the manner and at the locations shown. At the time of installation, reject the geotextile if it has defects, rips, holes, flaws, deterioration or damage incurred during manufacture, transportation or storage.

3.2.2 Placement

Place the geotextile with the long dimension parallel to the roadway and laid smooth and free of tension, stress, folds, wrinkles, or creases. Place the strips to provide a minimum width of 18 inches of overlap for each joint. Adjust the actual length of the geotextile used based on initial installation experience. Temporary pinning of the geotextile to help hold it in place until the geogrid and crushed stone base is placed will be allowed. Remove the temporary pins as the crushed stone is placed to relieve high tensile stress which may occur during placement of material on the geotextile. Perform trimming in such a manner that the geotextile is not damaged in any way.

3.3 PROTECTION

Protect the geotextile at all times during construction from contamination by surface runoff; remove any geotextile so contaminated and replace with uncontaminated geotextile. Replace any geotextile damaged during its installation or during placement of geogrid and crushed stone base. Schedule the work so that the covering of the geotextile with a layer of the specified material is accomplished within 2 calendar days after placement of the geotextile. Protect the geotextile from damage prior to and during the placement of geogrid and crushed stone base. Before placement of geogrid and crushed stone base, demonstrate that the placement technique will not cause damage to the geotextile. In no case shall any type of equipment be allowed on the unprotected geotextile.

-- End of Section --

SECTION 31 23 00.00 20

EXCAVATION AND FILL

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C600 (2010) Installation of Ductile-Iron Water Mains and Their Appurtenances

ASTM INTERNATIONAL (ASTM)

ASTM	C136	(2006) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM	C33/C33M	(2011a) Standard Specification for Concrete Aggregates
ASTM	D1140	(2000; R 2006) Amount of Material in Soils Finer than the No. 200 (75-micrometer) Sieve
ASTM	D1556	(2007) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM	D1557	(2012) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3) (2700 kN-m/m3)
ASTM	D2216	(2010) Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
ASTM	D2321	(2011) Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
ASTM	D2487	(2011) Soils for Engineering Purposes (Unified Soil Classification System)
ASTM	D4318	(2010) Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM	D6938	(2010) Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM	D698	(2012; E 2014; E 2015) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft.

(600 kN-m/cu. m.))

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1 (2008; Errata 1-2010; Changes 1-3 2010; Changes 4-6 2011) Safety and Health Requirements Manual

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 530/F-93/004	(1993; Rev O; Updates I, II, IIA, IIB, and
	III) Test Methods for Evaluating Solid
	Waste (Vol IA, IB, IC, and II) (SW-846)
EPA 600/4-79/020	(1983) Methods for Chemical Analysis of

Water and Wastes

1.2 DEFINITIONS

1.2.1 Capillary Water Barrier

A layer of clean, poorly graded crushed rock, stone, or natural sand or gravel having a high porosity which is placed beneath a building slab with or without a vapor barrier to cut off the capillary flow of pore water to the area immediately below a slab.

1.2.2 Degree of Compaction

Degree of compaction is expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D698 and ASTM D1557, for general soil types, abbreviated as percent laboratory maximum density.

1.2.3 Pile Supported Structure

As used herein, a structure where both the foundation and floor slab are pile supported.

1.3 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Shoring and Sheeting Plan

Dewatering work plan

Submit 15 days prior to starting work.

SD-06 Test Reports

Borrow Site Testing

Fill and backfill test

Select material test

Porous fill test for capillary water barrier

Density tests

Moisture Content Tests

Copies of all laboratory and field test reports within 24 hours of the completion of the test.

1.4 DELIVERY, STORAGE, AND HANDLING

Perform in a manner to prevent contamination or segregation of materials.

1.5 REQUIREMENTS FOR OFF SITE SOIL

Soils brought in from off site for use as backfill shall be tested for TPH, BTEX and full TCLP including ignitability, corrosivity and reactivity. Backfill shall contain less than 100 parts per million (ppm) of total petroleum hydrocarbons (TPH) and less than 10 ppm of the sum of Benzene, Toluene, Ethyl Benzene, and Xylene (BTEX) and shall not fail the Toxicity Characteristic Leaching Procedure (TCLP) test. TPH concentrations shall be determined by using EPA 600/4-79/020 Method 418.1. BTEX concentrations shall be determined by using EPA 530/F-93/004 Method 5030/8020. TCLP shall be performed in accordance with EPA 530/F-93/004 Method 1311. Provide Borrow Site Testing for TPH, BTEX and TCLP from a composite sample of material from the borrow site, with at least one test from each borrow site. Material shall not be brought on site until tests have been reviewed by the OWNER.

1.6 QUALITY ASSURANCE

1.6.1 Shoring and Sheeting Plan

Submit drawings and calculations, certified by a registered professional ENGINEER in the state of Texas, describing the methods for shoring and sheeting of excavations where required. Drawings shall include material sizes and types, arrangement of members, and the sequence and method of installation and removal. Calculations shall include data and references used.

1.6.2 Dewatering Work Plan

Submit procedures for accomplishing dewatering work where required.

1.6.3 Utilities

Movement of construction machinery and equipment over pipes and utilities during construction shall be at the CONTRACTOR's risk. Perform work adjacent to utilities in accordance with procedures outlined by utility company. Excavation made with power-driven equipment is not permitted within two feet of known utility or subsurface construction. For work immediately adjacent to or for excavations exposing a utility or other buried obstruction, excavate by hand. Prior to execution, inform the utility company of these operations to avoid any unsafe practice. Start hand excavation on each side of the indicated obstruction and continue until the obstruction is uncovered or until clearance for the new grade is assured. Support uncovered lines or other existing work affected by the contract excavation until approval for backfill is granted by the OWNER. Report damage to utility lines or subsurface construction immediately to the OWNER. PART 2 PRODUCTS

2.1 SOIL MATERIALS

2.1.1 Satisfactory Materials

Any materials classified by ASTM D2487 as GW, GP, GM, GP-GM, GW-GM, GC, GP-GC, GM-GC, SW, SP, free of debris, roots, wood, scrap material, vegetation, refuse, soft unsound particles, and deleterious, or objectionable materials. Unless specified otherwise, the maximum particle diameter shall be one-half the lift thickness at the intended location.

2.1.2 Unsatisfactory Materials

Materials which do not comply with the requirements for satisfactory materials. Unsatisfactory materials also include man-made fills, trash, refuse, or backfills from previous construction. Unsatisfactory material also includes material classified as satisfactory which contains root and other organic matter. The OWNER shall be notified of any contaminated materials.

2.1.3 Common Fill

Approved, unclassified soil material with the characteristics required to compact to the soil density specified for the intended location.

2.1.4 Backfill and Fill Material

ASTM D2487, classification GW, GP, GM, SW, SP, SM, with a maximum ASTM D4318 liquid limit of 35, maximum ASTM D4318 plasticity index of 12, and a maximum of 25 percent by weight passing ASTM D1140, No. 200 sieve. The backfill material behind the bulkhead for both above and below waterline shall be as indicated on the project drawings.

2.1.5 Select Material

Provide materials classified as GW, GP, SW, or SP by ASTM D2487 where indicated. The liquid limit of such material shall not exceed 35 percent when tested in accordance with ASTM D4318. The plasticity index shall not be greater than 12 percent when tested in accordance with ASTM D4318, and not more than 35 percent by weight shall be finer than No. 200 sieve when tested in accordance with ASTM D1140.

The combined material shall conform to the following sieve analysis:

Sieve Size	Percent Passing by Weight
2 1/2 inches	100
No. 4	40 - 85
No. 10	20 - 80
No. 40	10 - 60
No. 200	5 - 25

2.2 POROUS FILL FOR CAPILLARY WATER BARRIER

ASTM C33/C33M fine aggregate grading with a maximum of 3 percent by weight passing ASTM , No. 200 sieve and conforming to the general soil material requirements specified in paragraph entitled "Satisfactory Materials."

2.3 UTILITY BEDDING MATERIAL

Except as specified otherwise in the individual piping section, provide bedding for buried piping in accordance with AWWA C600, Type 4, except as specified herein. Backfill to top of pipe shall be compacted to 95 percent of ASTM D698 maximum density. Plastic piping shall have bedding to spring line of pipe. Provide ASTM D2321 materials as follows:

- a. Class I: Angular, 0.25 to 1.5 inches, graded stone, including a number of fill materials that have regional significance such as coral, slag, cinders, crushed stone, and crushed shells.
- b. Class II: Coarse sands and gravels with maximum particle size of 1.5 inches, including various graded sands and gravels containing small percentages of fines, generally granular and noncohesive, either wet or dry. Soil Types GW, GP, SW, and SP are included in this class as specified in ASTM D2487.

2.3.1 Sand

Clean, coarse-grained sand classified as SW by ASTM D2487 for bedding and backfill as indicated.

2.3.2 Gravel

Clean, coarsely graded, crushed stone classified as Type A, Grade 1 material, per item 247 of TXDOT Standard Specifications for Construction and Maintenance of Highway, Streets, and Bridges, June 2004 edition.

2.4 BURIED WARNING AND IDENTIFICATION TAPE

Polyethylene plastic and metallic core or metallic-faced, acid- and alkali-resistant, polyethylene plastic warning tape manufactured specifically for warning and identification of buried utility lines. Provide tape on rolls, 3 inch minimum width, color coded as specified below for the intended utility with warning and identification imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (intended service) LINE BELOW" or similar wording. Color and printing shall be permanent, unaffected by moisture or soil.

