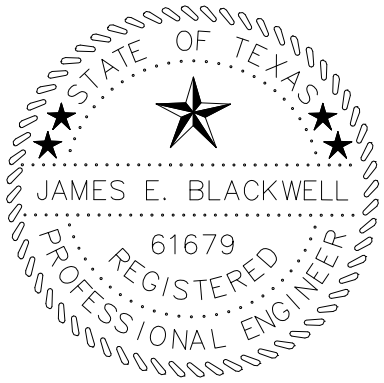
SPECIFICATIONS AND CONTRACT DOCUMENTS

FOR

CONSTRUCTION AND INSTALLATION OF CITY OF MASON, TEXAS WATER IMPROVEMENTS – PHASE 1

NOVEMBER 2008

CITY OF MASON, TEXAS



NOVEMBER 10, 2008

PREPARED BY:

BLACKWELL ENVIRONMENTAL, LLC

1107 Highway 1431, #113
Marble Falls, TX 78654
(512) 247-8700
(512) 556-8469 FAX

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TABLE OF CONTENTS

TABLE OF CONTENTS

SECTION 00010

INVITATION TO SUBMIT BIDS

The City of Mason, Texas will accept sealed bids for the construction of Phase 1 – 10" Water Main Loop.

Bids will be received at City Hall located in the City of Mason, Texas, 124 Moody Street, Mason, Texas 76856 until 4:00 P.M. local time on Monday, January 5, 2009, at which time and place they will be opened and read aloud. No bid may be withdrawn after the closing time for the receipt of bids for a period of sixty (60) calendar days.

The project involves furnishing all labor, tools, materials and equipment as specified in the bid documents necessary to install 5,900 linear feet of 10-inch SDR 26 – Class 160 PVC waterline, 6 fire hydrants, water main connections, valves and other appurtenances of construction, in place complete, situated in Mason, Texas.

Plans, Specifications and Contract Documents will be available on Wednesday, November 19, 2008, and may be obtained at the office of the City Administrator, City of Mason, Texas, 124 Moody Street, Mason, Texas 76856 for a non-refundable fee of $100.00. The Contract Documents and Plans may also be viewed online and downloaded for free at:

www.mason.tx.citygovt.org

Contact via phone at 325-347-6449 or via email at brian.boudreaux@cityofmason.us

The successful bidder, if awarded the Contract, will be required to furnish a Performance Bond and Payment Bond, each in the amount of one hundred percent (100%) of the Contract amount.

The surety company on the contract performance bond shall be a surety company authorized to do business in the State of Texas. Said bond and surety shall be subject to approval by the attorney for the OWNER.

Payment of the Contract amounts will be paid on a lump sum unit basis as bid in the bidding documents.

The City of Mason, Texas reserves the right to reject any or all bids, to waive informalities, and to re-advertise.

Mark the envelope "**Sealed Bid – Phase 1; 10" Water Main Loop**". Bid may be delivered or overnight mailed to the City Secretary at City Hall, 124 Moody Street, Mason TX 76856 or by USPS mail and received by the deadline to P.O. Box 68, Mason TX 76856.

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SECTION 00100

INSTRUCTIONS TO BIDDERS

1. **RECEIPT AND OPENING OF BIDS:** Sealed bids for the construction Phase 1 – 10" Water Main Loop located in the City of Mason, Mason County, Texas will be received by the City of Mason, Texas at City Hall located at 124 Moody Street, Mason, Texas 76856 until 4:00 P.M. local time on Monday, January 5, 2009, at which time and place they will be opened and read aloud. No bid may be withdrawn after the closing time for the receipt of bids for a period of sixty (60) calendar days.

The project involves furnishing all labor, tools, materials and equipment as specified in the bid documents necessary to install 5,900 lineal feet of 10-inch SDR 26 – Class 160 PVC waterline, 6 fire hydrants, water main connections, valves and other appurtenances of construction, in place complete, situated in Mason, Texas.

Bids shall be made on the forms furnished by the Owner and shall be enclosed in sealed envelopes addressed to City of Mason, Texas, 124 Moody Street, Mason, Texas 76856.

Attention is called to the fact that bidders not only offer to assume the obligations and liabilities imposed upon the Contractor in the form of the Contract, but expressly make certain of the representations and warranties made therein. No effort is made to emphasize any particular provisions of the Contract, but bidders must familiarize themselves with every provision and its effect.

2. **TIME OF COMPLETION:** The Contractor shall complete the Contract no later than 180 calendar days after the date required to commence work. In the event of failure to complete the work within the specified time, liquidated damages will be assessed as stated in the General Conditions of the Contract.

3. **PLANS AND SPECIFICATIONS:** Plans, Specifications and Contract Documents will be will be available on Wednesday, November 19, 2008, and may be obtained at the office of the City Administrator, City of Mason, Texas, 124 Moody Street, Mason, Texas 76856.

4. **PREPARATION OF BID:** The bidder must submit his bid on the forms furnished by the Owner. All blank spaces in the bid forms must be correctly filled in where indicated for each and every item for which a quantity is given, and the bidder must state the prices (written in ink, both in words and numerals) for which he proposes to do each item of the work contemplated or furnish each item of the materials required. In case of conflict between words and numerals, the words, unless obviously incorrect, will govern.

The bidder must sign his bids in the blank spaces provided therefore. If the bids are made by a partnership or corporation, the name and address of the partnership or corporation shall be shown, together with the names and addresses of the partners or

officers. If the bids are made by a partnership, it must be acknowledged by one of the partners, or by one of the officers if a corporation.

5. **Bonds:** The Successful bidder, if awarded the Contract, will be required to furnish a Performance Bond and Payment Bond, each in the amount of one hundred percent (100%) of the Contract amount.

The surety company on the contract performance bond shall be a surety company authorized to do business in the State of Texas. Said bond and surety shall be subject to approval by the attorney for the OWNER.

6. **RIGHT TO ACCEPT AND REJECT BIDS:** The Owner reserves the unqualified right, in its sole and absolute discretion, to reject any and all bids, or to accept that bid or combination of bids, if any, which in its sole and absolute judgment will under all circumstances best serve the Owner's interests. In the event that the successful bidder fails to execute the Contract upon his part, the Owner reserves the option to accept the bid of any other bidder within ten (10) days from such default, in which case such acceptance shall have the same effect as to such bidder as though he were the originally successful bidder.

SECTION 00200

BIDDERS QUALIFICATION STATEMENT

The contents of this statement are CONFIDENTIAL.

Submitted by:

Name of Organization _____

Name of Individual _____

Title _____

Address _____

_____

_____

Telephone _____

Submitted to:

Name _____

Address _____

_____

_____

Telephone _____

Project Name and Description (if applicable)

_____

_____

_____

_____

Contractor's General Business Information

Check If: ☐ Corporation ☐ Partnership ☐ Joint Venture ☐ Sole Proprietorship ☐ Other

If Corporation:

a. Date and State of Incorporation

_____

_____

b. List of Executive Officers

NAME	TITLE

If Partnership:

a. Date and State of Organization

_____

_____

b. Names of Current General Partners

_____

_____

c. Type of Partnership

☐ General ☐ Publicly Traded ☐ Limited ☐ Other (describe):_____

If Joint Venture:

a. Date and State of Organization

_____

_____

b. Name, Address and Form of Organization of Joint Venture Partners: (Indicate managing partner by an asterisk*)

NAME	ADDRESS	FORM

If Sole Proprietorship:

a. Date and State of Organization

DATE	STATE

b. Name and Address of Owner or Owners

NAME	ADDRESS

1. On Schedule A, attached, list major engineered construction projects completed by this organization in the past five (5) years. (If joint venture list each participant's projects separately).

2. On Schedule B, attached, list current projects under construction by this organization. (If joint venture, list each participant's projects separately).

3. Name of surety company and name, address, and phone number of agent.

   _____

   _____

   _____

   _____

4. Is your organization a member of a controlled group of corporations as defined in I.R.C. Sec. 1563?

   ☐ Yes ☐ No

   If yes, show names and addresses of affiliated companies.

   _____

   _____

   _____

   _____

5. Furnish on Schedule C, attached, details of the construction experience of the principal individuals of your organization directly involved in construction operations.

6. Has your organization ever failed to complete any construction contract awarded to it?

   ☐ Yes ☐ No - If yes, describe circumstances on attachment.

7. Has any Corporate officer, partner, joint venture participant or proprietor ever failed to complete a construction contract awarded to him or her in their own name or when acting as a principal of another organization?

   ☐ Yes ☐ No - If yes, describe circumstances on attachment.

8. In the last five years, has your organization ever failed to substantially complete a project in a timely manner?

   ☐ Yes ☐ No - If yes, describe circumstances on attachment.

9. Indicate general types of work performed with your own work force.

_____

_____

_____

_____

10. If required, can your organization provide a bid bond for this project?

☐ Yes ☐ No –

11. What is your approximate total bonding capacity?

☐ $500,000 to $2,000,000
☐ $2,000,000 to $5,000,000
☐ $5,000,000 to $10,000,00
☐ $10,000,000 or more

12. Describe the permanent safety program you maintain within your organization. Use attachment if necessary.

_____

_____

_____

_____

13. Furnish the following information with respect to an accredited banking institution familiar with your organization.

Name of Bank _____

Address _____

_____

_____

_____

_____

Account Manager _____

Telephone _____

I hereby certify that the information submitted herewith, including any attachment is true to the best of my knowledge and belief.

Name of Organization: _____

Signature: _____

Title: _____

STATE OF _____ §
§
COUNTY OF _____ §

The foregoing instrument was acknowledged before me this _____ day of _____, 2008,

By: _____

Title: _____

Name of Organization: _____

[SEAL]

Notary Public Signature

_____
Date Commission Expires

SCHEDULE A

PRIOR EXPERIENCE

	Project (Name: Location: Description)	Owner (Organization, Contact, Telephone)	Design Professional (Firm Name, Contact, Telephone)	Date Completed	Contract Price
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

SCHEDULE B

CURRENT EXPERIENCE

	Project (Name: Location: Description)	Owner (Organization, Contact, Telephone)	Design Professional (Firm Name, Contact, Telephone)	Date Completed	Contract Price
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

SCHEDULE C - PERSONNEL

Name:	Position:	Date started with this organization	Date started in construction	Prior positions and experience in construction

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SECTION 00300
BID DOCUMENT

CITY OF MASON, TEXAS
PHASE 1 – 10" WATER MAIN LOOP

TO: Brian Boudreaux – City Administrator
City of Mason
124 Moody Street
Mason, Texas 76856

GENTLEMEN:

The undersigned (hereinafter called the Bidder), a _____
(Corporation, Partnership, Individual...)

organized and doing business under the laws of the State of _____, hereby proposes and agrees to furnish all the necessary labor, materials, equipment, tools and services necessary for the construction of approximately 5,900 linear feet of 10" Water Main and associated appurtenances of construction, to be located in the City of Mason, Mason County, Texas, in accordance with the Contract Documents and Specifications included herein, within the time set forth therein, and at the price stated below plus any and all sums to be added and/or deducted resulting from all extra and or omitted work in accordance with the unit and/or lump sum prices stated in the itemized bid form attached hereto.

The undersigned has examined the location of the proposed work, the Drawings, Specifications and other Contract Documents and is familiar with the local conditions at the place where the work is to be performed.

The undersigned hereby acknowledges receipt of the following Addenda:

Addendum(s) No.	Dated
_____	_____
_____	_____
_____	_____

If awarded the Contract, the undersigned agrees to complete the work within one hundred and eighty (180) calendar days of the commencement of the Contract Time as defined in the General Conditions of the Contract.

Furthermore, it is understood by the undersigned that the Owner may take up to sixty (60) days from the date of the bid opening to accept or reject bids and, therefore, the undersigned hereby agrees to hold the prices and costs set forth herein for a period of sixty (60) days from the date of the bid opening.

Bidder agrees to perform all the work described in the Contract Documents and Specifications for the following prices:

Item #	Item Description	Unit	Quantity	Unit Cost	Total Cost
1	Mobilization/Demobilization/Bonds/ Insurance (Max 5%) for _____ _____ dollars and _____ cents	Lump Sum	1	$_____	$_____
2	Maintenance of Traffic (Min 2%) for _____ _____ dollars and _____ cents	Lump Sum	1	$_____	$_____
3	10” SDR 26, Class 160 PVC Water Main to include trenching, bedding and backfill, complete in place for _____ _____ dollars and _____ cents	LF	5,800	$_____	$_____
4	10” Mueller A-2360 MJ Gate Valve to include valve box, complete in place for _____ _____ dollars and _____ cents	EA	6	$_____	$_____
5	8” Tapping Sleeve, 8” Tapping Valve & Box, complete in place for _____ _____ dollars and _____ cents	EA	3	$_____	$_____

Item #	Item Description	Unit	Quantity	Unit Cost	Total Cost
6	Horizontal Directional Drill, 10” SDR 26, Class 160 PVC Water Main, complete in place for _____ _____ dollars and _____ cents	LF	160	$_____	$_____
7	Permanent Asphalt Replacement complete in place for _____ _____ dollars and _____ cents	LF	2,840	$_____	$_____
8	Concrete Curb & Gutter Replacement, complete in place for _____ _____ dollars and _____ cents	LF	85	$_____	$_____
9	Mueller Super Centurion Fire Hydrant Assembly, complete in place for _____ _____ dollars and _____ cents	EA	6	$_____	$_____
10	OCV 3333-3 Altitude Valve, or approved equal, to include vault, complete in place. for _____ _____ dollars and _____ cents	EA	1	$_____	$_____

11	OCV 127-2, 8" Globe Pressure Reducing Valve, or approved equal, to include vault, complete in place. for _____ _____ dollars and _____ cents	EA	1	$_____	$_____
12	Final Clean Up & Restoration for _____ _____ dollars and _____ cents	Lump Sum	1	$_____	$_____

Total Amount Bid: $_____
Figures

Total Amount Bid:

_____ dollars _____ cents
Words

The undersigned understands that the Owner reserves the right to reject any or all bids or to waive any formality or technicality in any bid in the interests of the Owner.

RESPECTFULLY SUBMITTED BY:

_____
(CONTRACTOR)

_____
(BY) (TITLE)

_____
(BUSINESS ADDRESS) (CITY)

_____
(STATE) (ZIP CODE) (DATE)

_____
(TELEPHONE NUMBER)

SECTION 00410

BID BOND

THE STATE OF TEXAS §

SURETY'S NO._____

COUNTY OF_____ §

KNOW ALL MEN BY THESE PRESENTS, THAT_____

_____

_____

(hereinafter called the Principal), as Principal, and _____

_____

(hereinafter called the Surety), as Surety, are bound unto the City of Mason, Texas, a General Law Municipal Corporation of Mason County, Texas (hereinafter called Obligee) in the amount _____DOLLARS ($_____), for the payment whereof said Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a Bid to enter into a certain written Contract with

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the said Principal shall faithfully, enter into such written Contract, then this obligation shall be void; otherwise to remain in full force and effect.

IT IS EXPRESSLY UNDERSTOOD AND AGREED that if said Principal should withdraw its Bid anytime after such Bid is opened and before official rejection of such Bid or, if successful in securing the award thereof, said Principal should fail to enter into the Contract and furnish satisfactory Performance Bond and Payment Bond, the Obligee, in either of such events, shall be entitled and is hereby given the right to collect the full amount of this Bid Bond as liquidated damages.

PROVIDED, further that if any legal action be filed upon this Bond, venue shall lie in McCulloch County, Texas.

IN WITNESS WHEREOF, the said Principal and Surety do sign and seal this instrument, this _____ day of _____, 20_____.

Principal/Contractor Surety

By_____ By_____

Address_____ Address_____

NOTE: Attach Power of Attorney

SECTION 00500

STANDARD AGREEMENT BETWEEN OWNER AND CONTRACTOR ON A UNIT PRICE BASIS

THIS AGREEMENT is dated as of the_____ day of_____ in the year 2009 by and between City of Mason, Texas (hereinafter called OWNER) and _____ (hereinafter called CONTRACTOR). OWNER and CONTRACTOR, in consideration of the mutual covenants hereinafter set forth, agree as follows:

ARTICLE 1 - WORK.

CONTRACTOR shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as furnishing all labor, tools, materials and equipment as specified in the bid documents necessary to install approximately 5,800 linear feet of 10-inch SDR 26 – Class 160 PVC waterline, 6 fire hydrants, water main connections, valves and other appurtenances of construction, in place complete, situated in Mason, Texas.

ARTICLE 2 - ENGINEER.

The Project has been designed by Blackwell Environmental, LLC, Georgetown, Texas, who is hereinafter called ENGINEER and who is to act as Owner's representative, assume all duties and responsibilities and have the rights and authority assigned to ENGINEER in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents.

ARTICLE 3 - CONTRACT TIMES.

3.1. The Contractor agrees to commence work under this Contract upon written notice to proceed, and to complete the project ready for use and operation within 180 calendar days of the commencement of the Contract Time as defined in the General Conditions of the Contract.

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 completed within the times specified in paragraph 3.1 above, plus any extensions thereof allowed in accordance with the General Contract Conditions. They also recognize the delays, expense and difficulties involved improving the actual loss suffered by OWNER if the Work is not completed on time. Accordingly, instead of requiring any such proof, OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) CONTRACTOR shall pay OWNER Two Hundred Fifty Dollars

($250.00) for each day that expires after the time specified in paragraphs 3.1 until the Work is substantially complete.

ARTICLE 4 - CONTRACT PRICE

OWNER shall pay CONTRACTOR for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to the proposal. Estimated quantities are not guaranteed, and determinations of actual quantities and classification are to be made by ENGINEER as provided by Section 01025 MEASUREMENT AND PAYMENT.

ARTICLE 5 - PAYMENT PROCEDURES

CONTRACTOR shall submit Applications for Payment in accordance with the General Contract Conditions. Applications for Payment will be processed by ENGINEER as provided in the General Contract Conditions.

5.1 Progress Payments; Retainage. OWNER shall make progress payments on account of the Contract Price on the basis of CONTRACTOR'S Applications for Payment as recommended by ENGINEER, on or about the 5th day of each month during construction as provided in paragraphs 5.1.1 and 5.1.2 below. All such payments will be measured by the schedule of values established by the General Contract Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is not schedule of values, as provided in the General Requirements.

5.1.1 Prior to Substantial Completion, progress payments will be made less the aggregate of payments previously made and less such amounts as ENGINEER shall determine, or OWNER may withhold, in accordance with the General Contract Conditions.

5.1.2 Upon Substantial Completion, in an amount sufficient to increase total payments to CONTRACTOR to 90% of the Contract Price (with the balance being retainage), less such amounts as ENGINEER shall determine, or OWNER may withhold, in accordance with the General Contract Conditions.

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

ARTICLE 6 - NOT USED

ARTICLE 7 - CONTRACTOR'S REPRESENTATIONS

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

7.1 CONTRACTOR has examined and carefully studied the Contract Documents (including the Addenda listed in paragraph 8) and the other related data identified in the Bidding Documents including "technical data."

7.2 CONTRACTOR has visited the site and become familiar with and is satisfied as to the general, local and site conditions that may affect cost, progress, performance or furnishing of the Work.

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

7.4 CONTRACTOR acknowledges that OWNER and ENGINEER do not assume responsibility for the accuracy or completeness of information and data shown or indicated in the Contract Documents with respect to Underground Facilities at or contiguous to the site. CONTRACTOR has obtained and carefully studied (or assumes responsibility for having done so) all such additional supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the site or otherwise which may affect cost, progress, performance or furnishing of the Work or which relate to any aspect of the means, methods, techniques, sequences and procedures of construction to be employed by CONTRACTOR and safety precautions and programs incident thereto. CONTRACTOR does not consider that any additional examinations, investigations, explorations, tests, studies or data are necessary for the performance and furnishing of the Work at the Contract Price, within the Contract Times and in accordance with the other terms and conditions of the Contract Documents.

7.5 CONTRACTOR is aware of the general nature of work to be performed by OWNER and others at the site that relates to the Work as indicated in the Contract Documents.

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

7.7 CONTRACTOR has given ENGINEER written notice of all conflicts, errors, ambiguities or discrepancies that CONTRACTOR has discovered in the

Contract Documents. and the written resolution thereof by ENGINEER is acceptable to CONTRACTOR, and the Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

ARTICLE 8 - CONTRACT DOCUMENTS

The Contract Documents which comprise the entire agreement between OWNER and CONTRACTOR concerning the Work consist of the following:

8.1 This Agreement.

8.2 Invitation for Bids.

8.3 Instructions to Bidders.

8.4 Exhibits to this Agreement.

8.5 Performance and Payment Bonds.

8.6 Notice to Proceed.

8.7 General Contract Conditions (Parts I and 11).
8.8 Special Provisions.

8.9 Attachments

8.10 Specifications bearing the title City of Mason, Texas, Water Improvements – Phase 1, and consisting divisions and pages, as listed in table of contents thereof.

8.11 Drawings bearing the title City of Mason, Texas, Water Improvements – Phase 1.

8.12 Addenda numbers (__) to (__), inclusive.

8.13 Signed copy of CONTRACTOR'S Bid.

8.14 Documentation submitted by CONTRACTOR prior to Notice of Award.

8.15 The following which may be delivered or issued after the Effective Date of the Agreement and are not attached hereto: All Written Amendments and other documents amending, modifying or

supplementing the Contract Documents pursuant to the General Contract Conditions.

The documents listed in paragraphs 8.2 et seq. above are attached to this Agreement (except as expressly noted otherwise above).

There are no Contract Documents other than those listed above in this Article 13. The contract Documents may only be amended, modified or supplemented as provided in the General Contract Conditions.

ARTICLE 9 - MISCELLANEOUS

9.1 Terms used in this Agreement which are defined in Article 1 of the General Contract Conditions will have the meanings indicated in the General Contract Conditions.

9.2 No assignment by a party hereto of any rights under or interests 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 the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

9.3 OWNER and CONTRACTOR each binds itself, its partners, successors, assigns and legal representatives to the other party hereto, its partners, successors, assigns and legal representatives in respect to all covenants, agreements and obligations contained in the Contract Documents.

9.4 Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon OWNER and CONTRACTOR, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision

IN WITNESS WHEREOF, OWNER and CONTRACTOR have signed this Agreement in triplicate. One counterpart each has been delivered to OWNER, CONTRACTOR and ENGINEER. All portions of the Contract Documents have been signed, initialed or identified by OWNER and CONTRACTOR or identified by ENGINEER on their behalf.

This Agreement will be effective on _____, 2008 (which is the Effective Date of the Agreement).

OWNER

CITY OF MASON, TEXAS
124 MOODY STREET
MASON, TEXAS 76856

CONTRACTOR

_____
_____
_____

STATE OF TEXAS §
§
COUNTY OF MASON §

The foregoing instrument was acknowledged before me this _____ day of _____, 2008, by _____, the Mayor of Mason, Texas on behalf of the City of Mason.

[SEAL]

_____
Notary Public

STATE OF TEXAS §
§
COUNTY OF _____ §

The foregoing instrument was acknowledged before me this _____ day of _____, 2008, by _____, the _____ of _____ a _____Company, on behalf of the company.

[SEAL]

_____
Notary Public

SECTION 00510

CERTIFICATION OF SIGNATORY AUTHORITY

Certifications

I _____, certify that I am the _____ of the corporation named as Contractor herein; that _____ who signed this Agreement on behalf of the Contractor, was then _____ of said corporation by authority of its governing body, and is within the scope of its corporate power.

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SECTION 00610

PERFOMANCE BOND

KNOW ALL MEN BE THESE PRESENTS: that

_____
(Name of Contractor or Company)

_____
(Address)

a _____ hereinafter called Principal, and _____
(Corporation/Partnership) (Name of Surety Company)

hereinafter called Surety, are held and firmly bound unto CITY OF MASON, TEXAS
(Name of recipient)

124 Moody TX 76856
(Recipient' s Address)

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 assignees, jointly and severally, firmly in 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 _____, 2008, a copy of which is hereto attached and made a part hereof for the construction of:

City of Mason, Texas Water System Improvements – Phase 1

NOW THEREFORE, if the Principal shall well, truly and faithfully perform its duties in 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 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 way affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK to 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.

IN WITNESS WHEREOF, this instrument is executed in _____
(Number)

counterparts, each one of which shall be deemed in original, this the _____ day

of _____, 20_____.

ATTEST: _____
(Principal)

_____ By: _____(s)
(Principal Secretary)

(SEAL)

_____ _____
(Witness as to Principal) (Address)

_____ _____
(Address)

_____ _____

ATTEST: _____
(Surety)

_____ _____
(Witness as to Surety) (Attorney in Fact)

_____ _____
(Address) (Address)

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

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the PROJECT is located.

SECTION 00620

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: that

_____
(Name of Contractor or Company)

_____
(Address)

a _____ hereinafter called Principal, and _____
(Corporation/Partnership)

_____ hereinafter called Surety, are held and firmly bound unto
(Name of Surety Company)

hereinafter called Surety, are held and firmly bound unto CITY OF MASON. TEXAS
(Name of recipient)

124 Moody Street, Mason, Texas 78656
(Recipient's Address)

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 assignees, 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:

City of Mason, Texas Water System Improvements – Phase 1

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 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 way affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or 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.

ATTEST: _____
(Principal)

_____ By: _____ (s)
(Principal Secretary)

(SEAL)

_____ _____
(Witness as to Principal) (Address)

_____ _____
(Address)

_____ _____

ATTEST: _____
(Surety)

_____ _____
(Witness as to Surety) (Attorney in Fact)

_____ _____
(Address) (Address)

NOTE: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the PROJECT is located.

SECTION 00700

GENERAL SPECIFICATIONS AND CONTRACT CONDITIONS -PART I

1. Contract and Contract Documents

    1.1. The project to be constructed pursuant to this contract is titled “City of Mason, Texas Water System Improvements – Phase 1”.

    1.2. The Plans, Specifications and Addenda shall form part of this contract and the provisions thereof shall be as binding upon the parties hereto as if they were herein fully set forth.

2. Definitions - Whenever used in any of the contract Documents, the following meanings shall be given to the terms herein defined:

    2.1. The term “Owner” shall mean the City of Mason Texas.

    2.2. The term "Contract" means the contract executed between the City of Mason, Texas, hereinafter called the Owner and the Contractor, of which these GENERAL CONDITIONS, form a part.

    2.3. The term "Project Area" means the area within which are the specified Contract limits of the improvements contemplated to be constructed in whole or in part under this contract.

    2.4. The term "Engineer" means Blackwell Environmental, LLC., Marble Falls, Texas, Engineer in charge, his successor, or any other person or persons, employed by BNC for purpose of directing or having in charge the work embraced in this Contract.

    2.5. The term "Contract Documents" means and shall include the following: Executed Contract, Addenda (if any), Invitation for Bids, Instructions to Bidders, Signed Copy of Bid, General Conditions, Attachments, Technical Specifications, and Drawings (as listed in the Schedule of Drawings).

3. Supervision by Contractor

    3.1. Except where the Contractor is an individual and gives his personal supervision to the work, the Contractor shall provide a competent superintendent, satisfactory to the Local Public Agency and the Engineer, on the work at all times during working hours with full authority to act for him. The Contractor shall also provide an adequate staff for the proper coordination and expediting of his work.

    3.2. The Contractor shall lay out his own work and he shall be responsible for all work executed by him under the Contract. He shall verify all figures and elevations before proceeding with the work and will be held responsible for any error resulting from his failure to do so.

4. Subcontracts

    4.1. The Contractor shall not execute an agreement with any subcontractor or permit any subcontractor to perform any work included in this contract until he has verified the subcontractor as eligible to participate in federally funded contracts.

    4.2. No proposed subcontractor shall be disapproved by the city except for cause.

4.3. The Contractor shall be as fully responsible to the city for the acts and omissions of his subcontractors, and of persons either directly or indirectly employed by them.

4.4. The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the work and required compliance by each subcontractor with the applicable provisions of the Contract.

4.5. Nothing contained in the Contract shall create any contractual relation between any subcontractor and the Owner.

5. Fitting and Coordination of Work

5.1. The Contractor shall be responsible for the proper fitting of all work and for the coordination of the operations of all trades, subcontractors, or materials suppliers engaged upon this Contract.

6. Payments to Contractor

6.1. Partial Payments

6.1.1. The Contractor shall prepare his requisition for partial payment as of the last day of the month and submit it, with the required number of copies, to the Engineer for his approval. The amount of the payment due the Contractor shall be determined by adding to the total value of work completed to date, the value of materials properly stored on the site and deducting (1) ten percent (10%) of the total amount, to be retained until final payment and (2) the amount of all previous payments. The total value of work completed to date shall be based on the estimated quantities of work completed and on the unit prices contained in the agreement. The value of materials properly stored on the site shall be based upon the estimated quantities of such materials and the invoice prices. Copies of all invoices shall be available for inspection of the Engineer.

6.1.2. Monthly or partial payments made by the Owner to the Contractor are moneys advanced for the purpose of assisting the Contractor to expedite the work of construction. The Contractor shall be responsible for the care and protection of all materials and work upon which payments have been made until final acceptance of such work and materials by the Owner. Such payments shall not constitute a waiver of the right of the Owner to require the fulfillment of all terms of the Contract and the delivery of all improvements embraced in this Contract complete and satisfactory to the Owner in all details.

6.2. Final Payment

6.2.1. After final inspection and acceptance by the Owner of all work under the Contract, the Contractor shall prepare his requisition for final payment which shall be based upon the careful inspection of each item of work at the applicable unit prices stipulated in the Agreement. The total amount of the final payment due the Contractor under this contract shall be the amount computed as described above less all previous payments.

6.2.2. The Owner before paying the final estimate, shall require the Contractor to furnish releases or receipts from all subcontractors having performed any work and all persons having supplied materials, equipment (installed on the Project) and services to the Contractor, if the Owner deems it necessary in order to protect its interest. The Owner may, if it deems such action advisable, make payment in part or in full to the Contractor without requiring the furnishing of such releases or receipts and any payments made shall in no way impair the

obligations of any surety or sureties furnished under this Contract.

6.2.3. Any amount due the Owner under Liquidated Damages, shall be deducted from the final payment due the Contractor.

6.3. Payments Subject to Submission of Certificates

6.3.1. Each payment to the Contractor by the Owner shall be made subject to submission by the Contractor of all written certifications required of him and his subcontractors.

6.4. Withholding Payments

6.4.1. The Owner may withhold from any payment due the Contractor whatever is deemed necessary to protect the Owner, and if so elects, may also withhold any amounts due from the Contractor to any subcontractors or material dealers, for work performed or material furnished by them.

6.4.2. The foregoing provisions shall be construed solely for the benefit of the Owner and will not require the Owner to determine or adjust any claims or disputes between the Contractor and his subcontractors or material dealers, or to withhold any moneys for their protection unless the Owner elects to do so. The failure or refusal of the Owner to withhold any moneys from the Contractor shall in no way impair the obligations of any surety or sureties under any bond or bonds furnished under this Contract.

7. Changes in the Work

7.1. The Owner may make changes in the scope of work required to be performed by the Contractor under the contract without relieving or releasing the Contractor from any of his obligations under the Contract or any guarantee given by him pursuant to the Contract provisions, and without affecting the validity of the guaranty bonds, and without relieving or releasing the surety or sureties of said bonds. All such work shall be executed under the terms of the original Contract unless it is expressly provided otherwise. Additionally, all such change orders must be approved by the TCDP staff prior to execution of same.

7.2. Except for the purpose of affording protection against any emergency endangering health, life, limb or property, the Contractor shall make no change in the materials used or in the specified manner of constructing and/or installing the improvements or supply additional labor, services or materials beyond that actually required for the execution of the Contract, unless in pursuance of a written order from the Owner authorizing the Contractor to proceed with the change. No claim for an adjustment of the Contract Price will be valid unless so ordered.

7.3. If applicable unit prices are contained in the Agreement, the Owner may order the Contractor to proceed with desired unit prices specified in the Contract, provided that in case of a unit price contract the net value of all changes does not increase the original total amount of the agreement by more than twenty-five percent (25%) or decrease the original total amount by eighteen percent (18%) for counties or twenty-five percent (25%) for cities.

7.4. Each change order shall include in its final form:

7.4.1. A detailed description of the change in the work.

7.4.2. The Contractor's proposal (if any) or a confirmed copy thereof.

7.4.3. A definite statement as to the resulting change in the contract price and/or time. T

7.4.4. he statement that all work involved in the change shall be performed in accordance with contract requirements except as modified by the change order.

7.4.5. The procedures as outlined in this section for a unit price contract also apply in any lump sum contract.

8. Claims for Extra Cost

8.1. If the Contractor claims that any instructions by Drawings or otherwise involve extra cost or extension of time, he shall, within ten days after the receipt of such instructions, and in any event before proceeding to execute the work, submit his protest thereto in writing to the Owner, stating clearly and in detail the basis of his objections. No such claim will be considered unless so made.

8.2. Claims for additional compensation for extra work, due to alleged errors in ground elevations, contour lines, or bench marks, will not be recognized unless accompanied by certified survey data, made prior to the time the original ground was disturbed, clearly showing that errors exist which resulted, or would result, in handling more material, or performing more work, than would be reasonably estimated from the Drawings and maps issued.

8.3. Any discrepancies which may be discovered between actual conditions and those represented by the Drawings and maps shall be reported at once to the Owner and work shall not proceed except at the Contractor's risk, until written instructions have been received by him from the Owner.

8.4. If, on the basis of the available evidence, the Owner determines that an adjustment of the Contract Price and/or time is justifiable, a change order shall be executed.

9. Termination, Delays, and Liquidated Damages

9.1. Right of the Owner to Terminate Contract.

9.1.1. In the event that any of the provisions of this contract are violated by the Contractor, or by any of his subcontractors, the Owner may serve written notice upon the Contractor and the Surety of its intention to terminate the contract. The notices shall contain the reasons for such intention to terminate the contract, and unless such violation or delay shall cease and satisfactory arrangement of correction be made within ten days, the contract shall, upon the expiration of said ten (10) days, cease and terminate. In the event of any such termination, the Owner shall immediately serve notice thereof upon the Surety and the Contractor. The Surety shall have the right to take over and perform the contract. Provided, however, that if the Surety does not commence performance thereof within ten (10) days from the date of the mailing to such Surety of notice of termination, the Owner may take over the work and complete the Project by bid/contract or by force account at the expense of the Contractor and his Surety shall be liable to the Owner for any excess cost incurred. In such event the Owner may take possession of and utilize in completing the work, such materials,

appliances, and plant as may be on the site of the work and necessary therefore.

9.1.2. Liquidated Damages for Delays

9.1.2.1. If the work is not completed within the time stipulated in the applicable bid for Lump Sum or Unit Price Contract provided, the Contractor shall pay to the Owner as fixed, agreed, and liquidated damages (it being impossible to determine the actual damages occasioned by the delay) the amount of $250.00 for each calendar day of delay, until the work is completed. The Contractor and his sureties shall be liable to the Owner for the amount thereof.

9.1.3. Excusable Delays

9.1.3.1. The right of the Contractor to proceed shall not be terminated nor shall the Contractor be charged with liquidated damages for any delays in the completion of the work due to:

9.1.3.1.1. Any acts of the Government, including controls or restrictions upon or requisitioning of materials, equipment, tools, or labor by reason of war, national defense, or any other national emergency;

9.1.3.1.2. Any acts of the Owner;

9.1.3.1.3. Causes not reasonably foreseeable by the parties to this Contract at the time of the execution of the Contract which are beyond the control and without the fault or negligence of the Contractor, including, but not restricted to, acts of God or of the public enemy, acts of another Contractor in the performance of some other contract with the Owner, fires, floods, epidemics, quarantine, restrictions, strikes, freight embargoes, and weather of unusual severity such as hurricanes, tornadoes, cyclones and other extreme conditions.

9.1.3.1.4. Provided, however, that the Contractor promptly notifies the Owner within ten (10) days in writing of the cause of the delay. Upon receipt of such notification, the Owner shall ascertain the facts and the cause and extent of delay. If, upon the basis of the facts and the terms of this contract, the delay is properly excusable, the Owner shall extend the time for completing the work for a period of time commensurate with the period of excusable delay.

10. Assignment or Novation

10.1. 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 may be 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.

11. Disputes

11.1. All disputes arising under this Contract or its interpretation except those disputes covered by FEDERAL LABOR STANDARDS PROVISIONS whether involving law or fact or both, or extra work, and all claims for alleged breach of contract shall, within ten (10) days of commencement of the dispute, be presented by the Contractor to the Owner for decision. Any claim not presented within the time limit specified in this paragraph shall be deemed to have been waived, except that if the claim is of a continuing character and notice of the claim is not given within ten (10) days of its commencement, the claim will be considered only for a period commencing ten (10) days prior to the receipt of the Owner.

11.2. The Contractor shall submit in detail his claim and his proof thereof.

11.3. If the Contractor does not agree with any decision of the Owner, he shall in no case allow the dispute to delay the work but shall notify the Owner promptly that he is proceeding with the work under protest.

12. Technical Specifications and Drawings

12.1. Anything mentioned in the Technical Specifications and not shown on the Drawings or vice versa, shall be of like effect as if shown on or mentioned in both. In case of difference between Drawings and Technical Specifications, the Technical Specifications shall govern. In case of any discrepancy in Drawings, or Technical Specifications, the matter shall be immediately submitted to the Owner, without whose decision, said discrepancy shall not be adjusted by the Contractor, save only at his own risk and expense.

13. Shop Drawings

13.1. All required shop drawings, machinery details, layout drawings, etc., shall be submitted to the Engineer in four (4) copies for approval sufficiently in advance of requirements to afford ample time for checking, including time for correcting, resubmitting and rechecking if necessary. The Contractor may proceed, only at his own risk, with manufacture or installation of any equipment or work covered by said shop drawings, etc., until they are approved and no claim, by the Contractor, for extension of the contract time shall be granted by reason of his failure in this respect.

13.2. Any drawings submitted without the Contractor's stamp of approval will not be considered and will be returned to him for proper resubmission. If any drawings show variations from the requirements of the Contract because of standard shop practice or other reason, the Contractor shall make specific mention of such variation in his letter of transmittal in order that, if acceptable, suitable action may be taken for proper adjustment of contract price and/or time, otherwise the Contractor will not be relieved of the responsibility for executing the work in accordance with the Contract even though the drawings have been approved.

13.3. If a shop drawing is in accordance with the contract or involves only a minor adjustment in the interest of the Owner not involving a change in contract price or time, the engineer may approve the drawing. The approval shall not relieve the Contractor from his responsibility for adherence to the contract or for any error in the drawing.

14. Requests for Supplementary Information

14.1. It shall be the responsibility of the Contractor to make timely requests of the Owner for any additional information not already in his possession which should be furnished by the Owner under the terms of this Contract, and which he will require in the planning and execution of the work. Such requests may be submitted from time to time as the need approaches, but each shall be filed in ample time to permit appropriate action to be taken by all parties involved so as to avoid delay. Each request shall be in writing, and list the various items and the latest date by which each will be required by the Contractor. The first list shall be submitted within two weeks after Contract award and shall be as complete as possible at that time. The Contractor shall, if requested, furnish promptly any assistance and information the Engineer may require in responding to these requests of the Contractor. The Contractor shall be fully responsible for any delay in his work or to others arising from his failure to comply fully with the provision of this section.

15. Materials and Workmanship

15.1. Unless otherwise specifically provided for in the technical specifications, all workmanship, equipment, materials and articles incorporated in the work shall be new and the best grade of the respective kinds for the purpose. Where equipment, materials, articles or workmanship are referred to in the technical specifications as "equal to" any particular standard, the Engineer shall decide the question of equality.

15.2. The Contractor shall furnish to the Owner for approval the manufacturer's detailed specifications for all machinery, mechanical and other special equipment, which he contemplates installing together with full information as to type, performance characteristics and all other pertinent information as required, and shall likewise submit for approval full information concerning all other materials or articles which he proposes to incorporate.

15.3. Machinery, mechanical and other equipment, materials or articles installed or used without such prior approval shall be at the risk of subsequent rejection.

15.4. Materials specified by reference to the number or symbol of a specific standard, shall comply with requirements in the latest revision thereof and any amendment or supplement thereto in effect on the date of the Invitation for Bids, except as limited to type, class or grade, or modified in the technical specifications shall have full force and effect as though printed therein.

15.5. The Owner may require the Contractor to dismiss from the work such employee or employees as the Owner or the Engineer may deem incompetent, or careless, or insubordinate.

16. Samples, Certificates and Tests

16.1. The Contractor shall submit all material or equipment samples, certificates, affidavits, etc., as called for in the contract documents or required by the Engineer, promptly after award of the contract and acceptance of the Contractor's bond. No such material or equipment shall be manufactured or delivered to the site, except at the Contractor's own risk, until the required samples or certificates have been approved in writing by the Engineer. Any delay in the work caused by late or improper submission of samples or certificates for approval shall not be considered just cause for an extension of the contract time. The Contractors shall comply with all reasonable instructions of the Owner and all existing state and local regulations regarding signs, advertising, traffic, fires, explosives, danger signals, and barricades.

16.2. Each sample submitted by the Contractor shall carry a label giving the name of the Contractor, the Project for which it is intended, and the name of the producer. The accompanying certificate or letter from the Contractor shall state that the sample complies with contract requirements, shall give the name and brand of the product, its place of origin, the name and address of the producer and all specifications or other detailed information which will assist the Engineer in making a prompt decision regarding the acceptability of the sample. It shall also include the statement that all materials or equipment furnished for use in the Project will comply with the samples and/or certified statements.

16.3. Approval of any materials shall be general only and shall not constitute a waiver of the Owner's right to demand full compliance with Contract requirements. After actual deliveries, the Engineer will have such check tests made as he deems necessary in each instance and may reject materials and equipment and accessories for cause, even though such materials and articles have been given general approval. If materials, equipment or accessories which fail to meet check tests have been incorporated in the work, the Engineer will have the right to cause their removal and replacement by proper materials or demand and secure such reparation by the Contractor as is equitable.

16.4. Except as otherwise specifically stated in the Contract, the costs of sampling and testing will be divided as follows:

16.4.1. The Contractor shall furnish without extra cost, including packing and delivery charges, all samples required for testing purposes, except those samples taken on the Project by the Engineer;

16.4.2. The Contractor shall assume all costs of re-testing materials which fail to meet contract requirements;

16.4.3. The Contractor shall assume all costs of testing materials offered in substitution for those found deficient;

16.4.4. The Owner will pay all other expenses.

17. Permits and Codes

17.1. The Contractor shall give all notices required by and comply with all applicable laws, ordinances, and codes of the Local Government. All construction work and/or utility installations shall comply with all applicable ordinances, and codes including all written waivers. Before installing any work, the Contractor shall examine the drawings and technical specifications for compliance with applicable ordinances and codes and shall immediately report any discrepancy to the Owner. Where the requirements of the drawings and technical specifications fail to comply with such applicable ordinances or codes, the Owner will adjust the Contract by Change Order to conform to such ordinances or codes (unless waivers in writing covering the difference have been granted by the governing body or department) and make appropriate adjustment in the Contract Price or stipulated unit prices.

17.2. Should the Contractor fail to observe the foregoing provisions and proceed with the construction and/or install any utility at variance with any applicable ordinance or code, including any written waivers (notwithstanding the fact that such installation is in compliance with the drawings and technical specifications), the Contractor shall remove such work without cost to the Owner.

17.3. The Contractor shall at his own expense, secure and pay for all permits for street pavement, sidewalks, shed, removal of abandoned water taps, sealing of house connection drains, pavement cuts, buildings, electrical, plumbing, water, gas and sewer permits required by the local regulatory body or any of its agencies.

17.4. The Contractor shall comply with applicable local laws and ordinances governing the disposal of surplus excavation, materials, debris and rubbish on or off the Project area and commit no trespass on any public or private property in any operation due to or connected with the improvements contained in this Contract.

17.5. The Contractor will be required to make arrangements for and pay the water, electrical power. or any other utilities required during construction.

17.6. During construction of this Project, the Contractor shall use every means possible to control the amount of dust created by construction. Prior to the close of a day's work, the Contractor, if directed by the Owner, shall moisten the bank and surrounding area to prevent a dusty condition.

18. Care of Work

18.1. The Contractor shall be responsible for all damages to person or property that occur as a result of his fault or negligence in connection with the prosecution of the work and shall be responsible for the proper care and protection of all materials delivered and work performed until completion and final acceptance.

18.2. The Contractor shall provide sufficient competent watchmen, both day and night, including Saturdays, Sundays, and holidays, from the time the work is commenced until final completion and acceptance.

18.3. In an emergency affecting the safety of life, limb or property, including adjoining property, the Contractor, without special instructions or authorization from the Owner, is authorized to act at his discretion to prevent such threatened loss or injury, and he shall so act. He shall likewise act if instructed to do so by the Owner.

18.4. The Contractor shall avoid damage as a result of his operations to existing sidewalks, streets, curbs, pavements, utilities (except those which are to be replaced or removed), adjoining property, etc., and he shall at his own expense completely repair any damage thereto caused by his operations.

18.5. The Contractor shall shore up, brace, underpin, secure, and protect as may be necessary, all foundations and other parts of existing structures adjacent to, adjoining, and in the vicinity of the site, which may be in any way affected by the excavations or other operations connected with the construction of the improvements included in this Contract. The Contractor shall be responsible for the giving of any and all required notices to any adjoining or adjacent property Owner or other party before the commencement of any work. The Contractor shall indemnify and save harmless the Owner from any damages on account of settlement or the loss of lateral support of adjoining property and from all loss or expense and all damages for which the Owner may become liable in consequence of such injury or damage to adjoining and adjacent structures and their premises.

19. Accident Prevention

19.1. No laborer or mechanic employed in the performance of this Contract shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his health or safety as determined under construction safety and health standards promulgated by the Secretary of Labor.

19.2. b) The Contractor shall exercise proper precaution at all times for the protection of persons and shall be responsible for all damages to persons or property, either on or off the site, which occur as a result of his prosecution of the work.

19.3. c) The Contractor shall maintain an accurate record of all cases of death, occupational disease, or injury requiring medical attention or causing loss of time from work, arising out of and in the course of employment on work under the Contract. The Contractor shall promptly furnish the Owner with reports concerning these matters.

19.4. d) The Contractor shall indemnify and save harmless the Owner from any claims for damages resulting from property damage, personal injury and/or death suffered or alleged to have been suffered by any person as a result of any work conducted under this contract.

19.5. e) The Contractor shall provide trench safety for all excavations more than five feet deep prior to excavation. House Bill 1569 concerning trench safety legislation are made a part of these contract documents for Contractor's reference. All OSHA Standards for trench safety must be adhered to by the Contractor.

19.6. ***f)*** The Contractor shall at all times conduct his work in such a manner as to ensure the least possible inconvenience to vehicular and pedestrian traffic. At the close of the work each day, all streets where possible in the opinion of the city shall be opened to the public in order that persons living in the area may have access to their homes or businesses by the use of the streets. Barricades, warning signs, and necessary lighting shall be provided to the satisfaction of the Owner at the expense of the Contractor.

20. Sanitary Facilities

20.1. The Contractor shall furnish, install and maintain ample sanitary facilities for the workmen. 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.

21. Use of Premises

21.1. The Contractor shall confine his equipment, storage of materials, and construction operations to the contract limits as shown on the drawings and as prescribed by ordinances or permits, or as may be desired by the Owner, and shall not unreasonably encumber the site or public rights of way with his materials and construction equipment.

22. Removal of Debris, Cleaning, Etc.

22.1. The Contractor shall periodically or as directed during the progress of the work, remove and legally dispose of all surplus excavated material and debris, and keep the Project Area and public rights of way reasonable clear. Upon completion of the work, he shall remove all

temporary construction facilities, debris and unused materials provided for work, and put the whole site of the work and public rights of way in a neat and clean condition.

23. Inspection

23.1. All materials and workmanship shall be subject to inspection, examination, or test by the Owner and Engineer at any and all times during manufacture or construction and at any and all places where such manufacture or construction occurs. The Owner shall have the right to reject defective material and workmanship or require its correction. Unacceptable workmanship shall be satisfactorily corrected. Rejected material shall be promptly segregated and removed from the Project Area and replaced with material of specified quality without charge. If the Contractor fails to proceed at once with the correction of rejected workmanship or defective material, the Owner may by contract or otherwise have the defects remedied or rejected materials removed from the Project Area and charge the cost of the same against any monies which may be due the Contractor, without prejudice to any other rights or remedies of the Owner.

23.2. The Contractor shall furnish promptly all materials reasonably necessary for any tests which may be required. All tests by the Owner will be performed in such manner as not to delay the work unnecessarily and will be made in accordance with the provisions of the technical specifications.

23.3. The Contractor shall notify the Owner sufficiently in advance of back filling or concealing any facilities to permit proper inspection. If any facilities are concealed without approval or consent of the Owner, the Contractor shall uncover for inspection and recover such facilities at his own expense, when so requested by the Owner.

23.4. Should it be considered necessary or advisable by the Owner at any time before final acceptance of the entire work to make an examination of work already completed by uncovering the same, the Contractor shall on request promptly furnish all necessary facilities, labor, and material. If such work is found to be defective in any important or essential respect, due to the fault of the Contractor or his subcontractors, the Contractor shall defray all the expenses of such examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the Contract, the actual cost of labor and material necessarily involved in the examination and replacement shall be allowed the Contractor and he shall, in addition, if completion of the work of the entire Contract has been delayed thereby, be granted a suitable extension of time on account of the additional work involved.

23.5. Inspection of materials and appurtenances to be incorporated in the improvements included in this Contract may be made at the place of production, manufacture or shipment, whenever the quantity justifies it, and such inspection and acceptance, unless otherwise stated in the technical specifications, shall be final, except as regards (1) latent defects, (2) departures from specific requirements of the Contract, (3) damage or loss in transit, or (4) fraud or such gross mistakes as amount to fraud. Subject to the requirements contained in the preceding sentence, the inspection of materials as a whole or in part will be made at the Project Site.

23.6. Neither inspection, testing, approval nor acceptance of the work in whole or in part, by the Owner or its agents shall relieve the Contractor or his sureties of full responsibility for materials furnished or work performed not in strict accordance with the Contract.

24. Review by Owner

24.1. The Owner and its authorized representatives and agents shall have access to and be permitted to observe and review all work, materials, equipment, payrolls, personnel records, employment conditions, material invoices, and other relevant data and records pertaining to this Contract, provided, however that all instructions and approval with respect to the work will be given to the Contractor only by the Owner through its authorized representatives or agents.

25. Final Inspection

25.1. When the Improvements included in this Contract are substantially completed, the Contractor shall notify the Owner in writing that the work will be ready for final inspection on a definite date which shall be stated in the notice. The Owner will make the arrangements necessary to have final inspection commenced on the date stated in the notice, or as soon thereafter as is practicable.

26. Deduction for Uncorrected Work

26.1. If the Owner deems it not expedient to require the Contractor to correct work not done in accordance with the Contract Documents, an equitable deduction from the Contract Price will be made by agreement between the Contractor and the Owner and subject to settlement, in case of dispute, as herein provided.

27. Insurance

27.1. 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.

27.2. Compensation Insurance:

27.2.1. The Contractor shall procure and shall maintain during the life of this contract Worker's Compensation Insurance as required by the State of Texas for all of his employees to be engaged in work at the site of the Project under this contract and, in case of any such work sublet, the Contractor shall require the subcontractor similarly to provide Worker's Compensation Insurance for all of the employees to be engaged in such work unless such employees are covered by the protection afforded by the Contractor's Worker's Compensation Insurance.

27.2.2. Contractor's Public Liability and Property Damage Insurance and Vehicle Liability Insurance: The Contractor shall procure and maintain during the life of this contract Contractor's Public Liability Insurance, Contractor's Property Damage Insurance and Vehicle Liability Insurance all in the amount of $1,000,000.

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

28. Warranty of Title

28.1. No material, supplies, or equipment to be installed or furnished under this contract shall be purchased subject to any chattel mortgage or under a conditional sale, lease-purchase or other agreement by which an interest is retained by the seller or supplier. The Contractor shall warrant good title to all materials, supplies, and equipment installed or incorporated in the work and upon completion of all work, shall deliver the same together with all improvements and appurtenances constructed or placed by him to the Owner free from any claims, liens, or charges. Neither the Contractor nor any person, firm, or corporation furnishing any material or labor for any work covered by this Contract shall have any right to a lien upon any improvement or appurtenance. Nothing contained in this paragraph, however, shall defeat or impair the right of persons furnishing materials or labor to recover under any law permitting such persons to look to funds due the Contractor in the hands of the Owner. The provisions of this paragraph shall be inserted in all subcontracts and material contracts and notice of its provisions shall be given to all persons furnishing materials for the work when no formal contract is entered into for such materials.

29. Warranty of Workmanship and Materials

29.1. Neither the final certificate of payment nor any provision in the Contract nor partial or entire use of the improvements included in this Contract by the Owner or the public shall constitute an acceptance of work not done in accordance with the Contract or relieve the Contractor of liability in respect to any express warranties or responsibility for faulty materials or workmanship. The Contractor shall promptly remedy any defects in the work and pay for any damage to other work resulting there from which shall appear within a period of twelve (12) months from the date of final acceptance of the work.

30. Compliance with Air and Water Acts

30.1. In compliance with the Clean Air Act, as amended, 41 U.S.C. Sec. 7401 et. seq., and the regulations of the Environmental Protection Agency with respect thereto, the Contractor agrees that:

30.1.1. Any facility to be utilized in the performance of this contract or any subcontract shall not be a facility listed on the EPA List of Violating Facilities pursuant to 40 CFR 15.20.

30.1.2. He will comply with all requirements of Section 114 of the Clean Air Act, as amended

30.1.3. Materials utilized in the Project shall be free of any hazardous materials, except as may be specifically provided for in the specifications.

30.2. If the Contractor encounters existing material on sites owned or controlled by the city or in material sources that are suspected by visual observation or smell to contain hazardous materials, the Contractor shall immediately notify the Engineer and the Owner. The Owner will be responsible for testing for the removal or disposition of hazardous materials on sites owned or controlled by the Owner. The Owner may suspend the work, wholly or in part during the testing, removal or disposition of hazardous materials on sites owned or controlled by the Owner.

31. Equal Employment Opportunity

31.1. The Contractor will not discriminate against any employee or the applicant for employment because of race, color, religion, sex, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to the following: employment, promotion, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Owner.