Warning Tape Color Codes

Yellow:	Electric
Yellow:	Gas, Oil; Dangerous Materials
Orange:	Telephone and Other
	Communications
Blue:	Water Systems
Green:	Sewer Systems
White:	Steam Systems
Gray:	Compressed Air

2.4.1 Warning Tape for Metallic Piping

Acid and alkali-resistant polyethylene plastic tape conforming to the width, color, and printing requirements specified above. Minimum thickness of tape shall be 0.003 inch. Tape shall have a minimum strength of 1500 psi lengthwise, and 1250 psi crosswise, with a maximum 350 percent elongation.

2.4.2 Detectable Warning Tape for Non-Metallic Piping

Polyethylene plastic tape conforming to the width, color, and printing requirements specified above. Minimum thickness of the tape shall be 0.004 inch. Tape shall have a minimum strength of 1500 psi lengthwise and 1250 psi crosswise. Tape shall be manufactured with integral wires, foil backing, or other means of enabling detection by a metal detector when tape is buried up to 3 feet deep. Encase metallic element of the tape in a protective jacket or provide with other means of corrosion protection.

2.5 DETECTION WIRE FOR NON-METALLIC PIPING

Detection wire shall be insulated single strand, solid copper with a minimum of 12 AWG.

PART 3 EXECUTION

3.1 PROTECTION

3.1.1 Shoring and Sheeting

Provide shoring and sheeting where required. The shoring and sheeting shall be designed by CONTRACTOR'S ENGINEER licensed in the state of Texas. CONTRACTOR shall submit the signed and sealed copy of design to OWNER for review. In addition to Section 25 A and B of EM 385-1-1, include provisions in the shoring and sheeting plan that will accomplish the following:

- a. Prevent undermining of pavements, foundations and slabs.
- b. Prevent slippage or movement in banks or slopes adjacent to the excavation.
- 3.1.2 Drainage and Dewatering

Provide for the collection and disposal of surface and subsurface water encountered during construction.

3.1.2.1 Drainage

So that construction operations progress successfully, completely drain construction site during periods of construction to keep soil materials sufficiently dry. The CONTRACTOR shall establish/construct storm drainage features (ponds/basins) at the earliest stages of site development, and throughout construction grade the construction area to provide positive surface water runoff away from the construction activity and/or provide temporary ditches, swales, and other drainage features and equipment as required to maintain dry soils, prevent erosion and undermining of foundations. When unsuitable working platforms for equipment operation and unsuitable soil support for subsequent construction features develop, remove unsuitable material and provide new soil material as specified herein. It is the responsibility of the CONTRACTOR to assess the soil and ground water conditions presented by the plans and specifications and to employ necessary measures to permit construction to proceed. Excavated slopes and backfill surfaces shall be protected to prevent erosion and sloughing. Excavation shall be performed so that the site, the area immediately surrounding the site, and the area affecting operations at the site shall be continually and effectively drained.

3.1.2.2 Dewatering

Groundwater flowing toward or into excavations shall be controlled to prevent sloughing of excavation slopes and walls, boils, uplift and heave in the excavation and to eliminate interference with orderly progress of construction. Drains, sumps, ditches or trenches will not be permitted within 3 feet of the foundation of any structure, except with specific written approval, and after specific contractual provisions for restoration of the foundation area have been made. Control measures shall be taken by the time the excavation reaches the water level in order to maintain the integrity of the in situ material.

Operate dewatering system continuously until construction work below existing water levels is complete. Submit performance records weekly. Measure and record performance of dewatering system at same time each day by use of observation wells or piezometers installed in conjunction with the dewatering system.

3.1.3 Underground Utilities

Location of the existing utilities indicated is approximate. The CONTRACTOR shall physically verify the location and elevation of the existing utilities indicated prior to starting construction. The CONTRACTOR shall contact the Public Works Department for assistance in locating existing utilities. The Texas One Call system shall be notified 48 hours prior to any excavating. The CONTRACTOR shall scan the construction site with electromagnetic and sonic equipment and mark the surface of the ground where existing underground utilities are discovered.

3.1.4 Machinery and Equipment

Movement of construction machinery and equipment over pipes during construction shall be at the CONTRACTOR's risk. Repair, or remove and provide new pipe for existing or newly installed pipe that has been displaced or damaged.

3.2 SURFACE PREPARATION

3.2.1 Clearing and Grubbing

Unless indicated otherwise, remove trees, stumps, logs, shrubs, brush and vegetation and other items that would interfere with construction operations. Remove stumps entirely. Grub out matted roots and roots over 2 inches in diameter to at least 18 inches below existing surface.

3.2.2 Stripping

Strip suitable soil from the site where excavation or grading is indicated and stockpile separately from other excavated material.

3.2.3 Unsuitable Material

Remove vegetation, debris, decayed vegetable matter, sod, mulch, and rubbish underneath paved areas or concrete slabs.

3.3 EXCAVATION

Excavate to contours, elevation, and dimensions indicated. Reuse excavated

materials that meet the specified requirements for the material type required at the intended location. Keep excavations free from water. Excavate soil disturbed or weakened by CONTRACTOR's operations, soils softened or made unsuitable for subsequent construction due to exposure to weather. Excavations below indicated depths will not be permitted except to remove unsatisfactory material. Unsatisfactory material encountered below the grades shown shall be removed as directed. Refill with satisfactory material and compact to 95 percent of maximum density. Unless specified otherwise, refill excavations cut below indicated depth with backfill and fill material and compact to 95 percent of ASTM D1557 maximum density. Satisfactory material removed below the depths indicated, without specific direction of the OWNER, shall be replaced with satisfactory materials to the indicated excavation grade; except as specified for spread footings. Determination of elevations and measurements of approved overdepth excavation of unsatisfactory material below grades indicated shall be done under the direction of the OWNER.

3.3.1 Structures With Spread Footings

Ensure that footing subgrades have been inspected and accepted by the OWNER prior to concrete placement. Fill over excavations with concrete during foundation placement.

3.3.2 Pile Cap Excavation and Backfilling

Excavate to bottom of pile cap prior to placing or driving piles, unless noted otherwise on drawings or authorized otherwise by the OWNER. Backfill and compact overexcavations and changes in grade due to pile driving operations to 95 percent of ASTM D698 maximum density.

3.3.3 Pipe Trenches

Excavate to the dimension indicated. Grade bottom of trenches to provide uniform support for each section of pipe after pipe bedding placement. Tamp if necessary to provide a firm pipe bed. Recesses shall be excavated to accommodate bells and joints so that pipe will be uniformly supported for the entire length. Rock, where encountered, shall be excavated to a depth of at least 6 inches below the bottom of the pipe.

3.3.4 Excavated Materials

Satisfactory excavated material required for fill or backfill shall be placed in the proper section of the permanent work required or shall be separately stockpiled if it cannot be readily placed. Satisfactory material in excess of that required for the permanent work and all unsatisfactory material shall be disposed of as directed by the OWNER.

3.3.5 Final Grade of Surfaces to Support Concrete

Excavation to final grade shall not be made until just before concrete is to be placed. Approximately level surfaces shall be roughened, and sloped surfaces shall be cut as indicated into rough steps or benches to provide a satisfactory bond. All surfaces shall be protected from erosion resulting from ponding or flow of water.

3.4 SUBGRADE PREPARATION

Unsatisfactory material in surfaces to receive fill or in excavated areas shall be removed and replaced with satisfactory materials as indicated on

project drawings or as directed by the OWNER. The surface shall be scarified to a depth of 6 inches before the fill is started. Sloped surfaces steeper than 1 vertical to 4 horizontal shall be plowed, stepped, benched, or broken up so that the fill material will bond with the existing material. When subgrades are less than the specified density, the ground surface shall be broken up to a minimum depth of 6 inches, pulverized, and compacted to the specified density. When the subgrade is part fill and part excavation or natural ground, the excavated or natural ground portion shall be scarified to a depth of 12 inches and compacted as specified for the adjacent fill. Material shall not be placed on surfaces that are muddy, frozen, or contain frost. Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, or other approved equipment well suited to the soil being compacted. Material shall be moistened or aerated as necessary to provide the moisture content that will readily facilitate obtaining the specified compaction with the equipment used. Minimum subgrade density shall be as specified herein, unless indicated on project drawings.

3.4.1 Proof Rolling

Proof rolling shall be done on an exposed subgrade free of surface water (wet conditions resulting from rainfall) which would promote degradation of an otherwise acceptable subgrade. After removal of deleterious materials and stripping, the exposed subgrade of the pavements (both concrete and asphalt) shall be proofrolled in the presence of OWNER's Geotechnical ENGINEER to evaluate the condition of the subgrade. Proof roll the existing subgrade of the pavement with six passes of a fully loaded dump truck or water truck or pneumatic-tired rollers with a weight of at least 25 tons and a tire pressure of at least 70 psi. Offset each trip of the truck/roller by at most 1 tire width. Operate the truck/roller in a systematic manner to ensure the number of passes over all areas, and at speeds between 2 1/2 to 3 1/2 miles per hour. Proof rolling shall be considered to extend at least 5 feet beyond the limits of the pavement. Notify the OWNER a minimum of 3 days prior to proof rolling. Areas of the subgrade, where rutting is in excess of 1 inch or excessive pumping is observed, shall be undercut to expose competent soils as directed by the OWNER's geotechnical ENGINEER and replaced with select material.