31.2. b) The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or nation origin.

31.3. c) The Contractor will cause the foregoing provisions to be inserted in all subcontracts for any work covered by this contract so that such provisions will be binding upon each subcontractor, provided that the foregoing provisions shall not apply to contracts or subcontracts for standard commercial supplies or raw materials.

31.4. The goals and timetables for minority and female participation, are as follows:

31.4.1. Goals For Minority Participation is 11.0%

31.4.2. Goals for Female Participation is 6.9%

31.5. These goals are applicable to all the Contractor's construction work (whether or not it is federal or federally assisted) performed in the covered area.

31.6. The Contractor shall take affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions.

31.7. Contractors are encouraged to participate in voluntary associations which assist in fulfilling their affirmative action obligations

31.8. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority.

31.9. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

31.10. The Contractor shall not enter into any subcontract with any person or firm debarred from government contracts.

31.11. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents.

32. Affirmative Action for Handicapped Workers

32.1. The Contractor will not discriminate against any employee or applicant for employment because of physical or mental handicap in regard to any position for which the employee or applicant for employment is qualified. The Contractor agrees to take affirmative action to employ, advance in employment and otherwise treat qualified handicapped individuals without discrimination based upon their physical or mental handicap in all employment practices such as the following: employment, promotion, demotion or transfer, recruitment, advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship.

33. Section 109 of the Housing and Community Development Act of 1974

33.1. No person in the United States shall on the grounds of race, color, national origin, or sex be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity funded in whole or in part with funds made available under this title.

34. The Provision of Local Training;, Employment. and Business Opportunities

34.1. To the greatest extent feasible, opportunities for training and employment will be given to lower income residents of the Project Area and contracts for work in connection with the Project will be awarded to business concerns which are located in, or owned in substantial part by persons residing in the area of the Project.

34.2. The Contractor will include this clause in every subcontract for work in connection with the Project.

35. Non-Segregated Facilities

35.1. The Contractor certifies that he does not and will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not and will not permit his employees any segregated facilities at any of his establishments, or permit his employees to perform their services at any location, under his control, where segregated facilities are maintained.

35.2. As used in this paragraph the term, "segregated facilities" means any waiting rooms, work areas, rest rooms and washrooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, creed, color, or national origin, because of habit, local custom, or otherwise.

36. Job Offices

36.1. The Contractor and his subcontractors may maintain such office and storage facilities on the site as are necessary for the proper conduct of the work. These shall be located so as to cause no interference to any work to be performed on the site. The Owner shall be consulted with regard to locations.

36.2. Upon completion of the improvements, or as directed by the Owner, the Contractors shall remove all such temporary structures and facilities from the site, and leave the site of the work in the conditions required by the Contract.

37. Partial Use of Site Improvements

37.1. The Owner may give notice to the Contractor and place in use those sections of the improvements which have been completed, inspected and can be accepted as complying with the technical specifications and if in its opinion, each such section is reasonably safe, fit, and convenient for the use and accommodation for which it was intended, provided:

37.1.1. The use of such sections of the improvements shall in no way impede the completion of the remainder of the work by the Contractor.

37.1.2. The Contractor shall not be responsible for any damages or maintenance costs due directly to the use of such sections.

37.1.3. The period of guarantee stipulated in the Section 529 hereof shall not begin to run until the date of the final acceptance of all work which the Contractor is required to construct under this Contract.

38. Contract Documents and Drawings

38.1. The Local Public Agency will furnish the Contractor without charge two copies of the Contract Documents, including Technical Specifications and Drawings. Additional copies requested by the Contractor will be furnished at cost.

39. Contract Period

39.1. The work to be performed under this contract shall commence within the time stipulated by the 'Owner in the Notice to Proceed, and shall be fully completed within the time period specified in the bid.

40. Liquidated Damages

40.1. Since the actual damages for any delay in completion of the work under this contract are impossible to determine, the Contractor and his Sureties shall be liable for and shall pay to the Owner the sum of two hundred fifty dollars ($250.00) as fixed, agreed and liquidated damages for each calendar day of delay from the above stipulated time for completion.

41. Collusive Agreements

41.1. Each bidder shall execute and attach the affidavit contained herein to the effect that he has not entered into a collusive agreement with any other person, firm, or corporation in regard to any bid submitted.

42. Contractor Certifications

42.1. Each bidder shall submit on the form furnished for that purpose Contractor Certifications.

43. Section 3 Plan

43.1. Each bidder shall submit a Section 3 Plan as a part of the bid proceedings. A form is furnished for this purpose.

44. Other Contracts

44.1. The Local Public Agency may award, or may have awarded other contracts for additional work, and the Contractor shall cooperate fully with such other Contractors, by scheduling his own work with that to be performed under other Contracts as may be directed by the Local Public Agency. The Contractor shall not commit or permit any act which will interfere with the performance of work by any other Contractor as scheduled.

45. Mutual Responsibility of Contractors

45.1. If, through acts of neglect on the part of the Contractor, any other Contractor or any subcontractor shall suffer loss or damage on their work, the Contractor shall settle with such other contractor or subcontractor by agreement or arbitration, if such other contractor or subcontractor will so settle. If such other Contractor or subcontractor shall assert any claim against the Local Public Agency on account of any damage alleged to have been so sustained, the Local Public Agency will notify this Contractor, who shall defend at his own expense any suit based upon such claim, and, if any judgment or claims against the Local Public Agency shall be allowed, the Contractor shall pay or satisfy such judgment or claim and pay all costs and expenses in connection therewith.

46. Progress Schedule

46.1. The Contractor shall submit for approval immediately after execution of the agreement, a carefully prepared progress schedule, showing the proposed dates of starting and completing each of the various sections of the work, the anticipated monthly payments to become due the Contractor, and the accumulated percent of progress each month.

47. Patents

47.1. The Contractor shall hold and save the Local Public Agency, its officers, and employees, harmless from liability of any nature or kind, including costs and expenses, for, or on account of, any patented or unpatented invention, process, article, or appliance manufactured or used in the performance of the contract, specifically stipulated in the Technical Specifications.

48. Interest of Certain Federal and Other Officials

48.1. No member of or delegate to the Congress of the United States and no Resident Commissioner shall be admitted to any share or part of this Contract or to any benefit to arise from same; provided, that the foregoing provision of this section shall not be construed to extend to this Contract if made with a corporation for its general benefit.

48.2. No member, officer, or employee of the Grantee, or its designees or agents, no member of the governing body of the Owner in which the Project is located, and no other public official of such Owner or Localities who exercises any functions or responsibilities in connection with the Project during his tenure or for one year thereafter, shall have any interest, direct or indirect, in any Contract or Subcontract, or the proceeds thereof, for work to be performed under this Contract.

48.3. The Contractor will include the provisions of paragraphs (1) and (2) in every subcontract so that such provisions will be binding upon each subcontractor.

49. Engineers Authority and Responsibility

49.1. Unless otherwise specified, the Engineer will serve as the agent of the Owner on all matters pertaining to the inspection of the work and verification of its progress, and shall provide advice and direction to the Owner on technical matters pertaining to the project. The Engineer shall determine all technical questions in relation to the work and the construction thereof, and shall decide questions which may arise relative to the execution of the Contract by the Contractor. The Engineer will not be in any way responsible for the construction means, methods, techniques, procedures, quality, safety precautions or lack thereof, or other details of the construction process as carried out by the Contractor, and will not be responsible or liable for any acts, errors, omissions, or negligence of the contractor, his agents, or employees.

50. Fair Trade Practices

50.1. Restrictions on Public Buildings and Public Works Projects

50.1.1. Definitions. "Component" as used in this clause means those articles, materials, and supplies incorporated directly into the product. "Contractor or subcontractor of a foreign country," as used in this clause means any Contractor or subcontractor that is a citizen or national of a foreign country or is controlled directly or indirectly by citizens or nationals of a foreign county. A Contractor or subcontractor shall be considered a citizen or national of a foreign country or controlled directly or indirectly by citizens or nationals of a foreign country –

50.1.1.1. If fifty percent (50%) or more of the Contractor or subcontractor is owned by a citizen or national of the foreign country;

50.1.1.2. If the title to fifty percent (50%) or more of the stock of the Contractor or subcontractor is held subject to trust or fiduciary obligation in favor of citizens or nationals of the foreign country;

50.1.1.3. If fifty percent (50%) or more of the voting power in the Contractor or subcontractor is vested in or exercisable on behalf of a citizen or national of the foreign country;

50.1.1.4. In the case of a partnership, if any general partner is a citizen of the foreign country;

50.1.1.5. In the case of a corporation, if its president or other chief executive officer or the chairman of the board of directors is a citizen of the foreign country or the majority of any number of its directors necessary to constitute a quorum are citizens of the foreign country or the corporation is organized under the laws of the foreign country or any subdivisions, territory, or possession thereof; or

50.1.1.6. In the case of a Contractor or subcontractor who is a joint venture, if any participant firm is a citizen or national of a foreign country or meets any of the criteria in subparagraphs above.

50.2. Restrictions.

50.2.1. The Contractor shall not (1) knowingly enter into any subcontract under this Contract with a subcontractor of a foreign country included on the list of countries that discriminate against U.S. firms published by the United States Trade Representative, or (2) supply any product under this contract of a foreign country included on the list of foreign countries that discriminate against the U.S. firms published by the USTR.

50.3. USTR list. The USTR published an initial list in the Federal Register on December 30, 1987 (53

FR 49244), which identified one country -Japan. The USTR can add other countries to the list or remove countries from it in accordance with Section 109(c) of Pub. L. 100-202.

50.4. Certification. The Contractor may rely upon the certification of a prospective subcontractor that is not a subcontractor of a foreign country included on the list of countries that discriminate against U.S. firms published by the USTR and that products supplied by such subcontractor for use on the federal public works project under this contract are not products of a foreign country included on the list of foreign countries that discriminate against U.S. firms published by the USTR unless such Contractor has knowledge that the certification is erroneous.

50.5. Subcontracts. The Contractor shall incorporate this clause modified only for the purpose of properly identifying the parties in all subcontracts. This paragraph (e) shall also be incorporated in all subcontracts.

51. Communications

51.1. All notices, demands, requests, instructions, approvals, proposals and claims must be in writing.

51.2. Any notice to or demand upon the Contractor shall be sufficiently given if delivered to the address stated on the signature page of the Agreement (or at such other office as the Contractor may from time to time designate in writing to the Local Public Agency), or if deposited in the United States mail in a sealed, postage-prepaid envelope, or delivered with charges prepaid to any telegraph company for transmission, in each case addressed to such office.

51.3. All papers required to be delivered to the Local Public Agency shall, unless otherwise specified in writing to the Contractor, be delivered to the Owner and any notice to or demand upon the Local Public Agency shall be sufficiently given if so delivered, or if deposited in the United States mail in a sealed, postage-prepaid envelope, or delivered with charges prepaid to any telegraph company for transmission to said Local Public Agency at such address, or to such other representatives of the Local Public Agency or to such other address as the Local Public Agency may subsequently specify in writing to the contractor for such purpose.

51.4. Any such notice shall be deemed to have been given as of the time of actual delivery or (in the case of mailing) when the same should have been received in due course of post, or (in the case of telegrams) at the time of actual receipt, as the case may be.

51.5. This section does not apply to decisions given pursuant to section 5 1 1(b) of this contract

52. Work by Others

52.1. Work by others should be completed as specified in the Technical Specifications and Plans. Contractor is cautioned that subcontractors will not be acceptable unless approved in writing by the Engineer and the Texas Department of Housing and Community Affairs.

53. Alternate Bid Items - As shown in bid proposal.

54. Access and Passage

54.1. The Contractor shall ensure that homeowners whose property lies along the streets being excavated are not blocked from access to their property for excessive periods of time, and shall take such steps as are necessary to expedite work in these areas, provide temporary means for

passage to and from the property, or otherwise avoid prolonged interference with such access and passage.

55. Scheduling of Work

55.1. The Contractor shall furnish a schedule of work to the Owner, and the Panhandle Regional Planning Commission. The schedule shall be revised as needed to reflect actual progress on the project.

SECTION 00800

SUPPLEMENTARY GENERAL CONDITIONS

The Supplementary General Conditions amend or supplement the General Contract Conditions of the Contract Documents and other provisions of the Contract Documents as indicated below. All provisions which are not so amended or supplemented remain in full force and effect.

1. DEFINITIONS.

    1.1. The term "Locality" and "Owner" in the Contract Documents both represent the CITY OF MASON, TEXAS.

    1.2. The term "Hazardous Waste" shall have the meaning provide in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

2. SHOP DRAWINGS. Add the following paragraphs:

    2.1. ENGINEER will review and approve Shop Drawings and Samples in accordance with the schedule of Shop Drawings and Sample submittals accepted by ENGINEER as required. ENGINEER's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. ENGINEER's review and approval will not extend to means, methods, techniques, sequences or procedures of construction (except where a particular means, method, technique, sequence or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and 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.

    2.2. ENGINEER'S review and approval of Shop Drawings or Samples shall not relive 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. ENGINEER has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample approval; nor will any approval by ENGINEER relieve CONTRACTOR from responsibility for complying with the requirements of this paragraph.

    2.3. Where a Shop Drawing or Sample is required by the Contract Documents or the schedule of Shop Drawings and Sample submissions accepted by ENGINEER as required any related Work performed prior to ENGINEER'S review and approval of the pertinent submittal will be at the sole expense and responsibility of CONTRACTOR.

    2.4. One initial submittal and one resubmittal will be reviewed by the ENGINEER at no cost to the CONTRACTOR. Subsequent reviews for resubmittals will be reviewed at a cost to the CONTRACTOR of $75.00 per hour.

3. PERMITS AND CODES. Add the following subparagraphs.

   3.1. Permits required by and obtainable through the OWNER must be acquired by the CONTRACTOR, however, fees for such permits are waived for this project.

   3.2. The Contractor is required to submit all forms specified in these Contract Documents including the Certification of Bidders of Compliance to Texas State Law.

4. USE OF PREMISES. Add the following subparagraphs:

   4.1. The project is located on land owned by the City of MASON, Texas.

   4.2. Contractor is responsible to locate and secure a project material storage location either in conjunction with the Owner or from a private property owner.

   4.3. The Contractor shall use the minimum area practicable for construction of the facilities, regardless of the type of lands, and shall be governed by the specific requirements for each type of lands. All access to the Owner's property shall be along routes designated.

5. REMOVAL OF DEBRIS, CLEANING, ETC.

6. INSURANCE. Add the following paragraphs:

   6.1. CONTRACTOR shall purchase and maintain until final payment property insurance upon the Work at the site to the full insurable value thereof (subject to such deductible amounts as may be provided in these Supplementary General Conditions or required by Laws and Regulations). This insurance shall include the interests of OWNER, CONTRACTOR, Subcontractor, ENGINEER and Engineer's consultants in the Work (all of whom shall be listed as insured’s or additional insured parties), shall insure against the perils of fire and extended coverage, 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 these Supplementary general 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 these Supplementary General Conditions, CONTRACTOR shall purchase and maintain similar property insurance on portions of the Work stored on and off the site or in transit when such portions of the Work are to be included in an application for Payment. The policies of insurance required to be purchased and maintained by CONTRACTOR in accordance with this paragraph shall comply with the requirements of the following paragraph.

   6.2. All the policies of insurance (or the certificates or other evidence thereof) required to be purchased and maintained by CONTRACTOR in accordance with above paragraph will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least thirty (30) days prior written notice has been given to OWNER by certified mail and will contain the following waiver provisions.

   6.3. OWNER waives all rights against CONTRACTOR, Subcontractors, ENGINEER, ENGINEER'S Consultants and the officers, directors, employees and gents of any of them, for:

      6.3.1. loss due to business interruption, loss of use or other consequential loss extending

beyond direct physical loss or damage to OWNER'S property or the Work caused by, arising out of or resulting from fire or other peril, whether or not insured by OWNER; and

6.3.2. loss or damage to completed Project or part thereof caused by, arising out of or resulting from fire or other insured peril covered by any property insurance maintained on the completed Project or part thereof by OWNER during partial utilization and after substantial completion and after final payment.

6.4. Any insurance policy maintained by OWNER covering any loss, damage or consequential loss referred to in this paragraph shall contain provisions to the effect that in the event of payment of any such loss, damage or consequential loss the insurers will have no rights of recovery against any of CONTRACTOR, Subcontractors, ENGINEER, ENGINEER'S Consultants and other officers, directors, employees and agents of any of them.

6.5. 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 General Contract Condition and Supplementary General Conditions on the basis of its not complying with the Contract Documents, Owner shall notify CONTRACTOR in writing thereof within fifteen (15) days of the date of delivery of such certificate to OWNER. Failure by OWNER to give any such notice of objection within the time provided shall constitute acceptance of such insurance purchased as complying with the Contract Documents.

7. CONTRACT DOCUMENTS AND DRAWINGS. Add the following paragraph:

7.1. This shall include all plans and specifications furnished to material suppliers and subcontractors but does not include the executed contract copies. Plans and specifications for use during construction will be furnished directly only to the Contractor. The Contractor shall then distribute copies of plans and specifications to suppliers, subcontractors, or others, as required for proper execution of the work. Should additional sets of documents be desired, they may be purchased by the Contractor only, at the following prices:

7.1.1. Plans and Specifications: $50.00 per volume

8. PROJECT SIGNS.

8.1. Contractor will furnish and install project sign.

8.2. Public buildings, facilities and centers constructed with Office of Rural Community Affairs (ORCA) Community Development Block Grant (CDBG) assistance shall have permanent signage placed in a prominent visible public area that recognizes the financial assistance provided by the Office of Rural Community Affairs and the U.S. Department of Housing and Urban Development Community Development Block Grant Program. The formatting of such signage will be at local discretion to best fit the architectural design of the facility constructed.

8.3. Other construction projects, e.g. water transmission lines, sewer collection lines, drainage, roadways, housing rehabilitation, etc. utilizing ORCA CDBG funding shall have temporary signage that recognizes the financial assistance provided by the office of Rural Community Affairs and the U.S. Department of Housing and Urban Development Community Development Block Grant Program erected in a prominent location at the construction project site or along a major thoroughfare within the locality as directed by the Owner.

9. BEFORE STARTING CONSTRUCTION.

9.1. A preliminary list of proposed Subcontractors with a brief description of the portions of the Work to be performed by each.

9.2. A preliminary schedule of Materials and Equipment Suppliers and delivery dates for major equipment.

9.3. Before any work at the site is started, CONTRACTOR shall deliver to OWNER, with a copy to ENGINEER, certificates of insurance which CONTRACTOR is required to purchase and maintain in accordance with General Contract Conditions.

10. SUBSURFACE CONDITIONS.

10.1. No reports of explorations and test of subsurface conditions at or contiguous to the site have been utilized.

11. PERFORMANCE, PAYMENT AND OTHER BONDS.

11.1. Sureties shall also be listed on the current Department of the Treasury Federal Register of companies holding certificates of authority as acceptable sureties. The bond shall not exceed the underwriting limitation established by the Department of Treasury Federal Register. The surety company shall also be satisfactory to the Owner and authorized to do business in the State of Texas.

12. CONTRACTOR'S LIABILITY INSURANCE.

12.1. The limits of liability for the insurance required by the General Contract Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

12.2. Workers' Compensation, etc. under paragraphs 126.a. of the General Contract Conditions:

(1) State: Statutory

(2) Applicable Federal (e.g. Longshoreman's): Statutory

(3) Employer's Liability:

Each accident	$ 100,000
Each employee disease	$ 100,000
Per Policy disease	$ 500,000

12.3. Comprehensive or Commercial General Liability - Bodily Injury and Property Damage Combined Single Liability Insurance Including:

12.3.1. Completed Operations, Products, Personal Injury, Contractual and, where applicable, Explosion, Collapse and Underground Coverages:

Bodily Injury: $500,000 Each Occurrence

$500,000 Annual Aggregate

Property Damage: (including explosion, collapse and underground coverage)

$500,000 Each Occurrence

$500,000 Annual Aggregate

Personal Injury: (employment exclusion deleted):

$ 500,000 Annual Aggregate

12.3.2. Comprehensive (Business) Automobile Liability under paragraph 126.b. of the General Contract Conditions:

Bodily Injury: $ 100.000 Each Person

$ 500,000 Each Occurrence

Property Damage: $ 100,000 Each Occurrence

13. REQUIRED WORKERS' COMPENSATION COVERAGE

13.1. The law requires that each person working on this site or providing services related to this construction project must be covered by workers' compensation insurance. This includes persons providing, hauling, or delivering equipment or materials, or providing labor or transportation or other service related to the project, regardless of the identity of their employer or status as an employee.

13.2. Call the Texas Workers' Compensation Commission at 512-440-3789 to receive information on the legal requirement for coverage, to verify whether your employer has provided the required coverage, or to report an employer's failure to provide coverage.

14. SALES TAXES.

14.1. Contracts for improvements to real property do not qualify for exemptions of Sales, Excise, and Use Taxes unless the Contractor elects to operate under a separated contract as defined by Section 3.291 of Chapter 3, Tax Administration of Title 34, Public Finance of the Texas Administrative Code, or such other rules or regulations as may be promulgated by the comptroller of Public Accounts of Texas.

14.2. If the low bidder elects to operate under a separated contract, he shall:

14.2.1. Obtain the necessary sales tax permits from the State Comptroller.

14.2.2. Identify the appropriate spaces in the proposal form the cost of materials physically incorporated into the project.

14.2.3. Provide resale certificates to suppliers.

14.2.4. Provide the City with copies of material invoices to substantiate the proposal value of materials.

14.3. If the low bidder does not elect to operate under a separated contract, he shall be responsible for all Sales, Excise and Use Taxes applicable to this project.

14.4. Subcontractors are eligible for sales tax exemptions if the subcontractor also complies with the above requirements. The contractor must issue a resale certificate to the subcontractor and the subcontractor, in turn, issues a resale certificate to his supplier.

15. INDEMNIFICATION.

15.1. Contractor agrees to notify Engineer or Owner immediately of the filing of any claims, demands, causes of action, and liens including, without limitation, laborer's, materialmen's and mechanics' liens, arising out of the services, labor and material furnished by Contractor or its subcontractors? under this contract. Owner may, upon receipt of notice of the filing of any such liens, at its option, require Contractor to furnish a bond in an amount and with such sureties as may be approved by Owner or Engineer, conditioned to indemnify and save harmless Owner or Engineer from all such liens upon or against Owner or Engineer's property. In the event Contractor fails or refuses to furnish such bond when so required, Owner or Engineer shall, in addition to any other remedies to which it may be entitled, have the right to pay any sums necessary to obtain the release of such liens and to deduct the amount paid therefore from the Contract price.

16. RESIDENT PROJECT REPRESENTATIVE. Add Exhibit A to the Supplementary General Conditions to define the Resident Project Representative's responsibilities.

17. COST OF THE WORK.

17.1. The Contractor is to comply with the provisions of Article *5* 159A, "Construction of public works in State and municipal or political subdivisions; prevailing wage rates to be maintained."

18. UNIT PRICE WORK.

18.1. 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 price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Proposal. 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.

18.2. 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.

18.3. OWNER or CONTRACTOR may make a claim for an adjustment in the Contract Price if:

18.3.1. The Owner reserves and shall have the right to make such alterations in the work as may be necessary or desirable to complete the work originally intended in an acceptable manner. Unless otherwise specified herein, the Engineer shall be and is hereby authorized to make such alterations in the work as may increase or decrease the originally awarded contract quantities, provided that the cost or the total cost of any major contract item by more than 25 percent (total cost being based on the unit prices and estimated quantities in the awarded contract). Alterations which do not exceed the 25 percent limitation shall not invalidate the contract nor release the surety, and the Contractor agrees to accept payment for such alterations as if the altered work had been a part of the original contact. These alterations which are for work within the general scope of the contract shall be covered by "Change Orders" issued by the Engineer. Change orders for altered work shall include extensions of contract time where, in the Engineer's opinion, such extensions are commensurate with the amount and difficulty of added work, and

18.3.2. Should the aggregate amount of altered work exceed the 25 percent limitation hereinbefore specified, such excess altered work shall be covered by supplemental agreement. If the Owner and the Contractor are unable to agree on a unit adjustment for any contract item that requires a supplemental agreement, the Owner reserves the right to terminate the contract with respect to the item and make other arrangements for its completion.

18.3.3. If CONTRACTOR believes that CONTRACTOR is entitled to an increase in Contract Price as a result of having incurred additional expense or OWNER believes that OWNER is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

19. ASBESTOS, PCBs, PETROLEUM, HAZARDOUS WASTE OR RADIOACTIVE MATERIAL.

19.1. Materials utilized in the project shall be free of any hazardous materials, except as may be specifically provided for in the specifications. OWNER shall be responsible for any Asbestos, PCBs, Petroleum, Hazardous Waste or Radioactive Material uncovered or revealed at the site which was not shown or indicated in Drawings or specifications or identified in the Contract Documents to be within the scope of the Work and which may present a substantial danger to persons or property exposed thereto in connection with the Work at the site. OWNER shall not be responsible for any such materials brought to the site by CONTRACTOR, Subcontractor, Suppliers or anyone else for whom CONTRACTOR is responsible.

19.2. CONTRACTOR shall immediately: (i) stop all Work in connection 'with such hazardous conditions and in any area affected thereby (except in an emergency, and (ii) notify OWNER and ENGINEER (and thereafter confirm such notice in writing). OWNER shall promptly consult with ENGINEER concerning the necessity for OWNER to retain a qualified expert to evaluate such hazardous condition or take corrective action, if any. CONTRACTOR shall not be required to resume Work in connection with such hazardous condition or in any such affected area until after OWNER has obtained any required permits related thereto and delivered to CONTRACTOR special written notice: (i) specifying that such condition and any affected are is or has been rendered safe for resumption of Work, or (ii) specifying any special conditions under which such Work may be resumed safely. If OWNER and CONTRACTOR cannot agree as to entitlement to or the amount or extent of an adjustment, if any, in the Contract Price or Contract Times as a result of such Work stoppage or such special conditions under which Work is agreed by CONTRACTOR to be resumed, either

party may make a claim therefore.

19.3. If after receipt of such special written notice CONTRACTOR does not agree to resume such work based on a reasonable belief it is unsafe, or does not agree to resume such Work under special conditions, then OWNER may order such portion of the Work that is in connection with such hazardous condition or in such affected area to be deleted from the Work. If OWNER and CONTRACTOR cannot agree as to entitlement to or the amount or extent of an adjustment, if any, in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a claim therefore. OWNER may have such deleted portion of the Work performed by OWNER'S own forces or others.

19.4. To the fullest extent permitted by Laws and Regulations, OWNER shall indemnify and hold harmless CONTRACTOR, Subcontractors, ENGINEER, ENGINEER'S Consultants and the officers, directors, employees, agents, other consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages arising out of or resulting from such hazardous condition, provided that: (i) any such claim, cost, loss or damage is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom, and (ii) nothing in this subparagraph shall obligate OWNER to indemnify any person or entity from and against the consequences of the person's or entity's own negligence.

END OF SECTION

SECTION 00810

DUTIES, RESPONSIBIILITIES, AND LIMITATIONS OF AUTHORITY OF RESIDENT PROJECT REPRESENTATIVE

Resident Project Representative

1) ENGINEER shall furnish a Resident Project Representative ("RPR"), assistants, and other field staff to assist ENGINEER in observing progress and quality of the Work. The RPR, assistants, and other field staff under this Exhibit C may provide full time representation or may provide representation to a lesser degree.