3.5 FILLING AND BACKFILLING

Fill and backfill to contours, elevations, and dimensions indicated. Compact each lift before placing overlaying lift. Except for fill behind the bulkhead, no fill shall be placed with water or soft conditions present in the area to be filled. The underlying material, upon which the fill is to be placed shall be clean and free from debris, waste concrete or cement, frost, ice, and standing or running water.

3.5.1 Backfill and Fill Material Placement

Provide for paved areas and under concrete slabs, except where select material is provided. Place in 12 inch lifts. Do not place over wet areas. Place backfill material adjacent to structures as the structural elements are completed and accepted. Backfill against concrete only when approved. Place and compact material to avoid loading upon or against the structure.

3.5.2 Select Material Placement

Provide under structures not pile supported. Place in 12 inch lifts. Do

not place over wet or frozen areas. Backfill adjacent to structures shall be placed as structural elements are completed and accepted. Backfill against concrete only when approved. Place and compact material to avoid loading upon or against structure.

3.5.3 Backfill and Fill Material Placement Over Pipes and at Walls

Backfilling shall not begin until construction below finish grade has been approved, underground utilities systems have been inspected, tested and approved, forms removed, and the excavation cleaned of trash and debris. Backfill shall be brought to indicated finish grade. Where pipe is coated or wrapped for protection against corrosion, the backfill material up to an elevation 2 feet above sewer lines and 1 foot above other utility lines shall be free from stones larger than 1 inch in any dimension. Heavy equipment for spreading and compacting backfill shall not be operated closer to foundation or retaining walls than a distance equal to the height of backfill above the top of footing; the area remaining shall be compacted in layers not more than 4 inches in compacted thickness with power-driven hand tampers suitable for the material being compacted. Backfill shall be placed carefully around pipes or tanks to avoid damage to coatings, wrappings, or tanks. Backfill shall not be placed against foundation walls prior to 7 days after completion of the walls. As far as practicable, backfill shall be brought up evenly on each side of the wall and sloped to drain away from the wall. The backfill of sheet pile bulkhead shall be carried out as indicated on project drawings.

3.5.4 Trench Backfilling

Backfill as rapidly as construction, testing, and acceptance of work permits. Place and compact backfill under structures and paved areas in 6 inch lifts to top of trench and in 6 inch lifts to one foot over pipe outside structures and paved areas.

3.6 BORROW

Where satisfactory materials are not available in sufficient quantity from required excavations, borrow materials shall be obtained as approved by OWNER.

3.7 BURIED WARNING AND IDENTIFICATION TAPE

Provide buried utility lines with utility identification tape. Bury tape 12 inches below finished grade; under pavements and slabs, bury tape 6 inches below top of subgrade.

3.8 BURIED DETECTION WIRE

Bury detection wire directly above non-metallic piping at a distance not to exceed 12 inches above the top of pipe. The wire shall extend continuously and unbroken, from manhole to manhole. The ends of the wire shall terminate inside the manholes at each end of the pipe, with a minimum of 3 feet of wire, coiled, remaining accessible in each manhole. The wire shall remain insulated over it's entire length. The wire shall enter manholes between the top of the corbel and the frame, and extend up through the chimney seal between the frame and the chimney seal. For force mains, the wire shall terminate in the valve pit at the pump station end of the pipe.

3.9 COMPACTION

Determine in-place density of existing subgrade; if required density exists, no compaction of existing subgrade will be required. Density requirements specified herein are for cohesionless materials. When cohesive materials are encountered or used, density requirements may be reduced by 5 percent, unless noted otherwise on project drawings.

3.9.1 General Site

Compact underneath areas outside the 5 foot line of the paved area or structure to 90 percent of ASTM D1557.

3.9.2 Structures, Spread Footings, and Concrete Slabs

Compact top 12 inches of subgrades to 95 percent of ASTM D1557. Compact select material to 95 percent of ASTM D1557.

3.9.3 Adjacent Area

Compact areas within 5 feet of structures to 90 percent of ASTM D1557.

3.9.4 Paved Areas

Compact top 12 inches of subgrades to 95 percent of ASTM D1557, unless noted otherwise on project drawings. Compact fill and backfill materials to 95 percent of ASTM D1557, unless noted otherwise on project drawings.

3.10 FINISH OPERATIONS

3.10.1 Grading

Finish grades as indicated within one-tenth of one foot. Grade areas to drain water away from structures. Maintain areas free of trash and debris. For existing grades that will remain but which were disturbed by CONTRACTOR's operations, grade as directed.

3.10.2 Protection of Surfaces

Protect newly backfilled, graded, and topsoiled areas from traffic, erosion, and settlements that may occur. Repair or reestablish damaged grades, elevations, or slopes.

3.11 FIELD QUALITY CONTROL

3.11.1 Sampling

Take the number and size of samples required to perform the following tests.

3.11.2 Testing

Perform one of each of the following tests for each material used. Provide additional tests for each source change.

3.11.2.1 Fill and Backfill Material Testing

Test fill and backfill material in accordance with ASTM C136 for conformance to ASTM D2487 gradation limits; ASTM D1140 for material finer than the No. 200 sieve; ASTM D4318 for liquid limit and for plastic limit; ASTM D698 or ASTM D1557 for moisture density relations, as applicable.

3.11.2.2 Select Material Testing

Test select material in accordance with ASTM C136 for conformance to ASTM D2487 gradation limits; ASTM D1140 for material finer than the No. 200 sieve; ASTM D698 or ASTM D1557 for moisture density relations, as applicable.

3.11.2.3 Density Tests

Test density in accordance with ASTM D1556, or ASTM D6938. When ASTM D6938 density tests are used, verify density test results by performing an ASTM D1556 density test at a location already ASTM D6938 tested as specified herein. Perform an ASTM D1556 density test at the start of the job, and for every 10 ASTM D6938 density tests thereafter. Test each lift at randomly selected locations every 2000 square feet of existing grade in fills for structures and concrete slabs, and every 2500 square feet for other fill areas and every 2000 square feet of subgrade in cut. Include density test results in daily report.

3.11.2.4 Moisture Content Tests

In the stockpile, excavation or borrow areas, a minimum of two tests per day per type of material or source of materials being placed is required during stable weather conditions. During unstable weather, tests shall be made as dictated by local conditions and approved moisture content shall be tested in accordance with ASTM D2216. Include moisture content test results in daily report.

-- End of Section --

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 32 11 24

GRADED CRUSHED AGGREGATE BASE COURSE FOR FLEXIBLE PAVEMENT

PART 1 GENERAL

1.1 SUBMITTALS

Refer to TxDOT Item 247.

1.1.1 Submittals and Testing

Submit documentation two weeks prior to accepting delivery of product, certifying that the material being delivered meets the requirements of TxDOT Item 247.2.

- a. The testing frequency for in-place density tests is one (1) test per 300 linear feet per lift per lane. TEX-115-E.
- b. The testing frequency for gradation, liquid limit, and plasticity index is each 2,500 cubic yards from completed stockpile. TEX-110-E.
- c. The testing frequency for strength is each 20,000 cubic yards from complete stockpile at the source. TEX-117-E.
- PART 2 PRODUCTS

Refer to TxDOT Item 247.2 Type A, Grade 1.

PART 3 EXECUTION

Refer to TxDOT Items 247.3 through 247.4.

-- End of Section --

SECTION 32 16 13

CONCRETE SIDEWALKS AND CURBS AND GUTTERS

PART 1 GENERAL 1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 182	(2005;	R 2012	2) St	andard	l Spec	cif:	ication	n for
	Burlap	Cloth	Made	from	Jute	or	Kenaf	and
	Cotton	Mats						

ASTM INTERNATIONAL (ASTM)

ASTM	C171	(2007) Standard Specification for Sheet Materials for Curing Concrete
ASTM	C172	(2010) Standard Practice for Sampling Freshly Mixed Concrete
ASTM	C173/C173M	(2014) Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM	C231	(2008c) Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM	C309	(2011) Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM	C31/C31M	(2012) Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM	C920	(2014a) Standard Specification for Elastomeric Joint Sealants
ASTM	D1751	(2004; E 2013; R 2013) Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
ASTM	D1752	(2004a; R 2013) Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion
ASTM	D5893	(2004) Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements

1.2 SYSTEM DESCRIPTION

1.2.1 General Requirements

Provide plant, equipment, machines, and tools used in the work subject to approval and maintained in a satisfactory working condition at all times. The equipment shall have the capability of producing the required product, meeting grade controls, thickness control and smoothness requirements as specified. Use of the equipment shall be discontinued if it produces unsatisfactory results. The OWNER shall have access at all times to the plant and equipment to ensure proper operation and compliance with specifications.

1.2.2 Slip Form Equipment

Slip form paver or curb forming machine, will be approved based on trial use on the job and shall be self-propelled, automatically controlled, crawler mounted, and capable of spreading, consolidating, and shaping the plastic concrete to the desired cross section in 1 pass.

1.3 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Concrete

Copies of certified delivery tickets for all concrete used in the construction.