2) Through such additional observations of Contractor's work in progress and field checks of materials and equipment by the RPR and assistants, ENGINEER shall endeavor to provide further protection for OWNER against defects and deficiencies in the Work. However, ENGINEER shall not, during such visits or as a result of such observations of Contractor's work·in progress, supervise, direct, or have control over the Contractor's Work nor shall ENGINEER have authority over or responsibility for the means, methods, techniques, sequences, or procedures selected by Contractor, for safety precautions and programs incident to the Contractor's work in progress, for any failure of Contractor to comply with Laws and Regulations applicable to Contractor's performing and furnishing the Work, or responsibility of construction for Contractor's failure to furnish and perform the Work in accordance with the Contract Documents

3) The duties and responsibilities of the RPR are limited to those of ENGINEER in the Agreement with the OWNER and in the Contract Documents, and are further limited and described as follows:

    a) *General:* RPR is ENGINEER's agent at the Site, will act as directed by and under the supervision of ENGINEER, and will confer with ENGINEER regarding RPR's actions. RPR's dealings in matters pertaining to the Contractor's work in progress shall in general be with ENGINEER and Contractor, keeping OWNER advised as necessary. RPR's dealings with subcontractors shall only be through or with the full knowledge and approval of Contractor. RPR shall generally communicate with OWNER with the knowledge of and under the direction of ENGINEER.

    b) *Schedules:* Review the progress schedule, schedule of Shop Drawing and Sample submittals, and schedule of values prepared by Contractor and consult with ENGINEER concerning acceptability.

    c) *Conferences and Meetings:* Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences and other project-related meetings, and prepare and circulate copies of minutes thereof.

4) *Liaison:*

a) Serve as ENGINEER's liaison with Contractor, working principally through Contractor's superintendent and assist in understanding the intent of the Contract Documents.

b) Assist ENGINEER in serving as OWNER's liaison with Contractor when Contractor's operations affect OWNER's on-Site operations.

c) Assist in obtaining from OWNER additional details or information, when required for proper execution of the Work.

5) *Interpretation o/Contract Documents:*

a) Report to ENGINEER when clarifications and interpretations of the Contract Documents are needed and transmit to Contractor clarifications and interpretations as issued by ENGINEER.

6) *Shop Drawings and Samples*

a) Record date of receipt of Samples and approved Shop Drawings.

b) Receive Samples which are furnished at the Site by Contractor, and notify ENGINEER of availability of Samples for examination.

c) Advise ENGINEER and Contractor of the commencement of any portion of the Work requiring a Shop Drawing or Sample submittal for which RPR believes that the submittal has not been approved by ENGINEER.

7) *Modifications:*

a) Consider and evaluate Contractor's suggestions for modifications in Drawings or Specifications and report with RPR's recommendations to ENGINEER. Transmit to Contractor in writing decisions as issued by ENGINEER.

8) *Review of Work and Rejection of Defective Work:*

a) Conduct on-Site observations of Contractor's work in progress to assist ENGINEER in determining if the Work is in general proceeding in accordance with the Contract Documents.

b) Report to ENGINEER whenever RPR believes that any part of Contractor's work in progress will not produce a completed Project that conforms generally to the Contract Documents or will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated in the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or approval required to be made; and advise ENGINEER of that part of work in progress that RPR believes should

be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.

9) *Inspections, Tests, and System Startups:*

a) Consult with ENGINEER in advance of scheduled major inspections, tests, and systems startups of important phases of the Work.

b) Verify that tests, equipment, and systems start-ups and operating and maintenance training are conducted in the presence of appropriate OWNER's personnel, and that Contractor maintains adequate records thereof.

c) Observe, record, and report to ENGINEER appropriate details relative to the test procedures and systems startups.

d) Accompany visiting inspectors representing public or other agencies having jurisdiction over the Project, record the results of these inspections, and report to ENGINEER.

10) *Records:*

a) Maintain at the Site orderly files for correspondence, reports of job conferences, reproductions of original Contract Documents including all Change Orders, Field Orders, Work Change Directives, Addenda, additional Drawings issued subsequent to the execution of the Contract, ENGINEER's clarifications and interpretations of the Contract Documents, progress reports, Shop Drawing and Sample submittals received from and delivered to Contractor, and other Project related documents.

b) Prepare a daily report or keep a diary or log book, recording Contractor's hours on the Site, weather conditions, data relative to questions of Change Orders. Field Orders, Work Change Directives, or changed conditions, Site visitors, daily activities, decisions, observations in general, and specific observations in more detail as in the case of observing test procedures: and send copies to ENGINEER.

c) Record names, addresses and telephone numbers of all Contractors, subcontractors, and major suppliers of materials and equipment.

d) Maintain records for use in preparing Project documentation.

e) Upon completion of the Work, furnish original set of all RPR Project documentation to ENGINEER.

11) *Reports:*

a) Furnish to ENGINEER periodic reports as required of progress of the Work and of Contractor's compliance with the progress schedule and schedule of Shop Drawing and Sample submittals.

b) Draft and recommend to ENGINEER proposed Change Orders, Work Change Directives, and Field Orders. Obtain backup material from Contractor.

c) Furnish to ENGINEER and OWNER copies of all inspection, test, and system startup reports.

d) Report immediately to ENGINEER the occurrence of any Site accidents, any Hazardous environmental Conditions, emergencies, or acts of God endangering the Work, and property damaged by fire or other causes.

12) *Payment Requests:*

a) Review Applications for Payment with Contractor for compliance with the established procedure for their submission and forward with recommendations to ENGINEER, noting particularly the relationship of the payment requested to the schedule of values, Work completed, and materials and equipment delivered at the Site but not incorporated in the Work.

13) *Certificates, Operation and. Maintenance Manuals:*

a) During the course of the Work, verify that materials and equipment certificates, operation and maintenance manuals and other data required by the Specifications to be assembled and furnished by Contractor are applicable to the items actually installed and in accordance with the Contract Documents, and have these documents delivered to ENGINEER for review and forwarding to OWNER prior to payment for that part of the Work.

14) *Completion:*

a) Before ENGINEER issues a Certificate of Substantial Completion, submit to Contractor a list of observed items requiring completion or correction.

b) Observe whether Contractor has arranged for inspections required by Laws and Regulations, including but not limited to those to be performed by public agencies having jurisdiction over the Work.

c) Participate in a final inspection in the company of ENGINEER, OWNER, and Contractor and prepare a final list of items to be completed or corrected.

d) Observe whether all items on final list have been completed or corrected and make recommendations to ENGINEER concerning acceptance and issuance of the Notice of Acceptability of the Work.

15) Resident Project Representative shall not:

a) Authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or-equal" items).

b) Exceed limitations of ENGINEER's authority as set forth in the Agreement or the Contract Documents.

c) Undertake any of the responsibilities of Contractor, subcontractors, suppliers, or Contractor's superintendent.

d) Advise on, issue directions relative to or assume control over any aspect of the means, methods, techniques, sequences or procedures of Contractor's work unless such advice or directions are specifically required by the Contract Documents.

e) Advise on, issue directions regarding, or assume control over safety precautions and programs in connection with the activities or operations of OWNER or Contractor.

f) Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by ENGINEER.

g) Accept Shop Drawing or Sample submittals from anyone other than Contractor.

h) Authorize OWNER to occupy the Project in whole or in part.

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SECTION 01010

SUMMARY OF WORK

1. GENERAL

1.1. RELATED DOCUMENTS

1.1.1. Drawings, General Contract Conditions of the Contract for Construction, Special Provisions and Division 1 -General Requirements apply to work of this Section.

1.2. SECTION INCLUDES

1.2.1. Work covered by Contract Documents.

1.2.2. Contractor use of site.

1.2.3. Work Sequence.

1.3. WORK COVERED BY CONTRACT DOCUMENTS

1.3.1. Contract

1.3.1.1. Identification: Melvin Reverse Osmosis Water System Improvements

1.3.1.2. Location: City of Mason, Texas

1.3.2. Summary of Work

1.3.2.1. Water Supply Improvements - The project involves furnishing all labor, tools, materials and equipment as specified in the bid documents necessary to install 5,900 linear feet of 10-inch SDR 26 – Class 160 PVC waterline, 6 fire hydrants, water main connections, valves and other appurtenances of construction, in place complete, situated in Mason, Texas.

1.3.2.1.1.

1.4. CONTRACTOR USE OF SITE AND PREMISES

1.4.1. Site is owned by the City of Mason, Texas.

1.4.2. Construction Operations: Limited to area noted on Drawings.

1.5. WORK SEQUENCE

1.5.1. Construct Work in an organized manner during the construction period, coordinate construction schedule and operations with Engineer and Owner.

2. PRODUCTS

Not Used

3. **EXECUTION**

Not Used

END OF SECTION

SECTION 01019

CONTRACT CONSIDERATIONS

1. GENERAL

1.1. RELATED DOCUMENTS

1.1.1. Drawings, General Contract Conditions (Parts I and II), Special Provisions and Division 1 -General Requirements apply to work of this Section.

1.2. SECTION INCLUDES

1.2.1. Application for Payment.

1.2.2. Measurement and payment -unit prices.

1.3. RELATED. SECTIONS

1.3.1. Section 01300 -Submittals: Schedule of Values.

1.3.2. Section 01600 -Material and Equipment: Product substitutions.

1.4. MEASUREMENT AND PAYMENT - UNIT PRICES

1.4.1. Authority: Measurement methods are delineated in the individual specification sections.

1.4.2. Take measurements and compute quantities. The Engineer will verify measurements and quantities.

1.4.3. Unit Quantities: quantities and measurements indicated in the Bid Form are for contract purposes only. Actual quantities provided will determine payment.

1.4.4. Payment Includes: Full compensation for required labor, Products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit.

1.4.5. Defect Assessment: Replace the materials or work, or portions of the Work, not conforming to specified requirements. If, in the opinion of the Engineer, it is not practical to remove and replace the Work, the Engineer will direct an appropriate remedy or adjust payment.

1.5. CONCURRENT CONTRACT

1.5.1. The Owner will be laying water pipe while the pipe trench work is in progress.

2. PRODUCTS

Not Used

3. **EXECUTION**

Not Used

END OF SECTION

SECTION 01025

MEASUREMENT AND PAYMENT

1. GENERAL

The unit price or lump sum price bid on each item, as stated in the Proposal, shall include furnishing all labor, superintendence, machinery, equipment, and materials necessary to complete the various items of work shown on the plans and called for in the specifications. Items on which no separate payment is made shall be included in the bid prices for the various pay items.

1.1. MOBILIZATION

1.1.1. Mobilization shall include cost associated with move-in related equipment and labor, payment bond, performance bond and insurance required for this project., No payment will be made specifically for mobilization. All cost associated with mobilization will be included in each pay item listed below.

1.1.2. Lump sum items to be paid for at a lump sum price per job shall include all work and materials involved in the installation within the limits designated on the plans. No measurement of the work or materials included in such items will be made. All work so included shall be installed, constructed or performed as shown on the drawings and specified herein.

1.2. FINAL CLEANUP

1.2.1. The Contractor shall make a final cleanup of all parts of the work before final acceptance of the work by the Owner. This cleanup shall include, among other things, removing all construction materials, final grading of all trench surfaces and construction sites, and in general preparing the sites of the work in an orderly manner.

1.2.2. The cost of the cleanup shall be included as a part of the cost of the various items of work involved and no direct compensation will be made for this work.

2. PRODUCTS

Not Used

3. EXECUTION

Not Used

END OF SECTION

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SECTION 01027

APPLICATIONS FOR PAYMENT

1. GENERAL

1.1. SECTION INCLUDES

1.1.1. Procedures for preparation and submittal of Applications for Payment.

1.2. RELATED SECTIONS

1.2.1. Agreement: Contract SurdPrice and unit prices.

1.2.2. General Contract Conditions: Progress Payments and Final Payment.

1.2.3. Section 01028 -Change Order Procedures: Procedures for changes to the Work.

1.2.4. Section 01 300 -Submittals: Submittal procedures.

1.2.5. Section 01 700 -Contract Closeout: Final Payment.

1.3. FORMAT

1.3.1. EJCDC 1910-8-E -Application for Payment including continuation sheets when required.

1.3.2. For each item, provide a column for listing: Item Number; Description of work; Scheduled Value, Previous Applications: Work in Place and Stored Materials under this Application: Authorized Change Orders; Total Completed and Stored to Date of Application; Percentage of Completion; Balance to Finish; and Retainage.

1.4. PREPARATION OF APPLICATIONS

1.4.1. Present required information in typewritten form.

1.4.2. Execute certification by signature of authorized officer.

1.4.3. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.

1.4.4. List each authorized Change Order as an extension on continuation sheet, listing Change Order number and dollar amount as for an original item of Work.

1.4.5. Prepare Application for Final Payment as specified in Section 01700.

1.5. SUBMITTAL PROCEDURES

1.5.1. Submit four copies of each Application for Payment.

1.5.2. Submit an updated construction schedule with each Application for Payment.

1.5.3. A. Payment Period: Submit at intervals stipulated in the Agreement.

1.6. SUBSTANTIATING DATA

1.6.1. When Engineer requires substantiating information, submit data justifying dollar amounts in question.

1.6.2. Provide one copy of data with cover letter for each copy of submittal. Show Application number and date, and line item by number and description.

2. PRODUCTS

Not Used

3. EXECUTION

Not Used

END OF SECTION

SECTION 01028

CHANGE ORDER PROCEDURES

1. GENERAL

1.1. SECTION INCLUDES

1.1.1. Submittals.

1.1.2. Documentation of change in Contract Sum/Price and Contract Time.

1.1.3. Change procedures.

1.1.4. Stipulated Price change order.

1.1.5. Unit price change order.

1.1.6. Time and material change order.

1.1.7. Execution of change orders.

1.1.8. Correlation of Contractor submittals.

1.2. RELATED SECTIONS

1.2.1. Document - General Contract Conditions.

1.2.2. Section 01019 - Contract Considerations; Section 01 027 -Applications for Payment: Payment applications.

1.2.3. Section 01300 - Submittals: Work schedule.

1.2.4. Section 01600 - Material and Equipment: Product options and substitutions.

1.2.5. Section 01700 - Contract Closeout: Project Record Documents.

1.3. SUBMITTALS

1.3.1. Submit name of the individual authorized to receive change documents, and be responsible for informing others in Contractor's employ or Subcontractors of changes to the Work.

1.3.2. Change Order Forms: EJCDC 1910-8-B Change Order.

1.4. DOCUMENTATION OF CHANGE IN CONTRACT SUM/PRICE AND CONTRACT TIME

1.4.1. Maintain detailed records of work done on a time and material basis. Provide full information required for evaluation of proposed changes, and to substantiate costs of changes in the Work.

1.4.2. Document each quotation for a change in cost or time with sufficient data to allow evaluation of the quotation.

1.4.3. On request, provide additional data to support computations:

1.4.3.1. Quantities of products, labor, and equipment.

1.4.3.2. Taxes, insurance and bonds.

1.4.3.3. Overhead and profit.

1.4.3.4. Justification for any change in Contract Time.

1.4.3.5. Credit for deletions from Contract, similarly documented.

1.4.4. Support each claim for additional costs, and for work done on a time and material basis, with additional information:

1.4.4.1. Origin and date of claim.

1.4.4.2. Dates and times work was performed, and by whom.

1.4.4.3. Time records and wage rates paid.

1.4.4.4. Invoices and receipts for products, equipment, and subcontracts, similarly documented.

1.5. CHANGE PROCEDURES

1.5.1. The Engineer will advise of minor changes in the Work not involving an adjustment to Contract Sum/Price or Contract Time as authorized by the Contract issuing supplemental instructions by letter.

1.5.2. The Engineer may issue a Proposal Request which includes a detailed description of a proposed change with supplementary or revised Drawings and specifications, a change in Contract Time for executing the change. Contractor will prepare and submit an estimate within 7 days.

1.5.3. The Contractor may propose a change by submitting a request for change to the Engineer, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Sum/Price and Contract Time with full documentation and a statement describing the effect on Work by separate or other contractors. Document any requested substitutions in accordance with Section 01600.

1.6. CONSTRUCTION CHANGE AUTHORIZATION

1.6.1. Engineer may issue a document, signed by the Owner, instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1.6.2. The document will describe changes in the Work, and will designate method of determining any change in Contract Sum/Price or Contract Time.

1.6.3. Promptly execute the change in Work.

1.7. STIPULATED PIUCE CHANGE ORDER

1.7.1. Based on Proposal Request and Contractor's maximum price quotation or Contractor's request for a Change Order as approved by Engineer.

1.8. UNIT PRICE CHANGE ORDER

1.8.1. For pre-determined unit prices and quantities, the Change Order will be executed on a fixed unit price basis.

1.8.2. For unit costs or quantities of units of work which are not pre-determined, execute Work under a Construction Change Authorization.

1.8.3. Changes in Contract Sum/Price or Contract Time will be computed as specified for Time and Material Change Order.

1.9. TIME AND MATERIAL CHANGE ORDER

1.9.1. Submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.

1.9.2. Engineer will determine the change allowable in Contract Sum/Price and Contract Time as provided in the Contract Documents.

1.9.3. Maintain detailed records of work done on Time and Material basis.

1.9.4. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.

1.10. EXECUTION OF CHANGE ORDERS

1.10.1. Execution of Change Orders: Engineer will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.

1.11. CORRELATION OF CONTRACTOR SUBMITTALS

1.11.1. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum/Price.

1.11.2. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust time for other items of work affected by the change, and resubmit.

1.11.3. Promptly enter changes in Project Record Documents.

2. PRODUCTS

Not Used

3. PART 3 -EXECUTION

Not Used

END OF SECTION

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SECTION 01039

COORDINATION AND MEETINGS

1. GENERAL

1.1. RELATED DOCUMENTS

1.1.1. Drawings, General Contract Conditions (Part I and 11), Special Provisions, and Division 1 -General Requirements apply to work of this Section.

1.2. SECTION INCLUDES

1.2.1. Coordination.

1.2.2. Field enginemen.

1.2.3. Preconstruction conference.

1.2.4. Progress meetings.

1.2.5. Cutting and patching.

1.3. COORDINATION

1.3.1. Coordinate scheduling, submittals, and Work of the various Sections of the Project Manual to assure efficient and orderly sequence of installation of interdependent construction elements.

1.3.2. Verify that utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

1.3.3. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

1.3.4. Items which require electrical connections shall be coordinated with Division 16.

1.3.5. Coordinate completion and clean up of Work of separate Sections in preparation for Substantial Completion.

1.3.6. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.4. FIELD ENGINEERING

1.4.1. Employ a Land Surveyor registered in the State of Texas and acceptable to Engineer.

1.4.2. Contractor to locate and protect survey control and reference points.

1.4.3. Control datum for survey is that shown on Drawings.

1.4.4. Verify set-backs and easements, confirm drawing dimensions and elevations.

1.4.5. Provide field engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.

1.4.6. Submit a copy of registered site drawing and certificate signed by the Land Surveyor that the elevations and locations of the Work are in conformance with the Contract Documents.

1.5. PRECONSTRUCTION MEETING

1.5.1. Engineer will schedule a meeting after Notice to Proceed.

1.5.2. Attendance Required: Owner, Engineer, Contractor and major Subcontractors.

1.5.3. Agenda:

1.5.3.1. Submission of executed bonds and insurance certificates.

1.5.3.2. Distribution of Contract Documents.

1.5.3.3. Submission of list of Subcontractors, list of products, Schedule of Values, and progress schedule.

1.5.3.4. Designation of personnel representing the parties in Contract and the Engineer.

1.5.3.5. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders and Contract closeout procedures.

1.5.3.6. Scheduling.

1.5.3.7. Scheduling activities of construction testing lab.

1.5.3.8. Use of premises by Owner and Contractor.

1.5.3.9. Owner's requirements.

1.5.3.10. Construction facilities and controls provided by Owner.

1.5.3.11. Survey layout.

1.5.3.12. Security and housekeeping procedures.

1.5.3.13. Schedules.

1.5.3.14. Procedures for testing.

1.5.3.15. Procedures for maintaining record documents.

1.5.3.16. Requirements for start-up of equipment.

1.5.3.17. Inspection and acceptance of equipment put into service during construction period.

1.5.4. Record minutes and distribute copies within three days after meeting to participants with two copies to Engineer and those affected by decisions made.

1.6. PROGRESS MEETINGS

1.6.1. Schedule and administer meetings throughout progress of the Work at maximum monthly ' intervals.

1.6.2. Engineer will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

1.6.3. Attendance Required: Job superintendent, major Subcontractors and suppliers, Engineer, as appropriate to agenda topics for each meeting.

1.6.4. Agenda:

1.6.4.1. Review minutes of previous meetings.

1.6.4.2. Review of Work progress.

1.6.4.3. Field observations, problems, and decisions.

1.6.4.4. Identification of problems which impede planned progress.

1.6.4.5. Review of submittals schedule and status of submittals.

1.6.4.6. Review of off-site fabrication and delivery schedules.

1.6.4.7. Maintenance of progress schedule.

1.6.4.8. Corrective measures to regain projected schedules.

1.6.4.9. Planned progress during succeeding work period.

1.6.4.10. Coordination of projected progress.

1.6.4.11. Maintenance of quality and work standards.

1.6.4.12. Effect of proposed changes on progress schedule and coordination.

1.6.4.13. Other business relating to Work.

1.6.4.14. Record minutes, and distribute copies within three days to Engineer, participants, and those affected by decisions made.

2. PRODUCTS

Not Used.

3. PART 3 -EXECUTION

3.1. EXAMINATION

3.1.1. Verify that existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

3.1.2. Verify that existing substrate is capable of structural attachment of new Work being applied or attached.

3.1.3. Examine and verify specific conditions described in individual specification sections.

3.1.4. Verify that utility services are available, of the correct characteristics, and in the correct location.

END OF SECTION

SECTION 01090

REFERENCE STANDARDS

1. GENERAL

1.1. RELATED DOCUMENTS

1.1.1. Drawings, General Contract Conditions (Parts I & 11), Special Provisions, and Division 1 -General Requirements apply to the work of this Section.

1.2. SECTION INCLUDES

1.2.1. Quality assurance.

1.2.2. Schedule of references.

1.3. QUALITY ASSURANCE

1.3.1. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

1.3.2. Conform to reference standard by date of issue current on date for receiving bids.

1.3.3. Should specified reference standards conflict with Contract Documents, request clarification from Engineer before proceeding.

1.3.4. The contractual relationship duties and responsibilities of the parties in Contract nor those of the Engineer shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.4. SCHEDULE OF REFERENCES

ACI American Concrete Institute
Box 19150
Reford Station
Detroit, MI 4821 9

AISC American Institute of Steel Construction
400 North Michigan Avenue
Eighth Floor
Chicago, IL 606 1 1

AISI American Iron and Steel Institute
1000 16th Street, N.W.
Washington, DC 20036

ASTM American Society for Testing and Materials
1916 Race Street

Philadelphia, PA 19103

AWS American Welding Society
550 LeJeune Road, N.W.
Miami, FL 33 135

AWWA American Water Works Association
6666 West Quincy Avenue
Denver, CO 80235

EJCDC Engineers' Joint Contract Documents Committee American Consulting Engineers Council 1015 15th Street N.W
Washington, DC 20005

NPCA National Paint and Coating Association
1500 Rhode Island Avenue N.W.
Washington, D.C. 20005

NSF National Sanitation Foundation
3475 Plymouth Road
P.O. Box 1468 Ann Arbor, MI 47 106

OSHA Occupational Safety and Health Administration
(U.S. Department of Labor) Government Printing Office
Washington, D.C. 20402

PCA Portland Cement Association
5420 Old Orchard Road
Skolue, IL 60077

SSPC Steel Structures Painting Council
4400 Fifth Avenue
Pittsburgh, PA 15213

UL Underwriters' Laboratories, Inc.
333 Pfingston Road Northbrook, IL 60062

W.W.P.A. Woven Wire Products Association
2515 N. Nordica Avenue
Chicago, IL 60635

2. PRODUCTS

Not Used

3. EXECUTION

Not Used

END OF SECTION

SECTION 01300

SUBMITTALS

1. GENERAL

1.1. RELATED DOCUMENTS

1.1.1. Drawings, General Contract Conditions (Parts I & 11), Special Provisions, and Division 1 -General Requirements apply to the work of this Section.

1.2. SECTION INCLUDES

1.2.1. Submittal procedures.

1.2.2. Construction progress schedules.

1.2.3. Proposed products list.

1.2.4. Shop drawings.

1.2.5. Product data.

1.2.6. Samples.

1.2.7. Manufacturers' instructions.

1.2.8. Manufacturers' certificates.

1.3. RELATED SECTIONS

1.3.1. Section 01400 -Quality Control: Manufacturers' field services and reports.

1.3.2. Section 01700 -Contract Closeout: Contract warranty, manufacturer's certificates and closeout submittals.

1.4. SUBMITTAL PROCEDURES

1.4.1. Transmit each submittal with Contractor's standard transmittal letter including Contractor's name, address and phone number.

1.4.2. Sequentially number the transmittal forms.

1.4.3. Identify Project, Contractor, Subcontractor or supplier; pertinent Drawing sheet and detail number(s), and specification Section number, as appropriate.

1.4.4. Apply Contractor's stamp, signed or initialed certifying that review, verification of Products required, field dimensions, adjacent construction Work, and coordination of information, is in accordance with the requirements of the Work and Contract Documents.

1.4.5. Schedule submittals to expedite the Project, and deliver to Engineer at business address. Coordinate submission of related items.

1.4.6. For each submittal for review, allow 10 days excluding delivery time to and from the contractor.

1.4.7. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.

1.4.8. Provide space for Contractor and Engineer review stamps.

1.4.9. Revise and resubmit submittals as required, identify all changes made since previous submittal.

1.4.10. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

1.4.11. Submittals not requested will not be recognized or processed.

1.5. RESUBMITTAL REQUIREMENTS

1.5.1. Revise initial submittal as required and resubmit to meet requirements as specified.

1.5.2. Mark as RESUBMITTAL.

1.5.3. Re-use original transmittal number and supplement with sequential alphabetical suffix for each re-submittal.

1.6. CONSTRUCTION PROGRESS SCHEDULES

1.6.1. Submit initial progress schedule in duplicate for Engineer review within 15 days after date established in Notice to Proceed.

1.6.2. Revise and resubmit as required.

1.6.3. Submit revised schedules with each Application for Payment, identifying changes since previous version.

1.6.4. Submit a horizontal bar chart with separate line for each section of Work, identifying first work day of each week.

1.6.5. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.

1.6.6. Indicate estimated percentage of completion for each item of Work at each submission.

1.6.7. Indicate submittal dates required for shop drawings, product data, samples, and product delivery dates.

1.7. SHOP DRAWINGS

1.7.1. Submit the number of opaque reproductions which Contractor requires, plus five (5) copies which will be retained by Engineer.

1.7.2. Drawing size shall be minimum 8-1/2 x 11 inches to a maximum of 24 x 36 inches.

1.7.3. Details shall be drawn to a minimum size of 1" equals 1 foot.

1.7.4. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article above and for record document purposes described in Section 01700 -Contract Closeout.