SD-06 Test Reports

Field Quality Control

Copies of all test reports within 24 hours of completion of the test.

1.4 ENVIRONMENTAL REQUIREMENTS

1.4.1 Placing During Cold Weather

Do not place concrete when the air temperature reaches 40 degrees F and is falling, or is already below that point. Placement may begin when the air temperature reaches 35 degrees F and is rising, or is already above 40 degrees F. Make provisions to protect the concrete from freezing during the specified curing period. If necessary to place concrete when the temperature of the air, aggregates, or water is below 35 degrees F, placement and protection shall be approved in writing. Approval will be contingent upon full conformance with the following provisions. The underlying material shall be prepared and protected so that it is entirely free of frost when the concrete is deposited. Mixing water and aggregates shall be heated as necessary to result in the temperature of the in-place concrete being between 50 and 85 degrees F. Methods and equipment for heating shall be approved. The aggregates shall be free of ice, snow, and frozen lumps before entering the mixer. Covering and other means shall be provided for maintaining the concrete at a temperature of at least 50

degrees F for not less than 72 hours after placing, and at a temperature above freezing for the remainder of the curing period.

1.4.2 Placing During Warm Weather

The temperature of the concrete as placed shall not exceed85 degrees F except where an approved retarder is used. The mixing water and/or aggregates shall be cooled, if necessary, to maintain a satisfactory placing temperature. The placing temperature shall not exceed95 degrees F at any time.

PART 2 PRODUCTS

2.1 MATERIALS

Provide concrete conforming to applicable requirements of Section 03 31 29.

- 2.1.1 Cementous Material
- 2.1.1.1 Cement

ASTM C150, Type I or II (III, for high early concrete) with maximum alkali content of 0.60%. Cement certificate shall include test results in accordance with ASTM C150, including equivalent alkalies indicated in the Supplementary Optional Chemical Requirements.

2.1.1.2 Fly Ash and Pozzolan

ASTM C618, Type F, except that the maximum allowable loss on ignition shall be 6%, maximum available alkalizes content shall be 1.5, and maximum calcium oxide (Ca)) content 8%. Fly ash certificates shall include test results in accordance with ASTM C618, including available alkalizes indicated in the Supplementary Optional Chemical Requirements.

2.1.1.3 Slag

ASTM C989, Ground Granulated Blas Furnace Slag (GGBFS), Grade 100 or 120. Certificates shall include test results in accordance with ASTM C989.

2.1.2 Water

ASTM C94/C94M: fresh clean and portable.

- 2.1.3 Aggregate
- 2.1.3.1 Alkali Reactivity Test

Aggregates to be used in all concrete shall be evaluated and tested by the CONTRACTOR for alkali-aggregate reactivity in accordance with ASTM C260. The types of aggregates shall be evaluated in a combination which matches the CONTRACTOR's proposed mix design (including Class F fly ash or GGBF slag), utilizing the modified version of ASTM C260. Test results of the combination shall have a measured expansion of less than 0.08 percent at 16 days. Should the test data indicate an expansion of greater than 0.08%, the aggregate shall be rejected and the CONTRACTOR shall submit new aggregate sources for retesting or may submit additional test results incorporating Lithium Nitrate for consideration.

ASTM C1260 shall be modified as follows to include one of the following

options:

- a. Utilize the CONTRACTOR's proposed low alkali Portland cerement and Class F fly ash in combination for the test proportioning. The laboratory shall use the CONTRACTOR's purposed percentage of cement and fly ash.
- b. Utilize the CONTRACTOR's proposed low alkali Portland cement and ground granulated blast furnace (GGBF) slag in combination for the test proportioning. The laboratory shall use the CONTRACTOR's proposed percentage of cement and GGBF.
- c. Utilize the CONTRACTOR's proposed low alkali Portland cement and Class F fly ash and ground granulated blast furnace (GGBF) slag in combination for the test proportioning. The laboratory shall use the CONTRACTOR's proposed percentage of cement, fly ash and GGBF.
- 2.1.3.2 Fine Aggregate

ASTM C33/C33M

2.1.3.3 Coarse Aggregate

ASTM C33/C33M

2.1.3.4 Admixtures

ASTM C494/C494M: Type A, water reducing; Type B, retarding; Type C, accelerating; Type D, water-reducing and retarding; and Type E, water-reducing and accelerating admixture. Do not use calcium chloride admixtures. Where not shown or specified, the use of admixtures is subject to written approval of the OWNER.

2.1.4 Air Content

ASTM C260 Mixtures shall have air content by volume of concrete of 5 to 7 percent, based on measurements made immediately after discharge from the mixer.

2.1.5 Slump

The concrete slump shall be 7 inches plus or minus 1 inch where determined in accordance with ASTM C143/C143M.

2.1.6 Reinforcement Steel

Reinforcement bars shall conform to ATM A615/A615M.

- 2.2 CONCRETE CURING MATERIALS
- 2.2.1 Impervious Sheet Materials

Impervious sheet materials shall conform to ASTM C171, type optional, except that polyethylene film, if used, shall be white opaque.

2.2.2 Burlap

Burlap shall conform to AASHTO M 182.

2.2.3 White Pigmented Membrane-Forming Curing Compound

White pigmented membrane-forming curing compound shall conform to ASTM C309, Type 2.

2.3 CONCRETE PROTECTION MATERIALS

Concrete protection materials shall be a linseed oil mixture of equal parts, by volume, of linseed oil and either mineral spirits, naphtha, or turpentine. At the option of the Contractor, commercially prepared linseed oil mixtures, formulated specifically for application to concrete to provide protection against the action of deicing chemicals may be used, except that emulsified mixtures are not acceptable.

2.4 JOINT FILLER STRIPS

2.4.1 Contraction Joint Filler for Curb and Gutter

Contraction joint filler for curb and gutter shall consist of hard-pressed fiberboard.

2.4.2 Expansion Joint Filler, Premolded

Expansion joint filler, premolded, shall conform to ASTM D1751 or ASTM D1752, 1/2 inch thick, unless otherwise indicated.

2.5 JOINT SEALANTS

Joint sealant, cold-applied shall conform to ASTM C920 or ASTM D5893.

2.6 FORM WORK

Design and construct form work to ensure that the finished concrete will conform accurately to the indicated dimensions, lines, and elevations, and within the tolerances specified. Forms shall be of wood or steel, straight, of sufficient strength to resist springing during depositing and consolidating concrete. Wood forms shall be surfaced plank, 2 inches nominal thickness, straight and free from warp, twist, loose knots, splits or other defects. Wood forms shall have a nominal length of 10 feet. Radius bends may be formed with 3/4 inch boards, laminated to the required thickness. Steel forms shall be channel-formed sections with a flat top surface and with welded braces at each end and at not less than two intermediate points. Ends of steel forms shall be interlocking and self-aligning. Steel forms shall include flexible forms for radius forming, corner forms, form spreaders, and fillers. Steel forms shall have a nominal length of 10 feet with a minimum of 3 welded stake pockets per form. Stake pins shall be solid steel rods with chamfered heads and pointed tips designed for use with steel forms.

2.6.1 Sidewalk Forms

Sidewalk forms shall be of a height equal to the full depth of the finished sidewalk.

2.6.2 Curb and Gutter Forms

Curb and gutter outside forms shall have a height equal to the full depth of the curb or gutter. The inside form of curb shall have batter as indicated and shall be securely fastened to and supported by the outside

form. Rigid forms shall be provided for curb returns, except that benders or thin plank forms may be used for curb or curb returns with a radius of 10 feet or more, where grade changes occur in the return, or where the central angle is such that a rigid form with a central angle of 90 degrees cannot be used. Back forms for curb returns may be made of 1-1/2 inch benders, for the full height of the curb, cleated together. In lieu of inside forms for curbs, a curb "mule" may be used for forming and finishing this surface, provided the results are approved.

PART 3 EXECUTION

3.1 SUBGRADE PREPARATION

The subgrade shall be constructed to the specified grade and cross section prior to concrete placement. Subgrade shall be placed and compacted as directed.

3.1.1 Sidewalk Subgrade

The subgrade shall be tested for grade and cross section with a template extending the full width of the sidewalk and supported between side forms.

3.1.2 Curb and Gutter Subgrade

The subgrade shall be tested for grade and cross section by means of a template extending the full width of the curb and gutter. The subgrade shall be of materials equal in bearing quality to the subgrade under the adjacent pavement.

3.1.3 Maintenance of Subgrade

The subgrade shall be maintained in a smooth, compacted condition in conformity with the required section and established grade until the concrete is placed. The subgrade shall be in a moist condition when concrete is placed. The subgrade shall be prepared and protected to produce a subgrade free from frost when the concrete is deposited.

3.2 FORM SETTING

Set forms to the indicated alignment, grade and dimensions. Hold forms rigidly in place by a minimum of 3 stakes per form placed at intervals not to exceed 4 feet. Corners, deep sections, and radius bends shall have additional stakes and braces, as required. Clamps, spreaders, and braces shall be used where required to ensure rigidity in the forms. Forms shall be removed without injuring the concrete. Bars or heavy tools shall not be used against the concrete in removing the forms. Any concrete found defective after form removal shall be promptly and satisfactorily repaired. Forms shall be cleaned and coated with form oil each time before concrete is placed. Wood forms may, instead, be thoroughly wetted with water before concrete is placed, except that with probable freezing temperatures, oiling is mandatory.