1.8. PRODUCT DATA

1.8.1. Submit the number of copies which the Contractor requires, plus three copies which will be retained by the Engineer.

1.8.2. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information unique to this Project.

1.8.3. Include recommendations for application and use, and reference to compliance with specified standards of trade associations and testing agencies.

1.8.4. Include notation of special coordination requirements for interfacing with adjacent work.

1.8.5. After review, distribute in accordance with Article on Procedures above and provide copies for Record Documents described in Section 01 700 -Contract Closeout.

1.9. SAMPLES

1.9.1. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

1.9.2. Submit samples of finishes from the full range of manufacturers' standard colors or in custom colors, textures, and patterns, as specified, as scheduled for Engineer's selection.

1.9.3. Where variations in color, pattern or texture are inherent in the material or product, submit multiple samples to indicate the approximate range or variations.

1.9.4. Include full Project information and identification of manufacturer, model number, type, style and color on each sample.

1.9.5. Submit the number or samples specified in individual specification Sections; one of which will be retained by Engineer.

1.9.6. Reviewed samples which may be used in the Work are indicated in individual specification Sections.

1.10. MANUFACTURER'S INSTRUCTIONS

1.10.1. When specified in individual specification Sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified for Product Data.

1.10.2. Identify conflicts between manufacturers' instructions and Contract Documents.

1.10.3. Indicate special procedures, conditions requiring special attention and special environmental criteria required for application or installation.

1.11. MANUFACTURER'S CERTIFICATES

1.11.1. When specified in individual specification Sections, submit manufacturers' certificate to Engineer, in quantities specified for Product Data.

1.11.2. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference date, affidavits, and certifications as appropriate. ,

1.11.3. Certificates may be recent or previous test results on material or Product, but must be acceptable to Engineer.

2. PRODUCTS

Not Used

3. EXECUTION

Not used

END OF SECTION

SECTION 01400

QUALITY CONTROL

1. PART 1 -GENERAL

1.1. RELATED DOCUMENTS

1.1.1. Drawings, General Contract Conditions (Parts I & 11), Special Provisions, and Division 1 -General Requirements apply to the work of this Section.

1.2. SECTION INCLUDES

1.2.1. Quality assurance and control of installation.

1.2.1.1. Tolerances.

1.2.1.2. References.

1.2.1.3. Inspection of Bearing Surfaces.

1.2.1.4. Inspection and testing laboratory services.

1.2.1.5. Manufacturers' field services and reports.

1.3. RELATED SECTIONS

1.3.1. Section 0 1090 -Reference Standards.

1.3.2. Section 01300 -Submittals: Submission of Manufacturers' Instructions and Certificates.

1.3.3. Section 01 600 -Material and Equipment: Requirements for material and product quality.

1.4. QUALITY ASSURANCEICONTROL OF INSTALLATION

1.4.1. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.

1.4.2. Comply totally with manufacturers' instructions, including each step in sequence.

1.4.3. Should manufacturers' instructions conflict with Contract Documents, request clarification from Engineer before proceeding.

1.4.4. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

1.4.5. Perform work by persons qualified to produce workmanship of specified quality.

1.4.6. Secure Products in place with positive anchorage devices designed and sized to

withstand stresses, vibration, physical distortion or disfigurement.

1.5. TOLERANCES

1.5.1. Monitor tolerance control of installed Products to produce acceptable Work. Do not permit tolerances to accumulate.

1.5.2. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.

1.5.3. Adjust Products to appropriate dimensions; position before securing Products in place.

1.6. REFERENCES

1.6.1. Conform to reference standard by date of issue current on date of Contract Documents, except where a specific date is established by code.

1.6.2. Obtain copies of standards when required by Contract Documents.

1.6.3. The contractual relationship duties and responsibilities of the parties in Contract nor those of the Engineer shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.7. INSPECTION OF BEARING SURFACES

1.7.1. Excavated surfaces that will receive concrete or paving materials shall be inspected prior to placement of materials. No loose debris, clods, or deleterious substances shall be present on the surface. Surface will be clean, level, and well compacted.

1.8. INSPECTION AND TESTING LABORATORY SERVICES

1.8.1. Owner will appoint, employ, and pay for specified services of an independent firm to perform inspection and testing on foundation construction, (i.e. concrete testing, subgrade preparation).

1.8.2. Contractor will appoint, employ and pay for services of an independent firm to perform welding inspecting and testing in accordance with AWWA Dl 00-84

1.8.3. The independent firm will perform inspections, tests, and other services specified in individual specification Sections and as required by the Engineer.

1.8.4. Reports will be submitted by the independent firm to the Engineer, in triplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.

1.8.5. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.

1.8.6. Notify Engineer and independent firm 48 hours prior to expected time for operations requiring services.

1.8.7. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.

1.8.8. Testing or inspecting does not relieve contractor from performing Work to contract requirements.

1.8.9. Retesting required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the Engineer. Payment for retesting will be paid by the Contractor.

2. **PRODUCTS**

Not Used

3. **EXECUTION**

Not Used.

END OF SECTION

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SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

1. GENERAL

1.1. RELATED DOCUMENTS

1.1.1. Drawings, General Contract Conditions (Parts I & 11), Special Provisions, and Division 1 -General Requirements apply to the work of this Section.

1.2. SECTION INCLUDES

1.2.1. Temporary. Utilities: Electricity, lighting, heat, ventilation, telephone service, water, and sanitary facilities.

1.2.2. Temporary Controls: Barriers, enclosures and fencing, protection of the Work, and water control. .

1.2.3. Construction Facilities: Access roads, parlung, progress cleaning, project signage, and temporary buildings.

1.3. RELATED SECTIONS

1.3.1. Section 01700 -Contract Closeout: Final cleaning.

1.4. TEMPORARY ELECTRICITY

1.4.1. Contractor to provide and pay for power service required from Utility.

1.4.2. Provide main service disconnect and overcurrent protection at convenient location in conformance with National Electrical Code.

1.5. TEMPORARY LIGHTING (ONLY IF NECESSARY)

1.5.1. Provide and maintain lighting for construction operations to achieve a minimum lighting level of 2 watt/sq ft.

1.5.2. Provide and maintain 1 wattlsq ft lighting to exterior staging and storage areas after dark for security purposes.

1.6. TEMPORARY VENTILATION

1.6.1. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

1.7. TEMPORARY WATER SERVICE

1.7.1. Contractor shall be responsible for transporting water for construction purposes and potable water for construction personnel.

1.7.2. Owner will provide water used except as noted below. Exercise measures to conserve water.

1.7.3. Extend branch piping with outlets located so water is available by hoses with threaded connections. Provide temporary pipe insulation to prevent freezing.

1.7.4. The Owner will make available to Contractor water for the filling and testing of the elevated storage tank one time. The Contractor will pay the cost of water at prevailing rates for refilling the tank for retests, etc.

1.8. TEMPORARY SANITARY FACILITIES

1.8.1. Provide and maintain required facilities and enclosures.

1.8.2. Permanent building facilities shall not be used during construction operations. Maintain daily in clean and sanitary condition.

1.9. BARRIERS

1.9.1. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.

1.9.2. Provide protection for plant life designated to remain. Replace damaged plant life.

1.9.3. Protect non-owned vehicular traffic, stored materials, site and structures from damage.

1.10. WATER CONTROL

1.10.1. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

1.10.2. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

1.11. PROTECTION OF INSTALLED WORK

1.11.1. Protect installed Work and provide special protection where specified in individual specification Sections.

1.11.2. Provide temporary and removable protection for installed Products. control activity in immediate work area to minimize damage.

1.12. SECURITY

1.12.1. Provide security and facilities to protect Work from unauthorized entry, vandalism, or theft.

1.13. PROGRESS CLEANING

1.13.1. Maintain areas free of waste materials, debris and rubbish. Maintain site in a clean and orderly condition.

1.13.2. Remove waste materials, debris, and rubbish from site and dispose off-site at intervals as required to maintain clean site.

1.14. FIELD OFFICES *AND*SHEDS

1.14.1. Field Office not required.

1.14.2. Locate sheds a minimum distance of 30 feet from existing and new structures.

2. PRODUCTS

Not Used

3. PART 3 -EXECUTION

Not Used

END OF SECTION

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SECTION 01568

EROSION AND SEDIMENT CONTROL DURING CONSTRUCTION

1. GENERAL

1.1. WORK INCLUDED

1.1.1. Obtain permits and furnish labor, materials, equipment and incidentals necessary to provide erosion and sediment control during construction including furnishing, installing and maintaining erosion and sediment control structures and procedures and the proper removal when no longer required.

1.2. SUBMITTALS

1.2.1. Submittals shall be in accordance with project requirements and shall include: Copies of submitted forms and copies of inspection reports as the project progresses.

1.3. TPDES PERMIT

1.3.1. PERMIT PROVISIONS

1.3.1.1. In accordance with the TPDES Construction General Permit (TXR 150000) for Storm Water Discharge associated with construction activity, a Stormwater Pollution Prevention Plan (SW3P) including the Site Map has been prepared by the Owner. A copy of this plan is available from the Architect upon request. Bidders are encouraged to obtain a copy of this plan in order to more fully determine their obligations as operator of the SW3P.

1.3.1.2. The Contractor will install and maintain the physical measures detailed in the Plan, and shall provide administrative oversight of the Plan.

1.3.1.3. Therefore, the Contractor shall:

1.3.1.3.1. Sign and post on-site a completed "Construction Site Notice," and provide copy to the operator of any separate municipal storm sewer system per permit requirements.

1.3.1.3.2. Install the Best Management Practices (BMP's) noted on the SW3P Site Plan.

1.3.1.3.3. Maintain the BMP's during the construction.

1.3.1.3.4. Periodically inspect the BMPs, monitor the Plan, and file reports and other items required by the TPDES Construction General Permit. The contractor shall maintain a Master Copy of the SW3P plan at the job-site and insert copies of required periodic inspection reports into the Master Copy of the SW3P.

1.3.1.3.5. Make revisions to the BMP's if needed as construction progresses, or make revisions in the event that the BMP's shown do not adequately limit

sediments leaving the site.

1.3.1.3.6. Remove BMP's from the project site.

1.3.1.4. The requirements of the General Permit shall supersede the above items in the event of a conflict.

1.3.1.5. For assistance in filling out the NO1 or NOT, the Contractor may access the TCEQ website at www.tceq.state.tx.us.

1.3.2. TEMPORARY DRAINAGE PROVISIONS

1.3.2.1. Contractor shall provide for the drainage of storm water and such water as may be applied or discharged on the site in performance of the work. Drainage facilities shall be adequate to prevent damage to the work, the site, and adjacent property.

1.3.2.2. Existing drainage channels and conduits shall be cleaned, enlarged, or supplemented as necessary to carry all increased runoff attributable to Contractor's operations. Dikes shall be constructed as necessary to divert increased runoff from entering adjacent property (except in natural channels), to protect Owner's facilities and the work, and to direct water to drainage channels or conduits. Ponding shall be provided as necessary to prevent downstream flooding.

1.3.3. DUST CONTROL

1.3.3.1. Dust control shall mean that no construction activity shall take place without applying such reasonable measures as may be required to prevent particulate matter from becoming airborne so it remains visible beyond the limits of construction. Reasonable measures may include the application of water or chemical dust suppressants, paving, frequent road cleaning, and planting vegetative ground cover. Utilize methods and practices of construction to eliminate blowing dust in full observance of State and Federal regulations. If dust complaints are received by the City of Midland or the Owner, reasonable control measures shall be applied by the contractor.

1.4. JOB CONDITIONS; CODES AND ORDINANCES

1.4.1. Comply with the local codes and ordinances. If local codes and ordinances require more stringent or additional erosion and sediment control measures during construction, Contractor shall provide such measures.

2. PRODUCTS

Not Used

3. EXECUTION

Not Used

END OF SECTION

SECTION 01600

MATERIAL AND EQUIPMENT

1. GENERAL

1.1. RELATED DOCUMENTS

1.1.1. Drawings, General Contract Conditions (Parts I & 11), Special Provisions, and Division 1 -General Requirements apply to the work of this Section.

1.2. SECTION INCLUDES

1.2.1. Products.
1.2.2. Transportation and handling.
1.2.3. Storage and protection.
1.2.4. Product options.
1.2.5. Substitutions.

1.3. RELATED SECTIONS

1.3.1. Document 00100 - Instructions to Bidders: Product options and substitution procedures.
1.3.2. Section 01400 - Quality Control: Product quality monitoring.

1.4. PRODUCTS

1.4.1. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for reuse.
1.4.2. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.
1.4.3. Provide interchangeable components of the same manufacturer, for similar components.

1.5. PRODUCT DELIVERY, STORAGE AND HANDLING

1.5.1. Delivery

1.5.1.1. Deliver materials, products and equipment to the project site in undamaged condition in manufacturer's original, unopened containers or packaging, with identifying labels intact and legible.
1.5.1.2. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.
1.5.1.3. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.
1.5.1.4. Arrange deliveries in accord with the construction schedule and in ample time to facilitate inspection prior to installation to avoid unnecessary delays in the construction process.

1.5.2. Storage

1.5.2.1. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight, climate controlled enclosures.
1.5.2.2. For exterior storage of fabricated products, place on sloped supports, above ground.
1.5.2.3. Provide off-site storage and protection when site does not permit on-site storage or protection.
1.5.2.4. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.
1.5.2.5. Store loose granular materials on solid flat surfaces in a well-drained area.
1.5.2.6. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
1.5.2.7. Arrange storage of products to permit access for inspection. Periodically inspect to assure products are undamaged and are maintained under specified conditions.
1.5.2.8. Materials, products and equipment may be stored off site in a bonded and insured warehouse approved by the A-E and Owner. Pay ail costs incurred for off-site storage facilities. Products properly stored in bonded off-site storage facilities may be included in progress pay requests with written approval of the Owner.

1.5.3. Handling

1.5.3.1. Handle materials, products and equipment in a manner prescribed by manufacturer or specified to protect from damage during storage and installation.

1.6. PRODUCT OPTIONS

1.6.1. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.
1.6.2. Products Specified by Naming One or More Manufacturers: Products of manufacturers named and meeting specifications, no options or substitutions allowed.
1.6.3. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

1.7. SUBSTITUTIONS

1.7.1. Instructions to Bidders specify time restrictions for submitting requests for Substitutions during the bidding period to requirements specified in this Section.
1.7.2. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.
1.7.3. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.
1.7.4. A request constitutes a representation that the Bidder:

1.7.4.1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
1.7.4.2. Will provide the same warranty for the Substitution as for the specified product.

1.7.4.3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
1.7.4.4. Waives claims for additional costs or time extension which may subsequently become apparent.
1.7.4.5. Will reimburse Owner for review or redesign services associated with re-approval by authorities.

1.7.5. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

1.7.6. Substitution Submittal Procedure:

1.7.6.1. Submit four copies of request for Substitution for consideration. Limit each request to one proposed Substitution.
1.7.6.2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence.
1.7.6.3. The Engineer will notify Contractor, in writing, of decision to accept or reject request.

2. PRODUCTS

Not Used

3. EXECUTION

Not used

END OF SECTION

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SECTION 01700

CONTRACT CLOSEOUT

1. GENERAL

1.1. RELATED DOCUMENTS

1.1.1. Drawings, General Contract Conditions (Parts I &11), Special Provisions, and Division 1 -General Requirements apply to the work of this Section.

1.2. SECTION INCLUDES

1.2.1. Closeout procedures.

1.2.2. Final cleaning.

1.2.3. Adjusting.

1.2.4. Project record documents.

1.2.5. Operation and maintenance data.

1.2.6. Warranties.

1.2.7. Spare parts and maintenance materials.

1.3. RELATED SECTIONS

1.3.1. Section 01500 - Construction Facilities and Temporary Controls: Progress cleaning.

1.4. CLOSEOUT PROCEDURES

1.4.1. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Engineer's inspection.

1.4.2. Provide submittals to Engineer that are required by governing or other authorities.

1.4.3. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

1.4.4. Submit notarized affidavit attesting that all bills have been paid.

1.4.5. Submit marked up drawings 'Record Drawings" that reflect work as actually completed.

1.5. FINAL CLEANING

1.5.1. Execute final cleaning prior to final inspection.

1.5.2. Clean site; sweep paved areas, rake clean landscaped surfaces.

1.5.3. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.5.4. Repair, patch and touch-up marred surfaces to match adjacent finishes.

1.6. ADJUSTING

1.6.1. Adjust operating Products and equipment to ensure smooth and unhindered operation

1.7. PROJECT RECORD DOCUMENTS

1.7.1. Maintain on site, one set of the following record documents; record actual revisions to the Work:

1.7.1.1. Contract Drawings.

1.7.1.2. Specifications.

1.7.1.3. Addenda.

1.7.1.4. Change Orders and other Modifications to the Contract.

1.7.1.5. Reviewed shop drawings, product data, and samples.

1.7.2. Store Record Documents separate from documents used for construction.

1.7.3. Record information concurrent with construction progress.

1.7.4. Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:

1.7.4.1. Manufacturer's name and product model and number.

1.7.4.2. Product substitutions or alternates utilized.

1.7.4.3. Changes made by Addenda and Modifications.

1.7.5. Record Documents and Shop Drawings: Legibly mark each item to record actual construction including:

1.7.5.1. Measured depths of foundations in relation to finish first floor datum.

1.7.5.2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

1.7.5.3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.

1.7.5.4. Field changes of dimension and detail.

1.7.5.5. Details not on original Contract Drawings.

1.7.5.6. Changes made by addenda and modification.

1.7.6. Submit documents to Engineer with claim for final Application for Payment.

1.8. WARRANTIES

1.8.1. Provide duplicate notarized copies.

1.8.2. Execute and assemble documents from Subcontractors, suppliers, and manufacturers.

1.8.3. Provide Table of Contents and assemble with metal prong binder in durable plastic presentation cover.

1.8.4. Submit prior to final Application for Payment.

1.8.5. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

1.9. SPARE PARTS *AND*MAINTENANCE MATERIALS

1.9.1. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification Sections.

1.9.2. Deliver to project site and place in location as directed; obtain receipt prior to final payment.

2. PRODUCTS

Not used

3. EXECUTION

Not used

END OF SECTION

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SECTION 02110

CLEARING AND GRUBBING

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. Extent of site clearing is shown on drawings.

B. Site clearing work includes, but is not limited to:

1. Protection of trees outside of clearing limits.
2. Removal of trees and other vegetation within site clearing limits.
3. Grubbing within the clearing limits.
4. Stripping topsoil
5. Removal of debris on the site.

1.02 RELATED DOCUMENTS

A. Section 01568 - Erosion and Sediment Control.

B. Drawings and general provisions of Contract, including General and Supplementary Conditions, and Detailed Specification sections, apply to work of this section.

1.03 JOB CONDITIONS

A. Examine areas for conditions under which work is to be performed. Report to the Engineer all conditions contrary to those shown on the contract drawings or specified herein and all other conditions that will affect satisfactory execution of the work. Do not proceed with work until unsatisfactory conditions have been corrected and authorization has been given by Owner's representative.

B. Conduct site clearing operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks or other occupied or used facilities without permission from authorities having jurisdiction.

C. Provide protection necessary to prevent damage to existing improvements indicated to remain in place on adjoining properties and on Owner's. Restore damaged improvements to their original condition, as acceptable to parties having jurisdiction, without additional cost to the owner.

D. Keep dirt, dust, noise and other objectionable nuisances to a minimum. Use temporary enclosures, coverings and sprinkling, or a combination thereof, as necessary to limit dust to lowest practicable level, except do not use water to the extent of causing flooding, contaminated runoff or icing.

E. Protect existing trees and other vegetation indicated to remain in place, against unnecessary cutting, breaking or skinning of roots, skinning and bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, access foot or vehicular traffic, or parking of vehicles within drip line. Provide temporary guards to protect trees and vegetation to be left standing.

1. Water trees and other vegetation to remain within limits of the contract work as required to maintain their health during course of construction operations.

2. Repair or replace trees and vegetation indicated to remain which are damaged by construction operations, in a manner acceptable to Owner, without additional cost to Owner. Employ licensed arborist to repair damages to trees and shrubs.

3. Replace trees which cannot be repaired and restored to full-growth status, as determined by arborist.

F. Property corners, iron pipe and/or monuments, shall be located and protected before beginning clearing operations.

1.04 QUALITY ASSURANCE

A. Obtain copy of Erosion Control Approval Letter and maintain at the site.

B. Obtain the required permits and conform to applicable codes for disposal of debris off-site and burning of debris on site.

C. Perform all work in accordance with requirements of OSHA and the Environmental Protection Agency in addition to State and local requirement.

1.05 MEASUREMENT AND PAYMENT

A. Measurement of "Clearing and Grubbing" shall be made by the acre.

B. "Clearing and Grubbing" shall be paid by the unit price bid in the Proposal for "Clearing" and shall constitute full compensation for furnishing of all material, labor, tools, equipment, services and incidentals necessary to complete the work as required by this section of the specifications.

PART 2 PRODUCTS

Not applicable to work of this section.

PART 3 EXECUTION

3.01 CLEARING

A. Clearing shall consist of the cutting, removal and satisfactory disposal of all trees and shrubs within the clearing limits as designated on the plans and/or within easements and right-of-ways which will require construction work during the project.

B. Clear only those areas required to install the soil erosion control devices as shown on the plans and outlined in Section 02930 - Erosion and Sediment Control of these specifications prior to starting overall clearing operations.

C. Repair and maintain erosion control devices during construction in order to always assure their efficiency.

D. Trees to remain shall be trimmed of branches which will obstruct the new construction or as directed by the Engineer. Branches to be trimmed shall be neatly cut close to the bole of the tree or main branch. Cuts more than 1 1/2" in diameter shall be painted with a tree wound paint formulated for use on damaged plant tissues.

3.02 GRUBBING

A. Grubbing shall consist of the removal and disposal of stumps, roots larger than 3 inches in diameter and matted roots from the designated clearing limits to a depth of 18" below the original surface level of the ground.

B. For trees to remain, provide protection for roots over 1 1/2" in diameter which are cut during grubbing, Coat cut faces with a tree wound paint, formulated for use on damaged plant tissues. Temporarily cover exposed roots with wet burlap to prevent roots from drying out, cover with earth as soon as possible.

C. Depressions made by grubbing shall be filled with suitable material and compacted to make the surface conform with the original adjacent surface of the ground, unless further excavation is indicated.

D. Use only hand methods for grubbing inside drip line of trees indicated to be left standing.

3.03 REMOVAL OF DEBRIS

A. Removal of debris shall consist of the satisfactory disposal of any garbage or rubble within the clearing limits, easements, right-of-way or as specifically designated on the plans.

3.04 DISPOSAL OF MATERIAL

A. All vegetation and debris within the areas to be cleared shall become the property of the Contractor upon the start of work and shall be removed from the site and properly

disposed.

B. Burning of combustible materials removed by clearing and grubbing operations will be allowed providing the Contractor obtains such permits and approvals required by local authorities. The Contractor will be responsible for controlling fires in compliance with all Federal, State, and Local laws and regulations. The securing of necessary burning permits shall be the responsibility of the Contractor. All burning shall be under the constant care of competent watchmen. All materials resulting from clearing and grubbing operations and disposed of by burning on the site shall be thoroughly and completely reduced to ashes.

END OF SECTION

SECTION 02151

TRENCH SAFETY SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. This section of the specifications covers trench safety systems for trench excavations greater than five feet in depth. All work performed under this section shall also comply with OSHA Part 1926, Subpart P and all State and Local codes.
B. The Contractor shall be responsible for complying with the requirements of the specifications, drawings and all applicable codes. The Contractor shall immediately notify the Engineer of any unforeseen field conditions which might affect the integrity of the trench safety system.

1.2 RELATED SECTIONS

A. General Conditions
B. Supplementary General Conditions
C. Section 02110, Site Preparation and Clearing

1.3 SCOPE OF WORK

A. The scope of work includes but is not limited to trench and excavation safety systems either by cut back method or braced excavation method for all trenches five feet and deeper whether indicated on the drawings or required by actual field conditions. Trenches not exceeding five feet in depth shall be protected as required by OSHA, State and Local standards.
B. Alternative methods of trench safety may be submitted for approval to the Engineer, however alternative methods will not be reviewed or approved prior to bid opening.

1.4 SUBMITTALS

A. Provide detail drawings for proposed trench safety systems. Clearly identify where each system is proposed for use and type of system to be used. Trench excavations cannot be started until trench safety systems have been submitted.
B. Trench Boxes -Submit manufacturer's standard data sheet and certificate of compliance signed by a registered engineer stating the maximum allowable depth for the given design pressure for each type of trench box proposed for use.
C. Alternative Systems -If alternative systems composed of steel, aluminum, wood or a combination of materials are proposed, submit design calculations signed by a registered engineer showing all member properties, design strengths and

any stress increases used with justification for their use.

1.5 QUALITY ASSURANCE

A. Trench safety systems shall be designed based on actual field conditions. The Contractor shall review and determine the field conditions for the project.

B. Work shall be performed by forces having at least two years experience with similar types of trench safety systems. All prefabricated items used in trench safety systems shall be manufactured by a company with at least two years experience in fabricating the items.

C. The Contractor shall be responsible for complying with all trench safety requirements and for the safety of trenches and excavations. The Contractor shall have designated "responsible person" on site while any trench is open.

PART 2 - **PRODUCTS**

A. Provide suitable materials capable of withstanding imposed loads without excessive deflections. Materials shall be clean, free of rust, holes, knots and other defects.

PART 3 - **EXECUTION**

3.1 JOB CONDITIONS

A. Prior to starting trench excavations, the Contractor shall examine all site conditions and note any conditions in existing pavements, structures and other items which may be adversely affected by trenching operations. Contractor shall mitigate any damage to existing structures.

3.2 EXISTING UTILITIES

A. Prior to starting trench excavations, chart and field locate all existing utilities. Notify owners of all utilities of work to be performed. Protect all existing utilities from damage. Provide additional support for utility lines which cannot span trench width. Do not interrupt existing services without written approval by the utility owner.

B. Any damaged utilities shall be repaired as required by the utility owner.

3.3 TRENCHING PROCEDURES

A. Provide shoring systems in accordance with the submitted design to adequately resist earth pressures indicated on the drawings.

B. Proceed with work in an orderly fashion. Install trench bracing systems as soon as possible after opening trenches. Do not allow workers in trench prior to installing trench bracing systems.

C. Backfill trenches as soon as possible after completion of work.

D. Stockpile excavated materials at least three feet away from edge of trench.
E. Maintain barricades and signage as required by State and Local codes to protect open excavations.
F. Do not allow surface water to enter excavations. Properly grade areas adjacent to trench excavations to control surface drainage away from excavations. Excavations which must remain open during periods of rainfall shall be covered with suitable material to prevent accumulations of water in excavation.
G. If cut back method is employed, maintain a clear distance of three feet from edge of cut to avoid allowing loose material to enter trench.
H. Do not operate heavy equipment except for trench digging equipment within twenty feet of edge of excavation.

END OF SECTION

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SECTION 02200

EARTHWORK

PART 1 - GENERAL

1.1 SECTION INCLUDES:

A. Operations required for the excavation of the proposed foundations.
B. Compaction of natural subgrades.
C. Placement and compaction of fill areas to grade.
D. Finish grading.
E. Disposal of excess or unsuitable materials.
F. Earthwork must conform with dimensions and typical sections shown, and within lines and grades established on the drawings.
G The CONTRACTOR shall inform and satisfy himself as to the character, quantity and distribution of material to be excavated.