3.2.1 Sidewalks

Set forms for sidewalks with the upper edge true to line and grade with an allowable tolerance of 1/8 inch in any 10 foot long section. After forms are set, grade and alignment shall be checked with a 10 foot straightedge. Forms shall have a transverse slope as indicated with the low side adjacent to the roadway. Side forms shall not be removed for 12 hours after

finishing has been completed.

3.2.2 Curbs and Gutters

The forms of the front of the curb shall be removed not less than 2 hours nor more than 6 hours after the concrete has been placed. Forms back of curb shall remain in place until the face and top of the curb have been finished, as specified for concrete finishing. Gutter forms shall not be removed while the concrete is sufficiently plastic to slump in any direction.

3.3 SIDEWALK CONCRETE PLACEMENT AND FINISHING

3.3.1 Formed Sidewalks

Place concrete in the forms in one layer. When consolidated and finished, the sidewalks shall be of the thickness indicated. After concrete has been placed in the forms, a strike-off guided by side forms shall be used to bring the surface to proper section to be compacted. The concrete shall be consolidated with an approved vibrator, and the surface shall be finished to grade with a strike off.

3.3.2 Concrete Finishing

After straightedging, when most of the water sheen has disappeared, and just before the concrete hardens, finish the surface with a wood float or darby to a smooth and uniformly fine granular or sandy texture free of waves, irregularities, or tool marks. A scored surface shall be produced by brooming with a fiber-bristle brush in a direction transverse to that of the traffic, followed by edging.

3.3.3 Edge and Joint Finishing

All slab edges, including those at formed joints, shall be finished with an edger having a radius of 1/8 inch. Transverse joint shall be edged before brooming, and the brooming shall eliminate the flat surface left by the surface face of the edger. Corners and edges which have crumbled and areas which lack sufficient mortar for proper finishing shall be cleaned and filled solidly with a properly proportioned mortar mixture and then finished.

3.3.4 Surface and Thickness Tolerances

Finished surfaces shall not vary more than 5/16 inch from the testing edge of a 10-foot straightedge. Permissible deficiency in section thickness will be up to 1/4 inch.

3.4 CURB AND GUTTER CONCRETE PLACEMENT AND FINISHING

3.4.1 Formed Curb and Gutter

Concrete shall be placed to the section required in a single lift. Consolidation shall be achieved by using approved mechanical vibrators. Curve shaped gutters shall be finished with a standard curb "mule".

3.4.2 Curb and Gutter Finishing

Approved slipformed curb and gutter machines may be used in lieu of hand placement.

3.4.3 Concrete Finishing

Exposed surfaces shall be floated and finished with a smooth wood float until true to grade and section and uniform in texture. Floated surfaces shall then be brushed with a fine-hair brush with longitudinal strokes. The edges of the gutter and top of the curb shall be rounded with an edging tool to a radius of 1/2 inch. Immediately after removing the front curb form, the face of the curb shall be rubbed with a wood or concrete rubbing block and water until blemishes, form marks, and tool marks have been removed. The front curb surface, while still wet, shall be brushed in the same manner as the gutter and curb top. The top surface of gutter and entrance shall be finished to grade with a wood float.

3.4.4 Joint Finishing

Curb edges at formed joints shall be finished as indicated.

3.4.5 Surface and Thickness Tolerances

Finished surfaces shall not vary more than 1/4 inch from the testing edge of a 10-foot straightedge. Permissible deficiency in section thickness will be up to 1/4 inch.

3.5 SIDEWALK JOINTS

Sidewalk joints shall be constructed to divide the surface into rectangular areas. Transverse contraction joints shall be spaced at a distance equal to the sidewalk width or 5 feet on centers, whichever is less, and shall be continuous across the slab. Longitudinal contraction joints shall be constructed along the centerline of all sidewalks 10 feet or more in width. Transverse expansion joints shall be installed at sidewalk returns and opposite expansion joints in adjoining curbs. Where the sidewalk is not in contact with the curb, transverse expansion joints shall be installed as indicated. Expansion joints shall be formed about structures and features which project through or into the sidewalk pavement, using joint filler of the type, thickness, and width indicated. Expansion joints are not required between sidewalks and curb that abut the sidewalk longitudinally.

3.5.1 Sidewalk Contraction Joints

The contraction joints shall be formed in the fresh concrete by cutting a groove in the top portion of the slab to a depth of at least one-fourth of the sidewalk slab thickness, using a jointer to cut the groove, or by sawing a groove in the hardened concrete with a power-driven saw, unless otherwise approved. Sawed joints shall be constructed by sawing a groove in the concrete with a 1/8 inch blade to the depth indicated. An ample supply of saw blades shall be available on the job before concrete placement is started, and at least one standby sawing unit in good working order shall be available at the jobsite at all times during the sawing operations.

3.5.2 Sidewalk Expansion Joints

Expansion joints shall be formed with 1/2 inch joint filler strips. Joint filler in expansion joints surrounding structures and features within the sidewalk may consist of preformed filler material conforming to ASTM D1752 or building paper. Joint filler shall be held in place with steel pins or

other devices to prevent warping of the filler during floating and finishing. Immediately after finishing operations are completed, joint edges shall be rounded with an edging tool having a radius of 1/8 inch, and concrete over the joint filler shall be removed. At the end of the curing period, expansion joints shall be cleaned and filled with cold-applied joint sealant. Joint sealant shall be gray or stone in color. The joint opening shall be thoroughly cleaned before the sealing material is placed. Sealing material shall not be spilled on exposed surfaces of the concrete temperatures shall be above 50 degrees F at the time of application of joint sealing material. Excess material on exposed surfaces of the concrete shall be removed immediately and concrete surfaces cleaned.

3.5.3 Reinforcement Steel Placement

Reinforcement steel shall be accurately and securely fastened in place with suitable supports and ties before the concrete is placed.

3.6 CURB AND GUTTER JOINTS

Curb and gutter joints shall be constructed at right angles to the line of curb and gutter.

3.6.1 Contraction Joints

Contraction joints shall be constructed directly opposite contraction joints in abutting portland cement concrete pavements and spaced so that monolithic sections between curb returns will not be less than 5 feet nor greater than 15 feet in length.

a. Contraction joints (except for slip forming) shall be constructed by means of 1/8 inch thick separators and of a section conforming to the cross section of the curb and gutter. Separators shall be removed as soon as practicable after concrete has set sufficiently to preserve the width and shape of the joint and prior to finishing.

b. When slip forming is used, the contraction joints shall be cut in the top portion of the gutter/curb hardened concrete in a continuous cut across the curb and gutter, using a power-driven saw. The depth of cut shall be at least one-fourth of the gutter/curb depth and 1/8 inch in width.

3.6.2 Expansion Joints

Expansion joints shall be formed by means of preformed expansion joint filler material cut and shaped to the cross section of curb and gutter. Expansion joints shall be provided in curb and gutter directly opposite expansion joints of abutting portland cement concrete pavement, and shall be of the same type and thickness as joints in the pavement. Where curb and gutter do not abut portland cement concrete pavement, expansion joints at least 1/2 inch in width shall be provided at intervals not less than 30 feet nor greater than 40 feet maximum. Expansion joints shall be provided in nonreinforced concrete gutter at locations indicated. Expansion joints shall be sealed immediately following curing of the concrete or as soon thereafter as weather conditions permit. Expansion joints and the top 1 inch depth of curb and gutter contraction-joints shall be sealed with joint sealant. The joint opening shall be thoroughly cleaned before the sealing material is placed. Sealing material shall not be spilled on exposed surfaces of the concrete. Concrete at the joint shall be surface dry and
atmospheric and concrete temperatures shall be above 50 degrees F at the time of application of joint sealing material. Excess material on exposed surfaces of the concrete shall be removed immediately and concrete surfaces cleaned.

3.7 CURING AND PROTECTION

3.7.1 General Requirements

Protect concrete against loss of moisture and rapid temperature changes for at least 7 days from the beginning of the curing operation. Protect unhardened concrete from rain and flowing water. All equipment needed for adequate curing and protection of the concrete shall be on hand and ready for use before actual concrete placement begins. Protection shall be provided as necessary to prevent cracking of the pavement due to temperature changes during the curing period.

3.7.1.1 Mat Method

The entire exposed surface shall be covered with 2 or more layers of burlap. Mats shall overlap each other at least 6 inches. The mat shall be thoroughly wetted with water prior to placing on concrete surface and shall be kept continuously in a saturated condition and in intimate contact with concrete for not less than 7 days.

3.7.1.2 Impervious Sheeting Method

The entire exposed surface shall be wetted with a fine spray of water and then covered with impervious sheeting material. Sheets shall be laid directly on the concrete surface with the light-colored side up and overlapped 12 inches when a continuous sheet is not used. The curing medium shall not be less than 18-inches wider than the concrete surface to be cured, and shall be securely weighted down by heavy wood planks, or a bank of moist earth placed along edges and laps in the sheets. Sheets shall be satisfactorily repaired or replaced if torn or otherwise damaged during curing. The curing medium shall remain on the concrete surface to be cured for not less than 7 days.

3.7.1.3 Membrane Curing Method

A uniform coating of white-pigmented membrane-curing compound shall be applied to the entire exposed surface of the concrete as soon after finishing as the free water has disappeared from the finished surface. Formed surfaces shall be coated immediately after the forms are removed and in no case longer than 1 hour after the removal of forms. Concrete shall not be allowed to dry before the application of the membrane. If any drying has occurred, the surface of the concrete shall be moistened with a fine spray of water and the curing compound applied as soon as the free water disappears. Curing compound shall be applied in two coats by hand-operated pressure sprayers at a coverage of approximately 200 square feet/gallon for the total of both coats. The second coat shall be applied in a direction approximately at right angles to the direction of application of the first coat. The compound shall form a uniform, continuous, coherent film that will not check, crack, or peel and shall be free from pinholes or other imperfections. If pinholes, abrasion, or other discontinuities exist, an additional coat shall be applied to the affected areas within 30 minutes. Concrete surfaces that are subjected to heavy rainfall within 3 hours after the curing compound has been applied shall be resprayed by the method and at the coverage specified above. Areas where

the curing compound is damaged by subsequent construction operations within the curing period shall be resprayed. Necessary precautions shall be taken to insure that the concrete is properly cured at sawed joints, and that no curing compound enters the joints. The top of the joint opening and the joint groove at exposed edges shall be tightly sealed before the concrete in the region of the joint is resprayed with curing compound. The method used for sealing the joint groove shall prevent loss of moisture from the joint during the entire specified curing period. Approved standby facilities for curing concrete pavement shall be provided at a location accessible to the jobsite for use in the event of mechanical failure of the spraying equipment or other conditions that might prevent correct application of the membrane-curing compound at the proper time. Concrete surfaces to which membrane-curing compounds have been applied shall be adequately protected during the entire curing period from pedestrian and vehicular traffic, except as required for joint-sawing operations and surface tests, and from any other possible damage to the continuity of the membrane.

3.7.2 Backfilling

After curing, debris shall be removed and the area adjoining the concrete shall be backfilled, graded, and compacted to conform to the surrounding area in accordance with lines and grades indicated.

3.7.3 Protection

Completed concrete shall be protected from damage until accepted. Repair damaged concrete and clean concrete discolored during construction. Concrete that is damaged shall be removed and reconstructed for the entire length between regularly scheduled joints. Refinishing the damaged portion will not be acceptable. Removed damaged portions shall be disposed of as directed.

3.7.4 Protective Coating

Protective coating, of linseed oil mixture, shall be applied to the exposed-to-view concrete surface after the curing period, if concrete will be exposed to de-icing chemicals within 6 weeks after placement. Concrete to receive a protective coating shall be moist cured.

3.7.4.1 Application

Curing and backfilling operation shall be completed prior to applying two coats of protective coating. Concrete shall be surface dry and clean before each application. Coverage shall be by spray application at not more than 50 square yards/gallon for first application and not more than 70 square yards/gallon for second application, except that the number of applications and coverage for each application for commercially prepared mixture shall be in accordance with the manufacturer's instructions. Coated surfaces shall be protected from vehicular and pedestrian traffic until dry.

3.7.4.2 Precautions

Protective coating shall not be heated by direct application of flame or electrical heaters and shall be protected from exposure to open flame, sparks, and fire adjacent to open containers or applicators. Material shall not be applied at ambient or material temperatures lower than 50 degrees F.

3.8 FIELD QUALITY CONTROL

3.8.1 General Requirements

Perform the inspection and tests described and meet the specified requirements for inspection details and frequency of testing. Based upon the results of these inspections and tests, take the action and submit reports as required below, and any additional tests to insure that the requirements of these specifications are met.

3.8.2 Concrete Testing

3.8.2.1 Strength Testing

Provide molded concrete specimens for strength tests. Samples of concrete placed each day shall be taken not less than once a day nor less than once for every 250 cubic yards of concrete. The samples for strength tests shall be taken in accordance with ASTM C172. Cylinders for acceptance shall be molded in conformance with ASTM C31/C31M by an approved testing laboratory. Each strength test result shall be the average of 2 test cylinders from the same concrete sample tested at 28 days, unless otherwise specified or approved. Concrete specified on the basis of compressive strength will be considered satisfactory if the averages of all sets of three consecutive strength test results equal or exceed the specified strength, and no individual strength test result falls below the specified strength by more than 500 psi.

3.8.2.2 Air Content

Determine air content in accordance with ASTM C173/C173M or ASTM C231. ASTM C231 shall be used with concretes and mortars made with relatively dense natural aggregates. Two tests for air content shall be made on randomly selected batches of each class of concrete placed during each shift. Additional tests shall be made when excessive variation in concrete workability is reported by the placing foreman or the Government inspector. If results are out of tolerance, the placing foreman shall be notified and he shall take appropriate action to have the air content corrected at the plant. Additional tests for air content will be performed on each truckload of material until such time as the air content is within the tolerance specified.

3.8.2.3 Slump Test

Two slump tests shall be made on randomly selected batches of each class of concrete for every 250 cubic yards, or fraction thereof, of concrete placed during each shift. Additional tests shall be performed when excessive variation in the workability of the concrete is noted or when excessive crumbling or slumping is noted along the edges of slip-formed concrete.

3.8.3 Thickness Evaluation

The anticipated thickness of the concrete shall be determined prior to placement by passing a template through the formed section or by measuring the depth of opening of the extrusion template of the curb forming machine. If a slip form paver is used for sidewalk placement, the subgrade shall be true to grade prior to concrete placement and the thickness will be determined by measuring each edge of the completed slab.

3.8.4 Surface Evaluation

The finished surface of each category of the completed work shall be uniform in color and free of blemishes and form or tool marks.

3.9 SURFACE DEFICIENCIES AND CORRECTIONS

3.9.1 Thickness Deficiency

When measurements indicate that the completed concrete section is deficient in thickness by more than 1/4 inch the deficient section will be removed, between regularly scheduled joints, and replaced.

3.9.2 High Areas

In areas not meeting surface smoothness and plan grade requirements, high areas shall be reduced either by rubbing the freshly finished concrete with carborundum brick and water when the concrete is less than 36 hours old or by grinding the hardened concrete with an approved surface grinding machine after the concrete is 36 hours old or more. The area corrected by grinding the surface of the hardened concrete shall not exceed 5 percent of the area of any integral slab, and the depth of grinding shall not exceed 1/4 inch. Pavement areas requiring grade or surface smoothness corrections in excess of the limits specified above shall be removed and replaced.

3.9.3 Appearance

Exposed surfaces of the finished work will be inspected by the Government and any deficiencies in appearance will be identified. Areas which exhibit excessive cracking, discoloration, form marks, or tool marks or which are otherwise inconsistent with the overall appearances of the work shall be removed and replaced.

-- End of Section --

DIVISION 35 – WATERWAY AND MARINE CONSTRUCTION

SECTION 35 31 19

STONE, CHANNEL, SHORELINE/COASTAL PROTECTION FOR STRUCTURES 01/08

PART 1 GENERAL

- 1.1 UNIT PRICES
- 1.1.1 Bedding Layer
- 1.1.1.1 Payment

Payment for gravel, crushed stone, and sand placed for bedding will be made at the applicable contract unit prices for Bedding Stone. Price(s) and payment(s) shall include all costs of furnishing, hauling, placing and maintaining the bedding material until placement of the riprap cover is completed and accepted. Preparation of the base will not be paid for separately and all costs incidental thereto shall be included in contract prices for other items for which payment will be made. No payment will be made for excess thickness of bedding material, nor for material required to replace subgrade material lost by overexcavation or otherwise.

1.1.1.2 Measurement

Gravel, crushed stone, and sand placed for bedding layers will be measured for payment as the volume determined by multiplying the area of the surface on which the gravel, crushed stone or sand is placed by the thickness measured perpendicular to the surface of the gravel, crushed stone or sand as dimensioned on the contract drawings.

1.1.1.3 Unit of Measure

Unit of measure: cubic yard.

- 1.1.2 Riprap
- 1.1.2.1 Payment

Payment for riprap satisfactorily placed will be made at the applicable contract unit price for R60 Riprap. Price(s) and payment(s) shall constitute full compensation for furnishing all plant, labor, materials and equipment and constructing the stone protection in the work as specified. No separate payment will be made for the stockpiling of riprap and all cost in connection with stockpiling shall be included in the contract unit price for riprap.

1.1.2.2 Measurement

Riprap will be measured for payment as the volume determined by multiplying the area of the surface on which the riprap is placed by the thickness of the riprap measured perpendicular as dimensioned on the contract drawings.

1.1.2.3 Unit of Measure

Unit of measure: cubic yard.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM C127	(2015) Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate
ASTM C535	(2016) Standard Test Method for Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM D75/D75M	(2019) Standard Practice for Sampling Aggregates
ASTM D3740	(2019) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
ASTM D5519	(2015) Particle Size Analysis of Natural and Man-Made Riprap Materials
ASTM D6092	(2014) Standard Practice for Specifying Standard Sizes of Stone for Erosion Control
ASTM E329	(2020) Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection
U.S. ARMY CORPS OF ENG	INEERS (USACE)
EM 1110-2-1601	(1991; 1994 Change 1) Engineering and Design Hydraulic Design of Flood

1.3 DEFINITIONS

1.3.1 Bank Stabilization

This paragraph explains certain terminology which is common to construction of bank stabilization work on the channel and which may not be self explanatory in the subsequent applicable provisions of the technical specifications and on the drawings.