1.2 CLASSIFICATIONS

The following are brief definitions of classifications of earthwork.

A. Topsoil: Natural, friable surface soil possessing the characteristics of representative soils on the site that produce growths of grass or other vegetation. Topsoil growths includes grasses and other vegetation.
B. Subgrade: Consists of that portion of the surface on which a compacted earth fill or embankment is constructed.
C. Compacted Earth Fill or Embankment: Earth fill placed and compacted between the top of existing grades and finish grade.
D. Finish Grading: Operations required for smoothing disturbed areas that are not overlaid with pavement.

1.3 WORK AFFECTING EXISTING UTILITIES

A. Protect above or below grade utilities which are to remain.
B. Do not take existing utilities out of service without specific authorization by the OWNER.

1.4 PROTECTION

A. Protect trees, shrubs, lawns, and other features remaining as portion of existing landscape.
B. Protect benchmarks, existing structures (not being removed), fences, roads, and paving.
C. Notify the ENGINEER of unexpected subsurface conditions.
D. Where damage could result from continuing work, discontinue work in area until ENGINEER notifies the CONTRACTOR of the required modifications.

PART 2 - PRODUCTS

2.1 EQUIPMENT

Use equipment that is required to complete this project.

A. Grading Equipment: Furnish, operate and maintain such equipment as is necessary to produce uniform layers, section and smoothness of grade for compaction and drainage.
B. Furnish, operate and maintain equipment for compaction of earth fills or embankments.
C. Miscellaneous Equipment: Scarifiers, disks, spring tooth or spike tooth harrows, earth hauling equipment, and other equipment must be suitable for removal of material from the excavation and construction of fills.

2.2 TOPSOIL

A. Source: Topsoil is to be obtained from excavation and fill areas. Strip and stockpile top twelve (12) inches of material from such areas.

PART 3 - GENERAL

3.1 EXCAVATION

A. Objective: As shown on the drawings, excavate to lines, grades and elevations.
B. Drainage: During excavation maintain grades for complete drainage. When directed, install temporary drains or drainage ditches to intercept or divert surface water and prevent interference or delay of the work. The pumping of water shall be included in the bid items. No separate payment will be made for drainage control and pumping.
C. Stockpiling: Stockpile excavated material in areas designated by the Engineer.
D. Dressing: Uniformly dress cut and fill slopes to slope, cross section and alignment, as shown.
E. Stripping of Ground Surface: All vegetation, all decayed vegetable matter, rubbish and other unsuitable material within the areas to be graded, shall be stripped or otherwise removed to ground level before grading or other earthwork is started. In no case will such material be allowed to remain in or on the areas to be graded.
F. Excavation:
    1. Excavate subsoil required to accommodate building foundations, slabs-on-grade paving and site structures, construction operations.
    2. Excavation cut not to interfere with normal 45 degree bearing splay of foundation.
    3. Grade top perimeter of excavation to prevent surface water from draining into excavation.
    4. Hand trim excavation. Remove loose matter.
    5. Remove lumped subsoil, boulders, and rock up to 1/3 cu yd measured by

volume.

6. Notify Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
7. Correct unauthorized excavation at no extra cost to Owner.
8. Correct areas over-excavated by error in accordance with Section 02223.
9. Stockpile excavated material in area designated on site and spread excess material not being reused in designated area.

3.2 PREPARATION OF GROUND SURFACE FOR FILLS OR EMBANKMENTS

A. Ground surface on which fill is to be placed shall be stripped of live, dead, or decayed vegetation, rubbish, debris and other unsatisfactory material.

B. Stripped ground surface shall be plowed, disced, or otherwise broken up; pulverized; moistened or aerated as necessary; thoroughly mixed; and compacted to at least 90 percent laboratory maximum density for cohesive materials or 95 percent laboratory maximum density for cohesionless materials.

C. The prepared ground surface shall be scarified and moistened or aerated as required just prior to placement of fill or embankment materials to assure adequate bond between fill or embankment material and the prepared ground surface.

3.3 COMPACTION AND MOISTURE CONTROL

A. Intent: Earth fills or embankments shall be compacted to not less than the following percentages of maximum density for soils which exhibit a well-defined moisture density relationship (cohesive soils) determined in accordance with ASTM D 698 (Standard Proctor Test).

1. Fills or embankments shall be compacted to not less than 95 percent maximum density.
2. Fills or embankments shall be compacted at a moisture content between two (2) percentage points below to three (3) percentage points above optimum moisture, as defined by ASTM D698.

B. The CONTRACTOR shall provide the required water to maintain the proper moisture control.

3.4 OVER EXCAVATION

A. Areas of the excavation that are excavated to elevations below those specified on the plans shall be backfilled and compacted as specified for embankment fill (paragraph 3.3).

3.5 MATERIAL DISPOSAL

A. Stockpile excavated material in area designated on site and remove excess material not being reused and waste from site.

END OF SECTION

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SECTION 02220

TRENCHING, BACKFILLING AND COMPACTION

PART 1 GENERAL

1.01 DESCRIPTION

The work under this Section includes all excavation, backfill, compaction pavement removal, site restoration and cleanup for the construction of underground pipelines, and their related structures.

1.02 RELATED WORK

A. Section 02110 - Clearing and Grubbing
B. Section 02200 - Grassing
C. Section 02700 - Sewerage and Drainage
D. Section 02745 - High Density Polyethylene Pipe
E. Section 02746 - Solid Leachate Piping Collection System
E. Section 02930 - Erosion and Sediment Control

1.03 DEFINITIONS

A. Pipeline Embedment:

1. Backfill material encasement extending from the full depth of bedding to a distance of twelve (12) inches above the top of the pipe.

2. Embedment is composed of bedding, initial backfill and foundation.

B. Foundation:

1. The load bearing portion of the embedment which underlines the bedding material.

2. Normally the excavated trench bottom except where unstable conditions exist and then alternate methods of foundation stabilization are required.

C. Bedding: Backfill material between a pipe and the foundation on which it rests.

D. Initial Backfill: Backfill placed from the top of the bedding and along the sides of the pipe to a distance of 12" above the top of the pipe.

E. Final Backfill: Backfill placed from a distance of 12" above the top of the pipe to the finished grade.

F. Embankment: Fill material placed above original ground surface to provide cover over a conduit which is fully or partially exposed.

G. Rock: Where "Rock" is used as the name of an excavated material, it shall mean boulders or pieces of rock, concrete or masonry measuring one cubic yard or more, hard shale or solid ledge rock and masonry which, in the opinion of the ENGINEER, requires for its removal the continuous use of pneumatic tools or drilling and blasting.

1.04 QUALITY ASSURANCE

A. Tests required by this section shall be performed by a qualified independent testing laboratory meeting the requirements of Section 01400.

B. The CONTRACTOR shall insure that all testing laboratory personnel contact the project representative prior to conducting tests to mutually select the test site. No testing shall commence without this contract.

C. All work shall comply with local development standards.

D. Regulatory Requirements:

1. Comply with applicable requirements of federal, state, and local laws, regulations and codes having jurisdiction at project site.

E. Reference Standards: Applicable requirements of standards and specifications referenced herein apply to the work of this Section.

1.05 SUBMITTALS

A. A minimum of two (2) copies of all test results shall be submitted to the ENGINEER.

1.06 MEASUREMENT AND PAYMENT

A. Payment shall be included in the unit price bid for the work to which this section is related.

PART 2 PRODUCTS

2.01 BACKFILL MATERIAL

A. The requirements of this Article shall apply to all backfill materials unless otherwise specified.

B. All material shall be suitable and free from roots, wood scape material, and other vegetable matter and refuse.

C. Acceptable material shall generally be a natural or artificial mixture of soil types normally found in natural deposits in the project vicinity or material obtained from the CONTRACTOR's excavations.

D. All material shall be sufficiently dry for compaction and shall not contain excessive amounts of soft or highly plastic clays.

E. Maximum size of stone shall not exceed four inches.

2.02 BEDDING MATERIAL

A. Fine granular bedding:

1. Materials for fine granular bedding shall consist of well graded fine to course sands or gravel meeting the gradation requirements of ASTM C 33 for fine aggregates.

2. Natural materials or artificial mixtures, consisting largely of a mixture of sand and clay, found in natural deposits in the project vicinity may be utilized as long as the material meets the proper proportions and gradation requirements.

3. The material shall generally pass a 3/8" sieve with no more than 10% passing a No. 100 sieve, and shall be non-plastic.

B. Gravel Bedding:

1. Materials used for gravel bedding shall consist of natural rounded or angular, graded stone or crushed rock, with little or no fines.

2. Generally, the aggregate size shall range from 1 1/2" to 3/8".

2.03 UNSUITABLE MATERIALS

A. General: Any material, which in the opinion of the ENGINEER, contains vegetable matter, muck, roots, and rubbish shall be considered unsuitable.

B. The following, as defined in the United Soils Classification System, shall be considered the basis for classifying unsuitable material unless specifically noted in other sections of the specifications:

1. Highly plastic clay soils of the CH and MH descriptions.

2. Border line soils of the SC-CH description.

3. Organic soils of the OL and OH description.

4. Highly organic soils of the PT description.

PART 3 EXECUTION

3.01 SITE PREPARATION

A. Clearing and grubbing for all pipeline construction shall be classified as "Clearing and

Grubbing" and performed in accordance with Section 02110.

B. Clearing and Care of Surface Materials:

1. In areas where pipelines are constructed through established lawns and other improved grass areas, the sod shall be carefully removed, kept alive and replaced after backfilling is finished.

2. Topsoil so removed shall be stockpiled at a suitable location so that it can be replace.

3. Pavement Removal:

a. Unless otherwise specified on the plans, all roadway, driveway, parking lot, sidewalk, etc., crossings shall be saw cut, properly braced and dewatered to protect undisturbed paving.

b. The CONTRACTOR shall remove pavement as necessary for installing the new pipe lines and appurtenances and for making connections to existing pipe lines.

c. Pavement shall be cut back from the top edges of ditch lines for a distance of at least twelve (12) inches on each side of the ditch to allow for solid bearing edges for pavement to be replaced.

d. Before removing any pavement, the pavement shall be marked for cuts neatly paralleling pipe lines and existing street lines.

e. Asphalt pavement shall be broken along the marked cuts by use of jack hammer or other suitable tool.

f. Concrete pavement shall be scored to a depth of approximately 1 1/2 inches along the marked cuts.

g. Scoring shall be done by use of rotary saw, after which the pavement may be broken below the scoring by use of jack hammer or other suitable tool.

h. The pavement adjacent to pipe line trenches must not be disturbed or damaged.

i. If the adjacent pavement is disturbed or damaged, due to any cause such as caving ditch banks, indiscriminate use of construction machinery, etc., the CONTRACTOR shall remove the damaged pavement and shall replace at his own expense

C. Trees, plants, and existing structures and utilities shall be protected with appropriate barriers prior to construction.

3.02 GENERAL TRENCH EXCAVATION

A. The requirements of this Article shall apply to all trench excavation unless otherwise specified.

B. Trench excavation shall be of such depth to enable proper installation of embedment materials that will result in construction of the pipeline to the alignment and grade, or depth of cover, as shown on the Drawings.

1. Over-excavation and replacement of materials with proper bedding material shall be required where specified by the ENGINEER.

2. If during the course of construction, the trench is inadvertently over-excavated, that area shall be backfilled with fine granular bedding material, unless gravel bedding is required where unsuitable materials are encountered in the subgrade or where specified by the ENGINEER.

C. All such related structures and appurtenances shall be constructed to the alignment, grade, and position as shown on the Drawings.

D. In all cases where materials are deposited along open excavation they shall be placed so that in the event of rain, no damage will result to the work or adjacent property.

E. Unstable trench bottom:

1. Where an unstable trench bottom condition is encountered due to the presence of muck, quicksand, or other unsuitable materials, the unstable soil material shall be removed to a depth which is sufficient to produce a firm foundation.

2. The unstable soil material shall then be replaced with Class B embedment for the full depth of unstable material excavation.

3. The depth of unstable soil excavation and bedding replacement will be dependent upon the severity of the trench bottom soil conditions.

4. Depths of bedding shall be as a minimum those specified for Class B embedment,. contained herein.

5. Alternate foundations shall be used where required as specified in Article 3.08 of this Section.

F. Regardless of the type of embedment used, all bell holes for bell and spigot pipe shall be excavated at proper intervals so that the barrel of the pipe will rest for its entire length upon the bottom of the trench or bedding material.

G. All Bedding materials shall achieve the required densities by tamping with suitable tools and shaped to receive the pipe and support it at the exact elevation and line as shown on the Drawings.

H. Wet excavation:

1. Where the excavation area shown on the Drawings falls under the water surface near the banks of a flowing stream or other body of water or in high ground water areas, the CONTRACTOR may adopt and carry out any method he may deem feasible for the performance of the excavation work and for the protection of the work thereafter; provided the method and equipment to be used has received prior approval of the ENGINEER.

2. During the selected method of construction, the excavation area shall be effectively protected from damage during the excavation period and until all contemplated construction work therein has been completed to the satisfaction of the ENGINEER.

3. The cost of all temporary construction work necessary or incidental thereto, including the cost of installing and removing sand bags, coffer dams, sheet piling, excavation and backfill, pumping and dewatering, shall be considered as an integral part of the cost of excavation and no separate payment therefore shall be allowed or made.

I. Disposal of materials:

1. Disposal of waste materials and smoothing of disturbed material during trenching operations shall be performed as the pipe is laid and shall not be allowed to lag more than 500 feet behind the pipe laying operations.

2. All materials removed by excavation which are suitable for the purpose shall be used whenever practicable for backfilling pipe trenches, foundations and footings, and for such other purposes as may be shown on the Drawings or directed by the ENGINEER.

3. All materials not used for backfilling, foundations, or footings shall be considered as waste materials and disposed of by the CONTRACTOR in an approved manner.

4. Waste materials may be deposited in spoil banks at locations as shown on the Drawings.

5. If no disposal areas are shown on the Drawings, the CONTRACTOR shall provide at his own expense disposal areas satisfactory to the ENGINEER.

6. Waste materials shall not be left in unsightly piles, but shall be spread in uniform layers and neatly leveled and shaped.

7. Spoil banks shall be provided with adequate openings to permit surface drainage of adjacent lands.

8. On completion of any part of the work proper disposal shall be made of all surplus or unused materials left within the construction limits of such work and the surface of the work left in a neat and workmanlike condition.

3.03 WATER IN TRENCHES

A. Trenches shall be reasonably free from water while the pipes are being laid.

1. The CONTRACTOR shall remove and dispose of any water (including storm water), sewage, or any other liquid which may be found or may accumulate in the excavations.

2. This may be done by pumping, an adequate well point system, or other means of dewatering approved by the ENGINEER.

B. The CONTRACTOR shall examine the site after excavating, and before proceeding with the work he shall notify the ENGINEER of any evidence of water rising in such areas.

C. Static water levels shall be drawn down below the bottom of the excavation sufficiently to allow for placement of bedding and backfill.

1. Under certain conditions, the ENGINEER may permit the CONTRACTOR to remove the water with the use of trenchside pumps through the use of an approved bedding.

2. The depth of bedding material will depend upon the amount of water, but care shall be taken to ensure that the trench wall soil material is such that it will not be removed from the area adjacent to the bedding.

D. The CONTRACTOR shall not open up more trench than the available pumping facilities are able to dewater.

E. The CONTRACTOR shall assume responsibility of disposing of all water so as not to injure or interfere with the normal drainage of the territory in which he is working.

F. In no case shall the pipe lines be used as drains for such water, and the ends of the pipe shall be kept properly and adequately blocked during construction by the use of approved stoppers and not by improvised equipment.

G. All necessary precautions shall be taken to prevent the entrance of mud, sand, or other obstructing matters into the pipe lines, and on completion of the work, any such material which may have entered the pipe lines must be cleaned out so that the entire system will be left clean and unobstructed.

H. Release of groundwater to its static level shall be performed in a manner to maintain undisturbed state of natural foundation soils, prevent disturbance of compacted backfill or bedding, and prevent flotation of pipelines.

I. The CONTRACTOR shall at all times have on hand sufficient pumping equipment and machinery in good working condition for all ordinary emergencies, and shall have available at all times competent workmen for operation of pumping equipment.

J. Dewatering systems shall be designed and operated to prevent removal of natural soils and to prevent excessive reductions in the groundwater outside the excavation to the extent that it would damage or endanger adjacent structures or property.

3.04 ROCK EXCAVATION

A. Where rock is encountered in the process of trench excavation it shall be completely uncovered and stripped of all loose material over the area as specified herein.

B. Rock shall be excavated with jack hammer and other power tools. No blasting shall be allowed on this project.

C. Ledge rock, boulders, and large stones shall be removed to provide a clearance of not less than 6 inches in every horizontal direction from all parts of pipe, fittings, and other appurtenances.

D. Where rock is encountered at grade in trenches, the trench shall be excavated not less than 6 inches below the bottom of the pipe bell, refilled with fine, granular material thoroughly tamped in-place and shaped to the pipe.

E. Excavated rock shall not be mixed with material selected for tamped backfilling under and around the pipe or up to a level at least two feet above the pipe.

3.05 TRENCH SIZE

A. Gravity piping:

1. As soil conditions will permit, the sides of trenches shall be cut in vertical, parallel planes from the bottom of the trench to the top of the pipe and have maximum width of two (2) feet plus the outside diameter of the pipe as shown on the Drawings.

2. The width of the remaining depth of the trench may be as wide as necessary except as restricted by limits of right-of-way or existing improvements that are to be protected; the sides, however, shall be as nearly vertical as practicable or allowable.

3. If the trench width from the bottom of the trench to the top of the pipe is over-excavated in excess of that specified, sewers shall be laid on a gravel bedding at no extra cost to the OWNER.

B. Pressure Piping:

1. Trenches for pressure piping shall provide a minimum of 30-inches cover over the barrel of the pipe, except as otherwise shown.

2. Width of trench at and below top of the pipe shall not exceed twelve (12) inches on either side of pipe.

3. Width of trench above top of pipe may be as wide as necessary within limits of right-

of-way, with banks as nearly vertical as practicable or allowable, and except as restricted by existing improvements, that are to be protected.

3.06 EXCAVATION FOR APPURTENANCES AND STRUCTURES

A. Excavation for appurtenances shall be made to a size that will allow at least 12 inches between the outer surfaces of the appurtenance and the excavation wall or shoring.

B. Excavation for precast manholes and other precast structures shall be undercut six (6) inches below the bottom of the precast structure and shall be backfilled with gravel bedding as specified under the bedding material in this section.

C. Undercutting and providing a bedding for structures shall be considered as an integral part of the work and no separate payment shall be allowed or made.

3.07 EMBEDMENT OF PIPE

A. Pipeline embedment shall consist of all bedding materials, including concrete, foundation and initial backfill as shown on the Drawings.

B. Class A Embedment:

1. Concrete Cradle: The pipe shall be embedded in a monolithic cradle of plain or reinforced concrete.

    a. The minimum thickness shall be one-fourth the inside pipe diameter or a minimum of 4 inches under the barrel and extending up the sides for a height equal to one-fourth the outside diameter.

    b. The cradle shall have a width at least equal to the outside diameter of the pipe barrel plus 8 inches or poured to the full width of the trench.

2. Concrete arch: The pipe shall be embedded in carefully compacted gravel bedding with a monolithic plain or reinforced concrete arch.

    a. The gravel bedding shall have a thickness of one-fourth the outside diameter or 3 inches minimum between the barrel and bottom of trench excavation extending to the springline of the pipe.

    b. The concrete arch shall have a minimum thickness of one-fourth the inside diameter at the crown and have a minimum width equal to the outside pipe diameter plus 8 inches or poured to the full width of the trench.

C. Class B Embedment:

1. Class B embedment shall be used where an unstable trench bottom condition is encountered or where established by the ENGINEER or where shown on the

Drawings.

2. The pipe shall be laid on gravel bedding placed on a flat trench.

3. The gravel bedding shall have a minimum thickness of one-fourth (1/4) the outside pipe diameter.

4. The gravel bedding shall extend to the springline of the pipe barrel, or one-half (1/2) the outside diameter of the pipe.

D. Class C Embedment:

1. Class C embedment shall be used as the normal or ordinary embedment and shall be used unless unstable trench conditions are present or where otherwise shown on the Drawings.

2. The pipe shall be embedded in fine granular material on a trench bottom which shall be level in cross-section except that a continuous trough shall be shaped in the bedding which will fit the pipe barrel with reasonable closeness.

3. The bedding shall have a minimum thickness beneath the pipe of 6 inches or one-eighth (1/8) of the outside diameter of the pipe, whichever is greater.

4. The bedding shall extend up the sides of the pipe one-sixth (1/6) of the outside diameter of the pipe.

E. Initial backfill material, which is from the bedding to one (1) foot above the pipe:

1. Shall be carefully deposited in successive horizontal layers of not more than twelve (12) inches in loose depth on each side of the pipe.

2. Shall be thoroughly and carefully tamped or rammed around the pipe with approved tools until reaching a minimum cover of not less than one (1) foot over the top of the pipe.

3.08 ALTERNATE FOUNDATIONS

A. Where the bottom of the trench is found to consist of material which is unstable to such a degree that, in the opinion of the ENGINEER, it cannot be removed and replaced with an adequate bedding material, alternative foundations methods may be required.

B. The ENGINEER may require, depending upon the severity of the unstable soil, to provide special foundations such as piling, concrete mats (or a combination thereof), sheeting with keyed-in plank foundation, or other means of stabilization.

C. The type of alternative foundation methods shall be constructed in accordance with the Drawings or as approved by the ENGINEER.

D. Should additional instructions or Detailed Drawings be required; they will be furnished in accordance with the Supplemental General Conditions.

3.09 BACKFILLING TRENCHES

A. The backfilling of sewer or other pipe line trenches shall be started immediately after the pipe work and embedment preparation has been inspected by the ENGINEER.

B. Final backfill material, which if from a height of one (1) foot above the pipeline upward:

1. Shall be backfilled in well compacted layers.

2. If the trench extends along or across streets, roadways, useable alleys, or sidewalks or any areas to be paved in new construction, the remainder of the trench shall be backfilled and tamped to its full depth in the manner specified for initial backfill.

3. Shall be backfilled in the manner specified for initial backfill where indicated on the Drawings.

C. Placement of backfill material in layers greater than twelve (12) inches loose fill shall require prior approval of compaction methods and equipment.

D. All backfilling shall be done in such manner as will not disturb or injure the pipe or structure over or against which it is being placed.

E. Any pipe or structure injured, damaged or moved from its proper line or grade during backfilling operations shall be opened up and repaired and then re-backfilled as herein specified.

F. Where excavation has been made, the top one (1) foot of backfill material shall consist of fine, loose earth free from large clods, vegetable matter, debris, stone, or other objectionable materials.

G. Temporary surfaces:

1. Where pipe trenches are cut across or along existing pavement, the CONTRACTOR shall construct a temporary surface over the cut by filling and tamping the upper 6 inches of the cut with selected gravel, crushed stone or reef which will not disintegrate under traffic and which shall be maintained in good condition under traffic until the permanent pavement has been constructed.

2. No specific payment will be allowed for temporary surfacing.

3.10 COMPACTION AND TESTING

A. Compaction and testing for quality control shall be in conformance with Section 01400 and the Specific requirements of this Section.

B. The cost of all material testing required shall be paid for by the CONTRACTOR and shall be included in the lump sum price bid.

C. Minimum tests required on all materials to prove compliance with the specifications shall be as follows:

1. A determination of soil classification, sieve analysis, maximum dry density as per ASTM D-698 and optimum moisture content shall be made from each material source.

2. In-place density test shall be made on all materials under roadways, streets, useable alleys, or other similar areas as required by the ENGINEER.

D. Compaction requirements:

1. Unless otherwise specifically noted elsewhere in these Specifications or on the Drawings, material shall meet the following compaction requirements.

a. Bedding and initial backfill material shall be well compacted.

b. Final backfill and embankments shall be compacted to a density equal to or greater than the surrounding undisturbed soil.

c. Compaction on total (initial & final) backfill and base material under roadways shall meet density requirements as indicated on the Drawings.

d. Embedment shall be well compacted.

2. The theoretical maximum density shall be arrived at in the manner prescribed under applicable documents.

3. Material containing excessive moisture shall not be placed.

4. Its placement may be delayed until it has dried out to the proper moisture content, or it may be thoroughly mixed with a drier material to obtain the desired water content.

5. Material with insufficient moisture shall be wetted before compaction sufficiently to obtain the desired moisture content.

6. Adequate equipment for furnishing and sprinkling water shall be kept available at all times during the progress of the work.

3.11 SURFACE RESTORATION AND CLEAN-UP

A. CONTRACTOR shall properly restore to the satisfaction of the ENGINEER all surfaces, pavements and drives, sidewalks and curbs, or whatever construction and irrespective of the type, which may be required to be removed or disturbed in the progress of work required under this Contract.

B. Surface Restoration:

1. Once backfilling has been completed and all objectionable material has been removed, surface restoration shall be conducted.

2. The CONTRACTOR shall fine grade all disturbed areas within the construction limits, unless otherwise directed by the ENGINEER.

3. Upon completion of fine grading the CONTRACTOR shall seed all disturbed areas, unless otherwise shown on the Drawings in accordance with Grassing: Section 02200.

4. Shrubbery of trees shall be properly heeled-in and replanted.

C. Pavement Replacement:

1. The CONTRACTOR shall replace all pavements removed for construction of the pipe lines and appurtenances, and shall also remove and replace at his own expense, any and all pavements adjacent to excavation which may have been disturbed or damaged as the result of construction operations.

2. The operations and materials required to provide a satisfactory replacement of roadbed and pavement shall be in accordance with Section 02550 of these Specifications.

3. Pavement and base replacement shall consist of 3" minimum bituminous plant mix surface on 8" of sand clay base unless otherwise specifically shown of the Drawings or directed by the Owner's representative.

D. Driveway and Sidewalk Replacement:

1. Driveways and sidewalks shall be replaced with the same material and thickness as was removed.

2. Where driveways or sidewalks are concrete, entire slabs or squares shall be removed and replaced.

3. The sub-base shall be thoroughly rolled or tamped to provide the original density of the material before removal.

E. Curb Replacement:

1. Curbing or gutters shall conform accurately to size, line, grade, and materials with the adjoining curbing or gutters.

2. The subsoil and foundation material shall be well compacted so as to prevent any settlement of concrete curbing or gutters.

F. Raising of Casting:

1. All utility casting shall be raised as required to meet the final grade of the pavement unless shown otherwise on the Drawings.

G. Clean-up and Maintenance:

1. All excavated areas, backfills, embankments, trenches and access road grading and ditches shall be maintained by the CONTRACTOR in good condition at all times until final acceptance by the OWNER.

2. Any settlement or washing that may occur prior to acceptance of the work, shall be repaired and grades re-established to the required elevations and slopes.

3. All debris and construction material and equipment shall be removed from the job site as soon as the work is completed.

4. All rights-of-way shall be left in a clean, neat and serviceable condition.

END OF SECTION

SECTION 02222

EXCAVATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Excavation for building and structure foundations.
B. Excavation for slabs-on-grade, paving and landscaping.
C. Excavation for site structures.