Control Channels

1.3.2 Stone Protection

Stone Protection is defined as a system which includes a layer of bedding material or layers of filter material beneath a layer or layers of riprap. Stone protection is placed around structures in slack water or within a dewatered site. Stone protection may also be used to protect channel banks when it is placed in the dry or in slack water.

1.3.3 Riprap

Riprap is defined as a material having a gradation band similar to those specified in EM 1110-2-1601, Chapter 3, uniform graded material. Riprap is normally produced by mechanical methods, with a jaw crusher and grizzly after the stone has been mined by blasting in a quarry. Riprap gradations have a maximum top size of 3.5 tons.

1.3.4 Graded Stone

Stone protection is defined as a system which includes a layer of bedding material or layers of filter material beneath a layer or layers of riprap. Stone protection is placed around structures in slack water or within a dewatered site. Stone protection may also be used to protect channel banks when it is placed in the dry or in slack water.

1.4 SUBMITTALS

OWNER approval is required for submittals with a "G" designation; submittals not having a "G" designation are for CONTRACTOR Quality Control review. When used, a designation following the "G" designation identifies the office that will review the submittal for the OWNER. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Name Of Professional Surveyor

Before Placement Soundings

Spill Contingency Plan

Survey Plan

Name And Location Of Quarry

Qualifications/Certifications For Sampling/Testing Agency

SD-02 Shop Drawings

Soundings - Submit drawings of surveys during progress of work by soundings.

SD-03 Product Data

Riprap

Bedding Material

Bulk Specific Gravity of Riprap and Bedding Mats

SD-04 Samples

Stone

SD-06 Test Reports

Gradation Tests - Riprap and Bedding Material

Evaluation Testing of Stone

Bedding Material

Bulk Specific Gravity

SD-07 Certificates

Stone

Bedding Material

SD-11 Closeout Submittals

After Placement Soundings

1.5 QUALITY ASSURANCE

- 1.5.1 Materials Testing
 - 1. CONTRACTOR/Quarry shall provide all equipment and facilities for testing construction materials.
 - 2. Prior to testing of bedding material and riprap, CONTRACTOR shall notify OWNER in writing and OWNER shall receive notice at least three (3) days prior so that OWNER may have the opportunity to attend the testing and witness the work.
 - 3. Prior to commencing stone production, CONTRACTOR shall provide the name and locating of the quarry that will provide the bedding material and riprap for the project. Suitable test reports and service records are required to determine the acceptability of the bedding material and riprap from the proposed source. Reports shall be from new test performed on actual bedding material and riprap to be used on the project. Acceptable bedding material and riprap shall meet the quality acceptance criteria in paragraph 2.01 A, when tested in accordance with the procedures listed below:

a. Sampling of the bedding material and riprap shall be performed in accordance with ASTM D75/D75M.

b. The absorption of bedding material and riprap shall be determined in accordance with ASTM C127.

c. The unit weight of bedding material and riprap shall be provided based on the specific gravity (saturated-surface-dry) determined in accordance with ASTM C127.

d. The loss by abrasion of bedding material and riprap shall be determined in accordance with ASTM C535, processed and tested for No. 1 grading.

e. The gradation of the riprap and bedding materials shall be determined in accordance with ASTM D5519, Test Method C.

4. Throughout the duration of the work, CONTRACTOR shall inspect, sample, and test construction materials for compliance with the specified requirements and record the inspection of all

operations. All sampling and testing shall be performed by a qualified testing laboratory meeting the requirements of ASTM D3740 and ASTM E329 or a commercial testing facility qualified by U.S. Army Corps of Engineers (USACE) Materials Testing Center (MTC). A copy of the records of inspection, as well as the records of corrective action taken, shall be provided to OWNER. As a minimum, CONTRACTOR shall perform quality control inspection and testing in accordance with the following schedule:

a. **Gradation**: Prior to construction and every 2,000 tons or a minimum of three (3) gradation tests- sample size shall consist of a least 50 stones per test and weigh at least 1 tons per test. Refer to paragraph 2.01 for quality requirements.

b. **Quality**: Prior to construction and every 2,000 tons or a minimum of three (3) set s of quality tests. Refer to paragraph 2.01 for quality requirements.

c. **Placement**: Continuous inspection of placement to ensure proper thickness and that material is not segregated. Refer to paragraph 3.02 for placement requirements.

5. Gradation test shall be performed by CONTRACTOR at the quarry under the direction of a qualified testing laboratory with periodic site/visits/witness by the OWNER to verify the riprap and bedding material meets the specified size ranges (paragraph 2.01 A). Testing procedures shall be provided to OWNER a minimum of five (5) days prior to initiation of gradation tests.

1.5.2 Daily Activities Report

CONTRACTOR shall provide a daily record of activities. Records shall document general quantity and locations of riprap and bedding material placement, percent project completion, and adverse weather or other problems that cause delays. Reports shall be submitted on a weekly basis. Refer to Section 01 06 00, Special Conditions.

1.6 CONSTRUCTION TOLERANCES

The finished surface and stone layer thickness shall not deviate from the lines and grades shown by more than the tolerances listed below. Tolerances are measured perpendicular to the indicated neatlines. Extreme limits of the tolerances given shall not be continuous in any direction for more than five times the nominal stone dimension nor for an area greater than 200 square feet of the structure surface.

NEATLINE TOLERANCES			
MATERIAL	ABOVE NEATLINE (inches)	BELOW NEATLINE (inches)	
Bedding	0	6	
Riprap	6	0	

The intention is that the work shall be built generally to the required elevations, slope and grade and that the outer surfaces shall be even and present a neat appearance. Placed material not meeting these limits shall be removed or reworked as directed by the OWNER. Payment will not be made for excess material which the OWNER permits to remain in place.

1.7 QUANTITY OF MATERIAL

The total estimated amount of material for bidding purposes to be placed within the specified limits is provided on the project drawings. The quantities listed are estimates only.

1.8 EXCESS ROCK PLACEMENT

To cover unavoidable inaccuracies of placement process, material actually placed to a depth of 6" above the depth specified and within the placement limits will be measured and paid for at full contract price.

1.9 SIDE SLOPES

Placement on side slopes shall follow, as closely as practicable, the lines indicated or specified. There shall be no vertical faces greater than 1 foot along side slopes. The amount of material placed on side slopes will be determined by comparing cross-sections collected before and after placement.

1.10 PERMIT

The CONTRACTOR shall comply with conditions and requirements of the Corps of Engineers Permit and other State or Federal permits. The OWNER will secure the permit for placement of material as indicated.

1.11 ENVIRONMENTAL PROTECTION REQUIREMENTS

Provide and maintain during the life of the contract, environmental protective measures. Also, provide environmental protective measures required to correct conditions, such as oil spills or debris, that occur during the placement operations. Comply with Federal, State, and local regulations pertaining to water, air, and noise pollution. Refer to Specification 01 16 60 Environmental Protection Measures for detailed requirements.

PART 2 PRODUCTS

- 2.1 BEDDING MATERIAL AND RIPRAP
- 2.1.1 Bedding Material and Riprap
 - A. Stone: All stone for bedding material and riprap shall be durable natural stone. It shall be free from visible cracks, clay pockets, cavities (bugs, or "honeycombs"), laminations, and other defects that would tend to increase unduly its deterioration from natural causes. Stone shall not include objectionable quantities of dirt, sand, clay, and/or rock fines. Stone stall have a minimum unit weight of 155 pounds per cubic foot, a maximum absorption of 3%, and a maximum loss by abrasion of 36%.

The bedding material and riprap shall be reasonably well graded and shall include essentially all stone sizes between the two extremes specified which will result in a dense, fairly well-graded material not having noticeable voids or a lack of the larger sizes. Bi-modal or gap graded stone gradation test results may result in rejection of the stone material. Bedding size range (gradiation) shall conform to the requirements specified below in Table 1.

Table 1		
Material Requirements for Bedu	Ing Material (ASIM D6092- F52)	
U.S. Standard Sieve	% Lighter	
4 in.	100	
3 in.	100	
2 in.	100	
3/4 in.	85-100	

Riprap size range (gradation) shall conform to the requirements specified below (Table 2) if unit weight of stone is between 155 pounds per cubic foot and 165 pounds per cubic foot.

Table 2		
Requirements for R-60 Ripra	ap (ASTM D6092- R60 RIPRAP)	
Stone Weight, lb	% Lighter	
150	100	
60	50-100	
30	15-50	
10	0-15	

B. Stone Shape: The greatest dimension of each stone shall not be more than three (3) times its least dimension. The faces of individual stones shall be roughly angular, not rounded in shape.

PART 3 EXECUTION

3.1 INSPECTION

Inspect the work, keep records of work performed, and ensure that gages, targets, ranges, and other markers are in place and usable for the intended purpose. Furnish, at the request of the OWNER, boats, boatmen, laborers, and materials necessary for inspecting, supervising, and surveying the work. When required, provide transportation for the OWNER and inspectors between vessels and adjacent points on shore. CONTRACTOR shall keep and have records available for review during the contract time and for a minimum of 90 days after final completion.

3.2 CONDUCT OF PLACEMENT

3.2.1 Order of Work

The sequence of construction shall be determined by the CONTRACTOR, unless

otherwise restricted by the contract documents. Construction shall be continuous from start to finish with no appreciable shut down periods.

The project site is located adjacent to existing ship docks, which may be utilized during construction. CONTRACTOR shall coordinate with Port of Brownsville and schedule work so that placement operations do not impact use of adjacent docks and use of adjacent docks do not impact placement work schedule. Delays caused by use of adjacent docks shall not be grounds for claims, changed conditions, or time extensions to the contract.

3.2.2 Interference with Navigation

The Port of Brownsville is a highly utilized facility and CONTRACTOR shall be aware of navigational requirements. Placement operations, equipment, and personnel shall not restrict navigation in the ship channel. Right of way shall be provided to any and all vessels entering and leaving the port. CONTRACTOR shall keep abreast of the navigation requirements of vessels' ingress and egress through the port and provide appropriate accommodations to move plant and other equipment so as not to interfere with navigation. Delays caused by shipping shall not be grounds for claims, changed conditions, or time extensions to the contract.

3.2.3 Lights

Each night, between sunset and sunrise and during periods of restricted visibility, provide lights for floating plants, ranges, and markers. Also provide lights for buoys that could endanger or obstruct navigation. When night work is in progress, maintain lights from sunset to sunrise for the observation of placement operations. Lighting shall conform to United States Coast Guard requirements for viability and color.

3.2.4 Ranges, Gages, and Lines

Furnish, set, and maintain ranges, buoys, and markers needed to define the work and to facilitate inspection. Establish and maintain gages in locations observable from each part of the work so that the depth may be determined. Suspend placement when the gages or ranges cannot be seen or followed. the OWNER will furnish, upon request by the CONTRACTOR, survey lines, points and elevations necessary for the setting of ranges, gages, and buoys.

3.2.5 Plant

Maintain the plant, scows, comings, barges, and associated equipment to meet the requirements of the work. Remove bedding material and riprap placed due to leaks and breaks.

3.3 PLACEMENT OF BEDDING LAYERS

3.3.1 General

A bedding layer, consisting of a 0' to 6' layer of gravel or crushed stone, shall be placed on the base as described below, in accordance with the details shown on the contract drawings, and within the limits shown on the contract drawings. A tolerance of plus 2 inches and minus 6 inches from the slope lines and grades shown on the contract drawings will be allowed in the finished surface of the bedding, except that the extreme of this tolerance shall not be continuous over an area greater than 200 square feet.

3.3.2 Placement of Bedding Material

Bedding material shall be spread uniformly on the base to the slope lines and grades as indicated on the contract drawings and in such manner as to avoid damage to the base. Placing of gravel or crushed stone by methods which tend to segregate the particle sizes within the bedding layer or cause mixing of the separate layers will not be permitted. Placement shall begin at the bottom of the area to be covered and continue up slope. Subsequent loads of material shall be placed against previously placed material in such a manner as to ensure a relatively homogenous mass. Any damage to the surface of the base during placing of the material shall be repaired before proceeding with the work. Compaction of material placed on the base will not be required, but the material surface shall be finished to present an adequately even surface, free from mounds or windrows.

- 3.4 PLACEMENT OF RIPRAP
- 3.4.1 General

Riprap shall be placed on the bedding layer specified in paragraph BEDDING MATERIAL within the limits shown on the contract drawings.

3.4.2 Placement

Under water placement rates shall be used when the top of the layer to be placed is covered by more than 3 feet of water.

3.4.2.1 Under Water

Riprap placed in the wet shall be placed evenly at a rate of one-half the total thickness per pass for R60 riprap. Prior to starting work, submit the proposed method of placing riprap under water. Riprap to be placed in the wet shall be done during periods of low water levels during the months of June through November. The riprap shall be placed in two passes, with the second pass perpendicular to the first pass.

3.5 Placement Control

3.5.1 Quality Control Measures

Establish and maintain quality control for all work performed at the job site under this section to assure compliance with contract requirements. Maintain records of the quality control tests, inspections and corrective actions. Quality control measures shall cover all construction operations including, but not limited to, the placement of all materials to the slope and grade lines shown and in accordance with this section.

3.5.2 Measurement

CONTRACTOR shall take soundings before and after placement.

All survey plots submitted to OWNER shall be sealed by a professional land surveyor registered in the State of Texas. Prior to commencing surveying activities, CONTRACTOR shall provide the name of professional surveyor to be used on the project.

All construction surveys submitted to OWNER shall be in the form of plan-view and cross-section plots. Survey plots shall also be provided in AutoCAD accompanied by XYZ ASCII text files or other digital format

approved by OWNER. All survey data shall be referenced to the project datums shown on the drawings. All plots shall clearly display the following information:

- 1. Project name
- Professional Land Surveyor's seal, signature, and business's affiliation.
- 3. Date(s) surveys were performed
- 4. Location and description of survey control
- 5. Vertical and horizontal datums
- 6. Sheet name
- 7. Name of CONTRACTOR
- 8. Drawing scale(s)
- 9. Transducer frequency (if hydrographic survey)

For final after placement survey, plots shall comprise a well organized, stand-alone set of drawings that does not include any outdated or superseded information that may have been submitted for interim surveys. Final plots shall clearly show final cross-sections superimposed over before placement and interim cross-sections.

3.5.3 Method of Measurement

The material placed will be measured by cubic yard, by means of soundings taken before and after placement. The drawings represent existing conditions based on current available information, but will be verified and corrected, if necessary, by soundings taken before placement. Soundings will be taken by 200 kHZ sonic methods; results of soundings will be the basis for payment. Transducer frequency shall be consistent between before placement, interim, and after placement soundings. Areas sounded more than 30 days prior to placement will be re-sounded.

Survey transects shall be taken every 25 feet perpendicular to the centerline of the Brownsville Ship Channel, and at crests/toes of the slopes. Survey transects shall be on or between Station 81+800 and 82+150. Transect shall extend from the steel sheet pile bulkhead to a plane 25' outboard of the OD6 breasting line. Maximum horizontal spacing of survey shots shall be five (5) feet.

CONTRACTOR shall notify OWNER in writing at least 3 days prior to the commencement of sounding activities so that OWNER may have the opportunity to accompany the survey crew and witness the work.

Prior to commencing sounding activities, CONTRACTOR shall provide OWNER a survey plan that includes a written description of the methodology and equipment to be used for sounding. CONTRACTOR shall also include documentation that equipment meets the Minimum Performance Standards for Corps of Engineers Hydrographic Surveys, as shown in Table 3-1 of EM 1110-2-1003, and description of calibration procedures. No other equipment shall be used for sounding without prior approval of OWNER.

3.5.4 Surveys During Progress of Work

Thickness of material placed will be determined by soundings taken behind the barge as work progresses. The CONTRACTOR shall take progress soundings.

3.6 CLEANUP

Upon completion of the work, all plant, including ranges, buoys, stakes,

piles, excess stone, and other markers or obstructions placed by or for CONTRACTOR shall be promptly removed.

-- End of Section --

Notice of Award

OIL DOCK #6 BULKHEAD REPAIRS

TO:

PROJECT DESCRIPTION: OIL DOCK #6 BULKHEAD REPAIRS

Dear Sir:

The Brownsville Navigation District ("Owner") has considered the bid submitted by your company for the above referenced project in response to its Invitation for Bids dated <u>6/07/2021</u> and <u>6/14/2021</u>, and the Instructions to Bidders.

You are hereby notified that your bid has been accepted by the Brownsville Navigation District in the amount of _____.

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

If you fail to execute this Agreement and furnish the bonds and insurance certificates within ten (10) 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.

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

Dated this day of , 20 .

OWNER: BROWNSVILLE NAVIGATION DISTRICT, TEXAS.

Ву: ____

ARIEL CHAVEZ II, P.E./R.P.L.S. Director of Engineering Services

Acceptance of Notice

Receipt of the above NOTICE OF AWARD is hereby acknowledged by

on this the _____ day of _____, 20 ____.

By:____

OFFICER'S NAME Officer's Title

OIL DOCK #6 BULKHEAD REPAIRS

Dated:

TO:

PROJECT DESCRIPTION:

OIL DOCK #6 BULKHEAD REPAIRS

OWNER's Contract No.: -

CONTRACT FOR: [Description of Work]

Dear Sir:

You are hereby notified that the Contract Time under the above contract will commence to run on _____. By that date, you are to start performing your obligations under the Contract Documents. In accordance with Article 3 of the Agreement the dates of Substantial Completion and completion and readiness for final payment are _____ and _____.

Before you may start any Work at the site, paragraph 2.7 of the Standard General Conditions provides that you and Owner must each deliver to the other (with copies to ENGINEER and other identified additional insureds) certificates of insurance which each is required to purchase and maintain in accordance with the Contract Documents.

Also before you may start any Work at the site, you must coordinate the BND Engineering Department for any possible modifications to the contract documents.

OWNER: BROWNSVILLE NAVIGATION DISTRICT, TEXAS.

Ву: ____

ARIEL CHAVEZ II, P.E./R.P.L.S. Director of Engineering Services

Acceptance of Notice

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

 on this the _______ day of ________.

By:_____ OFFICER'S NAME Officer's Title