1.2 RELATED SECTIONS

A. Section 01400 - Quality Control: Inspection of bearing surfaces.
B. Section 02223 - Backfilling.

1.3 FIELD MEASUREMENTS

A. Verify that survey benchmark and intended elevations for the Work are as indicated.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 PREPARATION

A. Identify required lines, levels, contours, and datum.
B. Identify known underground, above ground, and aerial utilities. Stake and flag locations.
C. Notify utility company to remove and relocate utilities.
D. Protect above and below grade utilities which are to remain.
E. Protect plant life, lawns, rock outcropping and other features remaining as a portion of final landscaping.
F. Protect bench marks, existing structures, fences, sidewalks, paving, and curbs from excavation equipment and vehicular traffic.

3.2 EXCAVATION

A. Excavate subsoil required to accommodate building foundations, slabs-on-grade paving and site structures, construction operations.
B. Excavation cut not to interfere with normal 45 degree bearing splay of foundation.

C. Grade top perimeter of excavation to prevent surface water from draining into excavation.
D. Hand trim excavation. Remove loose matter.
E. Remove lumped subsoil, boulders, and rock up to 1/3 cu yd measured by volume.
F. Notify Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
G. Correct unauthorized excavation at no extra cost to Owner.
H. Correct areas over-excavated by error in accordance with Section 02223.
I. Stockpile excavated material in area designated on site and spread excess material not being reused in designated area.

3.3 FIELD QUALITY CONTROL

A. Field inspection will be performed under provisions of Section 01400.
B. Provide for visual inspection of bearing surfaces.

3.4 PROTECTION

A. Protect excavations by methods required to prevent cave-in or loose soil from falling into excavation.
B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

END OF SECTION

SECTION 02223

BACKFILLING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Foundation perimeter and site structure backfilling to subgrade elevations.
B. Site filling and backfilling.
C. Fill under slabs-on-grade and paving.
D. Consolidation and compaction.
E. Fill for over-excavation.

1.2 RELATED SECTIONS

A. Section 01400 - Quality Control: Testing fill compaction.
B. Section 02222 - Excavation.
C. Section 03300 - Cast-in-Place Concrete: Concrete materials.

1.3 REFERENCES

A. ANSI/ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates.
B. ANSI/ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb Rammer and 12 inch Drop.
C. ANSI/ASTM D1556 - Test Method for Density of Soil in Place by the Sand-Cone Method.
D. ANSI/ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb Rammer and 18 inch Drop.

1.4 SUBMITTALS

A. Submit under provisions of Section 01300.

PART 2 - PRODUCTS

2.1 FILL MATERIALS

A. Type A - Structural Fill - Types GW, GM, GC, GP, SW, SP, SM with a PI between 5 and 12 and free of organic materials and rocks, lumps or other items larger than 2 inches.
B. Type B - Ordinary Fill - Types GW, SM, GC, SW, SP, SM, SS, CL or CH with a PI between 5 and 18 and free of organic materials and rocks, lumps or other items larger than 2 inches.
C. Type C - Sand - Natural river or bank sand; free of silt, clay, loam, friable or soluble materials, or organic matter; graded in accordance with ANSI/ASTM

C136.

D. Concrete: Structural concrete conforming to Section 03300.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify fill materials to be reused are acceptable.

3.2 PREPARATION

A. Generally, compact subgrade to density requirements for subsequent backfill materials.
B. Cut out soft areas of subgrade not capable of insitu compaction. Backfill with Type B fill and compact to density equal to or greater than requirements for subsequent backfill material.
C. Prior to placement of aggregate base course material at paved areas, compact subsoil to 95 percent of its maximum dry density in accordance with ANSI/ASTM D698.

3.3 BACKFILLING

A. Backfill areas to contours and elevations with unfrozen materials.
B. Systematically backfill to allow maximum time for natural settlement. Do not backfill overporous, wet, frozen or spongy subgrade surfaces.
C. Type A and B Fill: Place and compact materials in continuous layers not exceeding 8 inches
compacted depth.
Type C Fill: Place and compact material in continuous layers not exceeding 4 inches compacted depth.
D. Type C Fill: Place and compact material in continuous layers not exceeding 4 inches compacted depth.
E. Employ a placement method that does not disturb or damage utilities in trenches.
F. Maintain optimum moisture content of backfill materials to attain required compaction density.
G. Backfill against supported foundation walls. Do not backfill against unsupported foundation walls except for cantilevered retaining walls.
H. Backfill simultaneously on each side of unsupported foundation walls.
I. Slope grade away from building minimum 2 inches in 10 ft, unless noted otherwise.
J. Make grade changes gradual. Blend slope into level areas.
K. Spread surplus backfill materials in designated areas.
L. Leave fill material stockpile areas completely free of excess fill materials.

3.4 TOLERANCES

A. Top Surface of Backfilling: Plus or minus one inch from required elevations.

3.5 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Section 01400.
B. Tests and analysis of fill material will be performed in accordance with ANSI/ASTM D698 or D1557 and with Section 01400.
C. Compaction testing will be performed in accordance with ANSI/ASTM D698 and with Section 01400.
D. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.
E. Frequency of Tests: 1 test for each 1000 square feet of plan area.
F. Proof roll compacted fill surfaces under slabs-on-grade and paving.

3.6 PROTECTION OF FINISHED WORK

A. Protect finished Work under provisions of Section 01500.
B. Recompact fills subjected to vehicular traffic.

3.7 SCHEDULE

A. Interior Slab-On-Grade:
    1. Type A fill, compacted to 95 percent.
    2. Cover with Type C fill, 2 inches thick, compacted to 95 percent.
B. Exterior Side of Foundation Walls:
    1. Type B fill, to subgrade elevation, each lift, compacted to 90 percent.
C. Fill Under Grass Areas:
    1. Type B fill, to 6 inches below finish grade, compacted to 85 percent.
D. Fill to Correct Over-excavation:
    1. Type D fill, flush to required elevation.
E. Fill Over Excavation of Material:
    1. Type A fill, to 8 inches below finish grade, compacted to 95 percent.

END OF SECTION

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SECTION 02225

FLEXIBLE BASE MATERIAL

1. DESCRIPTION OF WORK

1.1. Description

1.2. This item governs furnishing and placing a crushed stone base course for surfacing, pavement, or other base courses. “Flexible Base" shall be constructed on an approved, prepared surface in one or more courses conforming to the typical sections and to the lines and grades, indicated on the Drawings or established by the Engineer or designated representative.

1.3. This specification is applicable for projects or work involving either inch-pound or SI units. Within the text and accompanying tables, the inch-pound units are given preference followed by SI units shown within parentheses.

1.4. Submittals

1.4.1. The submittal requirements of this specification item may include:

1.4.1.1. Source, gradation and TxDoT test results for the crushed limestone material,

1.4.1.2. Notification that the crushed limestone is completed and ready for testing, and

1.4.1.3. Field density test results for in-place compacted flexible base,

1.5. Material

1.5.1. Mineral Aggregate

1.5.1.1. The material shall be crushed argillaceous limestone meeting the requirements specified herein. The material shall be from sources approved by the City and shall consist of durable crushed stone that has been screened to the required gradation.

1.5.1.2. Flexible base materials shall be tested according to the following TxDoT standard test methods:

a) Preparation for Soil Constants and Sieve Analysis	Tex-101-E
b) Liquid Limit	Tex-104-E
c) Plastic Limit	Tex-105-E
d) Plasticity Index	Tex-106-E
e) Sieve Analysis	Tex-110-E
f) Wet Ball Mill	Tex-116-E
g) Triaxial Test	Tex-117-E, Part II

1.5.2. Base material shall be stockpiled after crushing, then tested by the City's designated laboratory and approved by the Engineer or designated representative prior to being hauled to the Project.

1.5.3. The material shall be well graded and shall meet the following requirements:

Sieve Designation		Other Requirements	% Retained	
US	SI			
1 3/4"	45 mm		0	
7/8"	22.4 mm		10-35	
3/8"	9.5 mm		30-50	
#4	4.75 mm		45-65	
#40	425 μm		70-85	
		Maximum Plasticity Index		10
		Maximum Wet Ball Mill		42
Maximum Increase in passing #40 (425 μm) sieve from Wet Ball Mill Test			20	

1.5.4. Minimum compressive strength when subjected to the triaxial test shall be 35 psi at 0 psi lateral pressure [240 kiloPascal (kPa) at 0 kPa lateral pressure] and 175 psi at 15 psi lateral pressure [1200 kiloPascal (kPa) at 100 kPa lateral pressure].

1.6. Stockpiling, Storage and Management

1.6.1. Managing Material:

1.6.1.1. The stockpile shall be constructed on a relatively smooth area that has been cleared of debris, weeds, brush, trees and grass. Stockpiles shall contain between 25,000 and 50,000 cubic yards (19,100 to 38,200 cubic meters). The stockpile shall be constructed using scrapers, bottom dumps or other

similar equipment that allows dumping and spreading without rehandling. The stockpile shall be constructed to allow dumping and spreading in one direction only. The height of the stockpile shall not exceed the capabilities of available equipment to make a full cut (bottom to top) on any of the four sides.

1.6.1.2. A stockpile shall be completed before being tested by the City. The Contractor's supplier shall notify the City when a stockpile has been completed and is ready to be tested. The stockpile shall not be added to after it has been tested.

1.6.1.3. The Contractor shall provide material only from stockpiles that have been inspected, tested and accepted by the City. A ticket showing the date, source, stockpile number, and net weight (mass) shall be provided to the Inspector with each load of material delivered to the Project.

1.6.1.4. Material shall be loaded from the stockpile by making successive vertical cuts through its entire depth.

1.6.2. Test Sampling:

1.6.2.1. The Contractor's supplier may choose the method of sample gathering for testing by the City's laboratory as follows:

1.6.2.1.1. The supplier shall make a full-height cut a sufficient distance into each side of the stockpile to obtain a uniform sample. The four samples (one from each side of the stockpile) shall then be combined and mixed into a single "test" specimen from which the City's laboratory can obtain a sample.

1.6.2.1.2. As the stockpile is constructed, a perpendicular cut will be made across the spreading direction at every two feet to four feet (0.6 to 1.2 meters) of height and the sample used to start a "mini" stockpile. The process shall be repeated in two feet to four feet (0.6 to 1.2 meter) increments of height, until the stockpile and the "mini" stockpile are completed. Samples shall be obtained from the "mini" stockpile in the same manner described in (1) above.

1.6.3. Testing and Acceptance:

1.6.3.1. The City will pay for initial testing of the stockpiled material. When initial tests indicate that the material is unacceptable, the City may, if requested by the Contractor's supplier, sample and test the material one more time. The additional sampling and testing shall be paid for by the supplier.

1.7. Construction Methods

1.7.1. Preparation of Subgrade:

1.7.1.1. Flexible base shall not be placed until the Contractor has verified by proof rolling that the subgrade has been prepared and compacted in conformity with Standard Specification Item 201S, "Subgrade Preparation," to the typical sections, lines and grades indicated on the Drawings. Any deviation shall be corrected and proof rolled prior to placement of the flexible base material.

1.7.1.2. The Contractor shall not place flexible base until the subgrade has cured to the satisfaction of the Engineer or designated representative, regardless of whether or not the subgrade has been successfully proof rolled. As a minimum, this will be after the surface displays no damp spots and there is no evidence of “sponginess” in the subgrade.

1.7.2. First Lift:

1.7.2.1. Immediately before placing the flexible base material, the subgrade shall be checked for conformity with grade and section. The thickness of each lift of flexible base shall be equal increments of the total base depth. No single lift shall be more than six inches (150 mm) or less than three inches (75 mm) compacted thickness.

1.7.2.2. The material shall be delivered in approved vehicles. It shall be the responsibility of the Contractor to deliver the required amount of material. If it becomes evident that insufficient material was placed, additional material as necessary shall be delivered and the entire course scarified, mixed and compacted.

1.7.2.3. Material deposited upon the subgrade shall be spread and shaped the same day unless otherwise approved by the Engineer or designated representative. In the event inclement weather or other unforeseen circumstances render spreading of the material impractical, the material shall be spread as soon as conditions allow.

1.7.2.4. Additionally, if the material cannot be spread and worked the same day it is deposited, the Contractor shall "close up" the dump piles before leaving the job site. “Closed up” shall be defined as the use of a motor grader to blade all dump piles together, leaving no open space between piles.

1.7.2.5. The material shall be spread, sprinkled, if required, then thoroughly mixed; bladed, dragged and shaped to conform to the typical sections indicated on the Drawings.

1.7.2.6. All areas and "nests" of segregated coarse or fine material shall be corrected or removed and replaced with well-graded material.

1.7.2.7. Each lift shall be sprinkled as required to bring the material to optimum moisture content, then compacted to the extent necessary to provide not less than the percent density specified in Section 210S.5.D, "Density." In no case shall the material be worked at more than 2 percent above or below optimum moisture as determined by TxDoT Test Method Tex-113-E. In addition to the requirements specified for density, the full depth of flexible base material shall be compacted to the extent necessary to remain firm and stable under construction equipment. After each section of flexible base material is completed, tests, as necessary, will be made by the Engineer or designated representative. As a minimum, three in-place density tests per section per day will be taken. If the material fails to meet the density requirements, it shall be reworked as necessary to meet these requirements. All initial testing will be paid for by the City. All retesting shall be paid for by the Contractor.

1.7.2.8. Throughout the entire operation, the surface of the material shall be maintained by blading and, upon completion, shall be smooth and shall conform to the typical section indicated on the Drawings and to the established lines and grades.

1.7.2.9. In that area on which pavement is to be placed, any deviation in excess of 1/4 inch (6.5 mm) in cross section or 1/4 inch in a length of 16 feet (6.5 mm in a length of 5 meters) measured longitudinally shall be corrected by loosening, adding or removing material, and by reshaping and recompacting. All irregularities, depressions or weak spots shall be corrected immediately by scarifying the areas affected, adding suitable material as required, and by reshaping and recompacting. Should the lift, due to any reason or cause, lose the required stability, density and/or finish before the surfacing is complete, it shall be recompacted and refinished at the Contractor's expense.

1.7.3. Succeeding Lifts:

1.7.3.1. Construction methods for succeeding lifts shall be the same as prescribed for the first lift. For that lift of the flexible base upon which the curb and gutter will be constructed, as well as the last flexible base lift (i.e. top of the flexible base), the Contractor shall check the surface of the lift for conformity to the lines and grades by setting "blue tops" at intervals not exceeding 50 feet (15 meters) on the centerline, at quarterpoints, at curb lines or edge of pavement, and at other points that may be indicated on the Drawings.

1.7.3.2. When the thickness of a particular lift of the flexible base is in question, the Contractor shall check the surface of the lift for conformity to the lines and grades by setting "blue tops" at intervals not exceeding 50 feet (15 meters) on the centerline, at quarter points, at curb lines or edge of pavement, and at other points that may be indicated on the Drawings

1.7.4. Density:

1.7.4.1. The flexible base shall be compacted to not less than 100 percent density as determined by TxDoT Test Method Tex-113-E.

1.7.4.2. Field density determination shall be made in accordance with TxDoT Test Method Tex-115-E unless otherwise approved by the Engineer or designated representative. Each lift of the flexible base shall also be tested by proof rolling in conformity with Standard Specification Item 236S “Proof Rolling.”

1.7.5. Priming:

1.7.5.1. After the flexible base material has been compacted to not less than 100 percent density, and tested by proof rolling, a prime coat will be applied in accordance with Standard Specification Item 306S, "Prime Coat."

1.7.6. Curing:

1.7.6.1. Pavement materials, such as a tack coat or surface course, shall not be placed on the primed surface until the prime coat has been absorbed into the base course. At least 24 hours, or longer if designated by the Engineer or designated representative, shall be allowed when cutback asphalt is used as the prime coat.

1.8. Measurement

1.8.1. "Flexible Base" will be measured by the cubic yard (cubic meter: 1 cubic meter equals 1.196 cubic yards), complete in place, as indicated in the Contract Documents.

1.9. Payment

1.10. This item will be paid for at the contract unit bid price for "Flexible Base". The unit bid price shall include full compensation for all work specified herein, including the furnishing, hauling, placing and compacting of all materials; for rolling, proof rolling, recompacting and refinishing; for all water required; for retesting as necessary; for priming; and for all equipment, tools, labor and incidentals necessary to complete the Work.

1.11. Payment will be made as part of the lump sum bid for Site Work.:

END

SECTION 02226

OSHA - EXCAVATION, TRENCHING AND SHORING REQUIREMENTS

PART 1 -GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Conditions of the Contract for Construction, Supplementary Conditions and Division 1 -General Requirements apply to Work of this Section.

1.2 RELATED SECTIONS

A. Section 02201 - Excavation, Grading and Subgrade Preparations
B. Section 02732 - Sanitary Sewer

1.3 RESPONSIBILITY

A. Proposers are required to follow the requirements of Occupational Safety and Health Administrative Section 1926.650, Subpart P - Excavations, Trenching and Shoring. Refer to attachment at the back of this section.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

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SECTION 02317

HORIZONTAL EARTH BORING AND PIPE JACKING

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. Earthwork: Section 02310

1.02 DESCRIPTION

A. The Work of this Section consists of operations, equipment, methods and materials necessary to install horizontal casing pipe as shown on the Contract Drawings. The casing pipe shall be either bored or jacked at the option of the Contractor.

1.03 SUBMITTALS

A. Shop Drawings: Detailed drawings showing the methods and procedures of the installation. This submittal will not relieve the Contractor of complete responsibility for the successful performance of the intended installation procedure.

1.04 PROJECT CONDITIONS

A. Existing Conditions:

1. Field conditions may require that the actual jacking operations be continued without interruption in order to prevent undermining of the surface area.

2. Should the Owner's Representative permit interruption of jacking operations, the Contractor shall provide bulkheads and dewatering measures as approved by the Owner's Representative.

PART 2 PRODUCTS

2.01 MATERIALS

A. Pipe Casing: Standard NPS, plain-end, steel pipe; ASTM A 53.
1. Outside Diameter -4 inches.
2. Minimum Wall Thickness: 0.500 inch.

2.02 MECHANICAL PIPE END SEALS

A. Interlocking links of solid synthetic rubber connected by corrosion resistant bolts and nuts to form a sealing belt in an annular pipe space; Link-Seal by Thunderline Link-Seal, Inc., 6525 Goforth St., Houston, TX 77021, (713) 747-8819.

2.03 SAND

A. Sound, durable bedding material free from organic or other deleterious material with 100 percent passing a No. 20 sieve.

2.04 CASING SPACERS

A. High density polyethylene (HDPE) , flexible spacers; “Raci” by Public Works Marketing, Inc., P. O. Box 38174, Dallas, TX 75238-0174, (214) 340-4226.

PART 3 EXECUTION

3.01 PREPARATION

A. Underground Utilities:

B.

1. Locate and mark-out existing, underground utilities between the boring/jacking and receiving pits.

2. Determine vertical orientation and depths of utility lines between the boring/jacking and receiving pits.

C. Pit Preparation:

1. Excavate boring/jacking pit and receiving pit.

2. Remove excavated material unsuitable for backfill from the Site.

3. Overexcavate pits to allow for placement of 12 inches of No. 2 course aggregate in pit bottom.

4. Dewater pits as required and as directed.

3.02 INSTALLATION

A. Locate boring/jacking pit and receiving pit a minimum of 25 feet from the edge of the roadway, railway, or other right-of-way.

B. Pipe Casing for Jacking:

1. Weld joints completely around the circumference of the pipe.

2. Install carrier pipe through the casing pipe with casing spacers secured.
   a. Install casing spacers in accordance with manufacturer's printed instructions and recommended spacing.
3. Completely fill the casing-carrier pipe annular space with sand.
4. Install the mechanical pipe end seals to close-off both ends of the casing pipe.

3.03 MAINTENANCE AND RESTORATION

A. Restore grades to original levels where settlement or damage due to performance of the Work has occurred. Correct conditions contributing to settlement. Remove and replace improperly placed or poorly compacted fill materials.

B. Restore pavements, walks, curbs, lawns, and other surface features damaged during performance of the Work to match the appearance and performance of existing corresponding features as closely as practicable.

C. Topsoil and seed or sod damaged lawn areas. Water as required until physical completion of the Work.

END OF SECTION

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SECTION 02331

PLASTIC WATER PIPE AND FITTINGS

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. Excavation: Section 02310.

B. Disinfection: Section 02333

1.02 SUBMITTALS

A. Product Data: Manufacturer's specifications with detailed information regarding dimensions, pressure rating, fittings and installation instructions. Manufacturer's data must indicate compliance with the standards specified herein.

PART 2 PRODUCTS

2.01 GENERAL

A. Provide pipe and fittings approved by the National Sanitation Foundation (NSF) for use with potable water.

B. Each length of pipe (coils at 5 feet intervals) shall be marked to identify size, material type and grade, pressure rating, ASTM Designation, manufacturer, and NSF approval.

2.02 POLYVINYL CHLORIDE (PVC) PIPE

A. Comply with AWWA Specification C900 for nominal pipe diameters 4 inches through 12 inches and with AWWA Specification C905 for nominal pipe diameters 14 inches through 36 inches.

B. Pipe Material: PVC 1120 meeting ASTM cell classification 12454-B..

C. Pipe used underground in sizes 1-1/2 inches and larger shall be joined using rubber gasketed bells or couplings. Pipe under 1-1/2 inches shall be joined by solvent cementing.

D. PVC pipe, SDR-PR; (Standard Dimension Ratio-Pressure Rated): ASTM D 2241.

E. PVC pipe, Schedule 40: ASTM D 1785.

F. PVC Pipe with integral bell-end for solvent cementing: ASTM D 2672.

G. Pipe shall be of the size, schedule, SDR, and pressure rating shown on the drawings or specified below.

PRESSURE RATINGS FOR PVC 1120 AND PVC 1220 NON-THREADED PIPE AT 23 DEGREES C (73.40 F)			
SDR	**PR (PSI)**	**SIZE (IN)**	**SCH.40 PR (PSI)**
13.5	315	1/2	600
17	250	3/4	480
21	200	1	450
26	160	1-1/2	330
32.5	125	2	280
41	100	3	260
64	63	4	220
		6	180

2.03 POLYETHYLENE (PE) PIPE

A. Comply with AWWA Specification C901.

B. Pipe Material: PE 3408 High Density Polyethylene (HDPE) meeting ASTM D 3350 cell classification of 334434-C.

C. Pipe:
1. PE Pipe (SIDR-PR) based on controlled inside diameter: ASTM D 2239.
2. PE Pipe (SDR-PR) based on controlled outside diameter: ASTM D 3035.

D. Pipe shall be of the size, SDR and pressure rating shown on the drawings or specified below.

PRESSURE RATINGS PER ASTM D 2239 AND ASTM D 3035 AT 23 DEGREES C (73.40 F)			
SIDR	**PR (PSI)**	**SDR**	**PR (PSI)**
5.3	250	7	267
7	200	9	200
9	160	11	160
11.5	125	13.5	128
15	100	15.5	110

E. Provide permanent identification of piping by co-extruding pipe identification, such as striping, into the pipe's outer surface. Identification material shall be the same material as the pipe material except for color. Identification printed or painted on the pipe surface will not be acceptable.

2.04 POLYBUTYLENE (PB) PIPE

A. Comply with AWWA Specification C902.

B. Pipe Material: PB 2110 meeting ASTM D 2581 material Type II, Grade 1, Class C.

C. PB Pipe (SIDR-PR) based on controlled inside diameter: ASTM D 2662.

D. PB Pipe (SDR-PR) based on controlled outside diameter: ASTM D 3000.

E. Pipe shall be of the size, SDR and pressure ratings shown on the drawings or specified below.

PRESSURE RATINGS PER ASTM D 2662 AND ASTM D 3000 AT 23 DEGREES C (73.4F)			
SIDR	**PR (PSI)**	**SDR**	**PR (PSI)**
9	200	11	200
11.5	160	13.5	160
15	125	17	125

2.05 PLASTIC FITTINGS

A. Provide fittings of the same size and pressure rating as the pipe to which they are connected.

B. Provide fittings as recommended by the pipe manufacturer to comply with the appropriate Standard listed below:

PVC Socket Type, Schedule 40: ASTM D 2466.

PE Fused Butt Type, Schedule 40: ASTM D 3261.

PE Fused Socket Type, SDR 11: ASTM D 2683.

Insert Type for PE pipe: ASTM D 2609.

C. Provide stainless steel clamps with insert type fittings for PE pipe.

2.06 SOLVENT CEMENT AND JOINTS

A. Solvent Cement for Joining PVC Pipe and Fittings: ASTM D 2564.

B. Rubber Gasketed Joints: ASTM D 3139.

PART 3 EXECUTION

3.01 INSPECTION

A. Inspect pipe and fittings before installation. Remove defective materials from the site.

3.02 GENERAL

A. Install pipe in accordance with the manufacturer's recommendations.

B. Underground Pipe: Install in accordance with ASTM D 2774.

C. PVC Pipe with Solvent Cemented Joints: Install in accordance with ASTM D 2855.

D. Pipe with Heat Fused Joints: Install in accordance with ASTM D 2657.

3.03 INSTALLATION

A. Install pipe as indicated on the Drawings.

B. Pipe in Trenches:
1. Keep trenches free from water.
2. Grade and shape trench bottom to insure a firm uniform bearing for the entire trench length. Provide a minimum cover of 4'-6" to finished grade unless otherwise shown on the drawings.
3. Cut pipe as recommended by the manufacturer.
4. Lay pipe on a continuously rising grade from low points to high points at service lines, air release valves or hydrants.
5. At each joint, dig a bell hole sufficiently wide and deep to allow the pipe barrel to bear uniformly on the trench bottom.
6. Construct concrete thrust blocks behind bends, tees, caps and plugs as shown on the drawings. Cast concrete against undisturbed earth.

3.04 PROTECTING PIPE

A. During the progress of the Work keep pipe clean from all sediment, debris, and other foreign material.

B. Close all open ends of pipes and fittings securely with removable plugs at end of Work day, during storms, when the Work is left at any time, and at such times as the Owner's Representative may direct.

3.05 DISINFECTION

A. Disinfect as specified in Section 02510.

3.06 PERFORMANCE

A. Description: Before testing, backfill or otherwise brace the pipe barrels between joints to prevent movement under pressure.

B. Hydrostatic Test: Before testing, backfill or otherwise brace the pipe barrels between joints to prevent movement under pressure.
   1. After the water main has been disinfected and before the pipe joints, fittings, valves, or other appurtenances are covered, expel and test the water main for two hours at 1.5 times the pressure rating(s) listed for the various types of pipe specified in Part 2.
   2. Remove all defective pipe, fittings, valves and appurtenances and replace with sound pipe, fittings, valves, or appurtenances, and repair all joints showing visible leaks until tight and repeat the test until satisfactory to the Owner's Representative.

C. Leakage Test:
   1. Conduct a leakage test after the pressure test has been satisfactorily completed.
   2. Leakage is defined as the quantity of water to be supplied into the laid pipe, or any valved section thereof, necessary to maintain the specified leakage test pressure after the pipe has been filled with water and the air expelled.
   3. The duration of each leakage test shall be two hours.
   4. During the leakage test subject the pipe to its rated pressure.
   5. No pipe installation will be accepted until the leakage is not more than the number of gallons per hour as determined by the following formula:

      $$\frac{L - ND \times \text{the square root of } P}{7400}$$

      in which:

      L = allowable leakage in gallons per hour

      N = number of joints in length of pipe line tested

      D = nominal diameter of pipe, inches

      P = average test pressure during the leakage test (PSI)

   6. Should any test of pipe disclose leakage greater than that computed by the above formula, locate and repair the defects so that the leakage is within the specified allowance. The hydrostatic and leakage tests shall be made on such lengths of pipe and in such manner as the Owner's Representative shall direct and in his presence. Keep trenches free from water to the satisfaction of the Owner's Representative until the completion of the tests.

D. Connections:
   1. Make connections between the pipe lines installed under this contract and the existing pipe lines or structures shown on the drawings. Should it be impossible to make a connection shown

on the drawings because the pipe with which the connection is shown to be made has not yet been installed, lay the pipe to a point directed by the Owner's Representative and plug or cap the end in a satisfactory manner; identify the terminal point with a stake extending above ground marked to indicate the pipe size and service.

END OF SECTION

SECTION 02333

DISINFECTION OF WATER UTILITY DISTRIBUTION

PART 1 GENERAL

1.01 QUALITY ASSURANCE

A. Conform to provisions of AWWA C-651 for water line disinfection. Do not use Tablet Method therein.

B. Conform to provisions of AWWA C-652 for water tank disinfection.

C. Comply with all requirements of the Texas Commission on Environmental Quality (TCEQ) for disinfection of potable water lines, valves, hydrants, storage tanks, and appurtenances.

PART 2 PRODUCTS

2.01 DISINFECTANT

A. Chlorine Gas meeting AWWA B301.

B. Hypochlorites meeting AWWA B300.

2.02 TEST KITS

A. High range test kit for chlorine residual (0-200 mg/1) Hach Chemical Co. Model CN-21P.

B. DPD chlorine residual test kit (0-3.5 mg/1) Hach Chemical Co. Model CN-66.

C. Test kits to remain property of the Contractor.

PART 3 EXECUTION

3.01 DISINFECTION - WATER MAINS

A. Flush mains with clear water at a minimum rate of 2.5 fps prior to disinfection. See Table 1.

TABLE 1 - WATER MAIN FLUSHING DATA		
PIPE DIAMETER (INCHES)	**FLUSHING RATE GPM @ 2.5 fps**	**HYDRANT OPENINGS @ 40 psi**
2	25	one - 2-1/2
4	100	one - 2-1/2
6	220	one - 2-1/2
8	390	one - 2-1/2
10	610	one - 2-1/2
12	880	one - 2-1/2
14	1200	two - 2-1/2
16	1570	two - 2-1/2
18	1985	two - 2-1/2
24	3525	one - 4-1/2 and one - 2-1/2

B. Chlorine Gas: Apply with a solution-feed chlorinator in combination with a booster pump for injecting the chlorine gas-water mixture into the main. Do not use direct feed chlorinators.

C. Hypochlorites: Apply solutions to water mains with a gasoline or electrically powered chemical feed pump designed for feeding chlorine solutions.

D. Application (Continuous Feed Method).
1. Connect chlorinator or force pump to water main upstream from point of repair or replacement, or new lines.
2. Proportion application rate of chlorine solution to obtain a minimum concentration of 50 mg/1 of available chlorine. Use high range test kit to determine concentration. See Table 2.

TABLE 2 - QUANTITY OF DISINFECTANT REQUIRED FOR 50 mg/l OF AVAILABLE CHLORINE PER 100 FT. OF PIPE							
PIPE DIAMETER (INCHES)	POUNDS		OUNCES			QUARTS	
	Cl GAS	SOLUTION 70%	HYPOCHLORITE 70%	14.7%	5.25%	14.7%	5.25%
2	0.1	0.1	0.2	0.8	2.1	0.1	0.1
4	0.1	0.1	0.6	3.0	8.3	0.1	0.3
6	0.1	0.1	1.4	6.7	18.7	0.2	0.6
8	0.1	0.2	2.5	11.9	33.2	0.4	1.1
10	0.2	0.3	3.9	18.5	51.9	0.6	1.6
12	0.3	0.4	5.6	26.7	74.7	0.9	2.4
14	0.4	0.5	7.6	36.3	102.0	1.2	3.2
16	0.5	0.7	10.1	47.5	133.0	1.5	4.2
18	0.6	0.8	12.6	60.0	168.0	1.9	5.3
24	1.0	1.4	22.4	107.0	298.0	3.4	9.4

3. In the absence of a meter, determine rate either by placing a pitot gage at discharge or by measuring the time to fill a container of known volume. See Table 3.

TABLE 3 - TIME FOR DISINFECTANT TO FLOW THROUGH 100 FT. OF PIPE - MINUTES			
PIPE DIAMETER (INCHES)	@ 25 GPM	@ 100 GPM	@ 500 GPM
2	0.7	0.2	0.04
4	2.6	0.7	0.13
6	5.9	1.5	0.3
8	10.5	2.6	0.5
10	16.3	4.1	0.8
12	23.5	5.9	1.2
14	32.0	8.0	1.6
16	41.8	10.5	2.1
18	52.9	13.2	2.7
24	94.0	23.5	4.7

4. Continue to apply chlorine solution until it reaches discharge. Check for the presence of chlorine at discharge by adding an orthotolidine reagent. In the presence of chlorine the reagent will turn red.
5. Maintain chlorinated water in the main for a minimum of 24 hours. At the end of this period chlorine concentration shall be at least 25 mg/1. Use high range test kit to determine concentration.
6. Operate all valves and hydrants to insure their proper disinfection.
7. Prevent back flow of super chlorinated water into existing distribution system.

E. Final Flushing:
   1. After a 24-hour retention period, flush main until maximum chlorine concentration is 1.0 mg/1. Use DPD chlorine residual test kit.
   2. Discharge super chlorinated water in a manner that will not adversely affect plants and animals. Comply with applicable State regulations for waste discharge.

F. Bacteriological Tests: Contact local health units for sampling criteria and procedures. Local health units may have more stringent criteria.
   1. Test water main for bacteriological quality before putting pipe into service. A minimum of two successive sets of samples shall be taken at 24-hour intervals. Both sets of samples shall indicate bacteriological safe water before putting the facility in operation. Pay all expenses incurred for testing.
   2. Tests shall be conducted by a laboratory approved by the TCEQ.

G. Give all test results to Owner's Representative.
   1. Should test results prove any part of the system bacteriologically unsafe, repeat disinfection procedures until satisfactory results are obtained.

3.02 DISINFECTION - WATER TANKS

A. Thoroughly remove dirt and loose material from interior of tank.

B. Disinfect tank using one of the following three procedures (Note that Procedure 1 does not require draining tank after chlorine application unless required to meet paragraph 3.02 C below).

Procedure 1: Direct application of chlorine solution to interior surfaces of tank.

1. Dissolve one ounce HTH (70 percent calcium hypochlorite) as a paste in each 26 gallons of clean water; or add 4 fluid ounces of 5 percent sodium hypochlorite to each 8 gallons of clean water; or add 4 fluid ounces of 14 percent sodium hypochlorite to each 24 gallons of clean water. Each of these solutions has a 200 mg/1 concentration of available chlorine.
2. Spray the chlorine solution over the inner surface of the cleaned, empty tank using tree-spraying equipment or whitewash brushes.
3. After a 30-minute retention period, fill tank with potable water and then follow the required procedure of paragraph 3.02 C. - Flushing.

Procedure 2: Adding disinfectant to water as tank is filled.

1. Dissolve 1/2 lb. HTH (70 percent calcium hypochlorite) as a paste in each 1000 gallons of water needed to fill the structure; or add 1

fluid ounce of 5 percent sodium hypochlorite to each 8 gallons of water; or add 1 fluid ounce of 14 percent sodium hypochlorite to each 24 gallons of clean water. Each of these solutions has a 50 mg/1 concentration of available chlorine. Add paste in batches as structure is being filled.

2. Allow chlorinated water to remain in tank from 6 to 24 hours. Drain tank and then follow the required procedure of paragraph 3.02 C. - Flushing.

Procedure 3: Add disinfectant with a portable chlorinator as water enters tank.

1. Add chlorine or hypochlorite solution to obtain a minimum concentration of 50 mg/1 of available chlorine.
2. Allow chlorinated water to remain in tank from 6 to 24 hours. Drain tank and then follow the required procedure of paragraph 3.02 C. - Flushing.

C. Flushing: Continuously fill and drain tank until water discharging from tank has a maximum chlorine concentration of 1.0 mg/1.
   1. Discharge super chlorinated water in a manner that will not adversely affect plants and animals. Comply with applicable State regulations for waste discharge.

D. Bacteriological Tests: Contact local health units for sampling criteria and procedures. Local health units may have more stringent criteria.
   1. Test water from tank for bacteriological quality before putting tank in service. A minimum of two successive sets of samples shall be taken at 24-hour intervals. Both sets of samples shall indicate bacteriological safe water before putting the facility in operation. Pay all expenses incurred for testing.
   2. Tests shall be conducted by a laboratory approved by the TCEQ.

E. Give all test results to the Owner's Representative.
   1. Should test results prove any part of the system bacteriologically unsafe, repeat disinfection procedures until satisfactory results are obtained.

END OF SECTION

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SECTION 02710

MISCELLANEOUS PIPING AND VALVES

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. This section covers the materials for all Polyvinyl Chloride (PVC) pipe, ductile iron pipe and cast iron as scheduled on the drawings.

1.02 RELATED SECTIONS

A. Section 02220 - Trenching, Backfilling and Compaction

1.03 SUBMITTAL REQUIREMENTS

All submittals shall be clearly marked as to what is to be provided. Submittals not so marked will be returned. Contractor shall submit:

A. Shop drawings with the following information on each of the pipe types provided:

1. indicate compliance with applicable ASTM standard
2. unit weight
3. SDR
4. diameter
5. physical dimensions
6. method of jointing with instructions
7. nominal pipe joint lengths
8. recommended bedding and installation details
9. instructions and tables or information on strength of each pipe type versus bury conditions of depth and traffic loadings

B. Manufacturer's certificate of compliance.
The Engineer requires certified lab data from the manufacturer to verify the physical properties of the materials supplied under this specification and Engineer, at his own expense, may take random samples for testing by an independent laboratory.

C. Pipe work in structures shall be detailed by the Contractor to conform to the general arrangement shown on the plans and to fit the equipment to be provided. Shop drawings of pipe layout and equipment shall be submitted to the Engineer and approved prior to installation.

1.04 MEASUREMENT AND PAYMENT

A. No measurement shall be made for "Miscellaneous Piping and Valves".

B. No separate payment shall be made for work or products required in this section. The costs shall be included in the unit/lump sum price in the Proposal for the item to which the work in this section applies.

PART 2 PRODUCTS

2.01 CAST IRON PIPE AND FITTINGS

A. Cast iron pipe fittings shall be designed and manufactured as per AWWA C110 and shall have flanged ends for exposed piping and shall conform to ANSI Specification A21.6 and A21.10, Grade 21/45 iron strength. The fittings shall be of minimum thickness Class 50 and shall be capable of withstanding the test pressure where indicated, per ANSI Specification A21.1. Fittings up to and including 12 inches in size shall be designed for internal pressure of 250 psi; larger fittings shall be designed for internal pressure of 150 psi. All pipes and fittings shall be lined with cement mortar with a seal coat of bituminous material all in accordance with AWWA C104.

B. Exterior of pipe (non-buried installation) shall be furnished and delivered without bituminous exterior coating, but shall be primed only to facilitate painting.

C. Cast iron soil pipe used for sewer services shall be heavy weight iron soil pipe, coated, and shall meet federal Specification WW-401. Joints in cast iron soil pipe are bell-and-spigot type with stab-in compression.

2.02 DUCTILE IRON PIPE AND FITTINGS

A. All pipe fittings shall be molded fittings with 250 psi rating.

B. For buried service pipe shall have bell and plain ends for single-rubber-gasket push-on joints, unless otherwise noted. Joints shall conform to ANSI Specifications A21.11. Exposed service pipe and fittings shall be flanged connection or grooved connection as indicated. Mechanical joint will be required where noted on drawings and for bends and fittings.

Pipe shall be Class 50.

C. Dimensions shall conform to the requirements of Specifications ANSI A21.6, ANSI A21.8, ANSI A21.10 (AWWA C110), ANSI A21.11, and ANSI B16.1, as applicable. Dimensions shall be gauged at sufficiently frequent intervals to assure dimensional control. Insides of

sockets and outside of spigot ends shall be tested with circular gauges.

D. Nominal laying lengths shall be 18 feet nominal maximum of 20 percent of each size for each order being as much as 24 inches shorter than the nominal laying length and an additional 10 percent as much as 6 inches shorter than nominal laying length.

E. Each pipe shall be weighed prior to placing of the inside lining. Weight, nominal thickness, sampling period, and class of pipe shall be shown on each pipe. The manufacturer's year of production and the letters DI or DUCTILE shall be clear and legible and on, or near, the bell end.

2.03 AIR RELEASE VALVES

Air release valves shall be two (2) inch Crispen pressure air valves, Model P 20, with a vacuum check unit, two (2) inch val-matic, model VM-45, with a vacuum check unit or an approved equal. These valves shall be suitable for 200 psi working pressure and designed to allow air to escape automatically while the force main is in service and under pressure. The valve shall be housed in a manhole and shall be installed in accordance with the standard detail on the Construction Drawings. Air release valve locations shall be located at the high points, as shown on the plans unless otherwise approved by the Engineer.

PART 3 EXECUTION

3.01 PIPE INSTALLATION

The pipe material and valves listed herein shall be installed in accordance with the manufacturer's recommendations and the requirements of these specifications.

END OF SECTION

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SECTION 03100

CONCRETE FORMWORK

1.01 General

A. Assume all responsibility for the design and engineering of the formwork as well as its construction and removal.

B. Design formwork for the loads, lateral pressure, and allowable stresses outlined in "Recommended Practice for Concrete Form work", ACI 347-78.

1.02 Materials

A. Facing materials shall be such as to provide the specified surface finish.

B. Form coating shall be a field applied chemical concrete release agent capable of preventing bond between poured concrete and the form and shall contain no oil; or shall be factory applied non-absorptive liner. Coat forms before reinforcement is placed.

1.03 Tolerances

A. Construct formwork so that concrete surfaces will conform to the tolerance limits specified in Table 4.3.1 "Tolerances for Formed Surfaces," ACI 301-72 (Revised 1975).

B. Provide positive means of adjustment (wedges or jacks) of shores and struts to compensate for anticipated deflections and settlement in the formwork during concrete placing operations.

1.04 Form Construction

A. Build forms tight to prevent loss of mortar from the concrete.

B. Provide clean-out openings at base of column, pier, and wall forms to facilitate cleaning and observation immediately before concrete is placed.

C. Unless shown otherwise on drawings, corners of concrete members exposed to view after all other finish materials are in place shall be beveled by the use of chamfer strips, measuring 1/2" across the beveled face, placed in the forms. Submit sample for approval before proceeding.

D. Overlap and hold forms against hardened concrete of a previous placement to prevent offsets or loss of mortar at the construction joint and to maintain a true surface.

1.05 Removal of Forms

A. Horizontal member forms used to support the weight of concrete of structural members shall remain in place until the concrete has gained not less than 2/3 of the specified 28-day strength.

B. Vertical member forms and other forms not supporting the weight of the concrete shall not be removed in less than 24 hours.

1.06 Reshoring

A. Members to receive construction loads shall be reshored so as to distribute construction loads safely to the ground or to members capable of supporting the construction loads without exceeding their design live load.

B. Members supporting construction loads shall have gained the full specified 28-day concrete strength prior to loading.

1.07 Camber

A. Cantilever Slabs: Camber at end of cantilever in increments of 1/8-inch per 5-foot of length.

B. One-way Slabs: Camber at midspan in increments of 1/8-inch per 10-foot of span.

C. Two-Way Slabs: Camber at center of bay in increments of 1/8-inch per 10-foot of diagonal distance between supports.

D. Camber all slabs except cantilever slabs less than 5-foot length and one-way slabs less than 10-foot span or as indicated on PLANS.

E. Do not camber beams unless indicated on PLANS.

END OF SECTION

SECTION 03105

CONCRETE REINFORCEMENT

1.01 Shop Drawings

A. Five (5) copies of the shop drawings for the fabrication and placing of reinforcing steel shall be submitted to the Engineer for approval, after being checked and approved by the Contractor and before proceeding.

B. Placing plans shall show dimensions, details, notes, location, size, length and each bar mark together with the accessories belonging to the reinforcing for the concrete.

C. Schedules shall show all information and be of the same general form as those on the Contract Documents.

D. Concrete wall reinforcing shall be shown in elevation.

E. Detail all reinforcing steel in accordance with the Manual of Standard Practice for detailing Reinforced Concrete Structures ACI 315-80 unless otherwise indicated on the drawings.

1.02 Material

A. Reinforcement shall be fabricated from ASTM A615-79 and Supplement S1 Deformed Billet Steel Bars for Concrete Reinforcement of the grades indicated on the drawings.

B. Welded smooth wire fabric (W) shall conform to "Specifications for Welded Steel Wire Fabric for Concrete Reinforcement" ASTM 185-73 and shall be fabricated from plain wire conforming to "Specifications for Cold-Drawn Steel Wire for Concrete Reinforcement" ASTM A82-76.

C. Welded deformed wire fabric (D) shall conform to "Specifications for Welded Deformed Steel Wire Fabric for Concrete Reinforcement" ASTM A497-72 and shall be fabricated from deformed wire conforming to "Specifications for Deformed Steel Wire for Concrete Reinforcement" ASTM A496-72.

D. Wire bar supports shall conform to the National Bureau of Standards PS7-66, "Wire Bar Supports for Reinforced Concrete Construction."

E. Precast concrete block bar supports shall be Precast Concrete Doweled Blocks or Precast Concrete Blocks with wires as indicated in the Manual of Standard Practice CRSI 23rd Edition, 1980.

F. Bar supports shall be as follows:

1. On Ground: Precast Concrete Block Supports or Class "A" Bright Basic Bar Supports with earthbearing bases (sand plates) of 20 gauge metal;

2. Interior: Class "B" Pregalvanized Bar Supports or Class "E" Special Stainless Supports;

3. Exterior: Class "D" Hot Dipped Galvanized Bar Supports conforming to Table I, ASTM A153-73 or Class "E" Special Stainless Bar Supports; and,

4. Tie wire shall not be less than 16 gauge black annealed wire.

1.03 Fabrication

A. All hooks shall be bent using the pin diameters and dimensions as defined as "ACI Standard Hooks" in the Manual of Standard Practice CRSI 23rd Edition, 1980, unless otherwise shown on the drawings.

B. Reinforcing bars shall not be bent or straightened in a manner that will injure the materials.

C. Reinforcing bars shall conform to the dimensions shown on the plans and within the fabrication tolerances as shown in the Manual of Standard Practice CRSI 23rd Edition, 1980.

1.04 Placing Reinforcement

A. Reinforcement shall be placed in designated positions in the forms and held in place, before and during the placing of concrete by means of bar supports, to carry the reinforcing bars they support within the following tolerances from the positions shown on the drawings or specified herein:

1. For clear concrete protection and for depth "d" inflexural member, walls, and compression members where "d" is:

8 inches or less ..... ±1/4 inch

More than 8 inches but
less than 24 inches ..... ±1/2 inch

2 4 inches or more ..... ±1.0 inch

but the cover shall not be reduced by more than one half of the specified cover.

2. For longitudinal location of bends and ends of bars:

±2 inches except at discontinuous ends of members where tolerance shall be ±1/2 inch.

3. For spacing:

±2 inches except that total number of bars shall not be reduced.

B. Except as shown otherwise on structural drawings, concrete cover for reinforcing bars shall be as follows:

1. Cast against and permanently exposed to earth ..... 3 inches

2. Exposed to earth and weather..... 2 inches

3. Interior formed surfaces:

Piers and Columns ..... 2 inches
Beams ..... 1-1/2 inches
Walls ..... 1 inch
Slabs ..... 3/4 inch

C. Vertical bars in piers and columns shall be offset one bar diameter at lapped splices. Furnish templates for setting dowels.

D. Bars which are straight except for hooks are listed in schedules as straight bars. Lengths shown are for straight segments, not hooks.

E. "Continuous" bars unless indicated otherwise on the drawings shall be lapped 30 diameters at splices. Provide corner bars at corner conditions.

F. Splices not shown in Contract Documents shall be subject to approval.

G. Lap welded wire fabric not less than the spacing of the cross wires plus 2 inches and wire together at splices.

H. Support all reinforcing bars. Space bar supports a maximum of 4 feet on center with the first support not greater than 2 feet from the end of bars. Tie to prevent displacement during concreting operations.

I. Reinforcement shall not be "field" bent after being embedded in hardened concrete except where specifically shown on the drawings.

SECTION NO. 03310

CONCRETE WORK

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

Extent of concrete work is shown on drawings.

Fibermesh reinforced concrete shall mean concrete to which is added collated fibrillated polypropylene (CFP) fibers as secondary reinforcement as specified under Reinforcing Materials.

1.02 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions, apply to work of this section.

1.03 QUALITY ASSURANCE

A. Codes and Standards

Comply with provisions of following codes, specifications and standards, except where more stringent requirements are shown or specified:

ACI 301 "Specifications for Structural Concrete for Buildings".

ACI 318 "Building Code Requirements for Reinforced Concrete".

Concrete Reinforcing Steel Institute, "Manual of Standard Practice".

B. Concrete Testing Service

Engage a testing laboratory acceptable to Engineer to perform material evaluation tests and to design concrete mixes.

C. Materials and installed work may require testing and retesting, as directed by Engineer, at any time during progress of work. Allow free access to material stockpiles and facilities. Tests, including retesting of rejected materials and installed work, shall be done at Contractor's expense.

1.04 SUBMITTALS

A. Product Data

Submit data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds, dry-shake finish materials, and others as requested by Engineer.

B. Shop Drawings; Reinforcement

Submit shop drawings for fabrication, bending, and placement of concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, diagrams of bent bars, arrangement of concrete reinforcement. Include special reinforcement required and openings through concrete structures.

C. Samples

Submit samples of materials as specified and as otherwise requested by Engineer, including names, sources and descriptions.

D. Laboratory Test Reports

Submit laboratory test reports for concrete materials and mix design test as specified.

E. Material Certificates

Provide materials certificates in lieu of materials laboratory test reports when permitted by Engineer. Material certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with, or exceeds, specified requirements.

1.05 MEASUREMENT AND PAYMENT

A. No measurement shall be made for "Concrete Work".

B. Payment for work or products required in this section shall be included in the unit/lump sum price bid in the Proposal for the item to which the work in this section applies.

PART 2 PRODUCTS

2.01 FORM MATERIALS

A. Forms for Exposed Finish Concrete

Unless otherwise indicated, construct formwork for exposed concrete surfaces with plywood, metal, metal-framed plywood faced or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable

sizes to minimize number of joints and to conform to joint system shown on drawings. Provide form material with sufficient thickness to withstand pressure of newly-placed concrete without bow or deflection.

B. Forms of Unexposed Finish Concrete

Form concrete surfaces which will be unexposed in finished structure with plywood, lumber, metal, or other acceptable material. Provide lumber dressed on at least 2 edges and one side for tight fit.

C. Form Coatings

Provide commercial formulation form-coating compounds that will not bond with, stain nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.

2.02 REINFORCING MATERIALS

A. Reinforcing Bars

ASTM A 615, Grade 60, deformed.

B. C.F.P. fibers shall be engineered synthetic fibers made of Polypropylene Fiber with a specific gravity of .90, ignition temperature of 1100 and tensile strength of 80-110 K51. The absorption rate allowed to the fibers is more along with no corrosion or chemical reaction and to be alkali resistant. CFP shall be added at a rate of 1.5 pounds per cubic yard of concrete and to be mixed with the concrete at the batching plant and after all other ingredients have been added. Mix for a minimum of 5 minutes before making pour. A source of CFP is Fibermesh I as manufactured by Fibermesh Company in Chattanooga, TN.

C. Welded Wire Fabric

ASTM A 185, welded steel wire fabric.

D. Supports for Reinforcement

Provide supports for reinforcement including bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars, and welded wire fabric in place. Use wire bar type supports complying with CRSI specifications, unless otherwise acceptable.

1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.

2. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are plastic protected (CRSI, Class 1) or stainless steel protected (CRSI, Class 2).

2.03 CONCRETE MATERIALS

A. Portland Cement

ASTM C 150, Type I, unless otherwise acceptable to Engineer.

Use one brand of cement throughout project, unless otherwise acceptable to Engineer.

B. Normal Weight Aggregates

ASTM C 33, and as herein specified. Provide aggregates from a single source for exposed concrete.

For exterior exposed surfaces, do not use fine or coarse aggregates containing spalling-causing deleterious substances.

Local aggregates not complying with ASTM C 33 but which have shown by special test or actual service to produce concrete of adequate strength and durability may be used when acceptable to Engineer.

C. Water: Drinkable.

D. Air-Entraining Admixture: ASTM C 260.

1. Available Products
Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

"Sika Aer"; Sika Corp.
"MB-VR or MB-AE"; Master Builders.
"Dorex AEA"; W. R. Grace.
"Edoco 2001 or 2002"; Edoco Technical Products.

E. Water-Reducing Admixture

ASTM C 494, Type A, and contain not more than 0.1% chloride ions.

1. Available Products
Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

"Eucon WR-75"; Euclid Chemical Co.
"Pozzolith 344"; Master Builders.
"Plastocrete 160"; Sika Chemical Corp.
"Chemtard"; Chem-Masters Corp.

F. Water-Reducing, Non-Chloride Accelerator Admixture

ASTM C 494, Type E, and containing not more than 0.1% chloride ions.

1. Available Products
Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

"Accelguard 80"; Euclid Chemical Co.
"Pozzolith 500"; Master Builders.

G. Water-Reducing, Retarding Admixture

ASTM C 494, Type D, and contain not more than 0.1% chloride ions.

1. Available Products
Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

"Edoco 20006"; Edoco Technical Products.
"Pozzolith 300-R"; Master Builders.
"Eucon Retarder 75"; Euclid Chemical Co.
"Daratard"; W.R. Grace.
"Plastiment"; Sika Chemical Co.

H. Calcium chloride or admixtures containing more than 0.1% chloride ions are not permitted.

2.04 RELATED MATERIALS

A. Non-Shrink Grout: CRD-C 621, factory pre-mixed grout.

1. Available Products
Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

<u>Non-metallic</u>
"Masterflow 713"; Master Builders.
"Sonogrout"; Sonneborn-Contech.
"Euco-NS"; Euclid Chemical Co.
"Crystex"; L & M Const. Chemical Co.
"Sure-Grip Grout"; Dayton Superior Corp.
"Horngrout"; A. C. Horn.

B. Chemical Hardener

Colorless aqueous solution containing a blend of magnesium fluorosilicate and zinc fluorosilicate combined with a wetting agent, containing not less than 2 lbs. of

fluorosilicates per gal.

1. Available Products
   Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

   "Surfhard"; Euclid Chemical Co.
   "Lapidolith"; Sonneborn-Contech.
   "Saniseal"; Master Builders.
   "Burk-O-Lith"; The Burk Co.

C. Absorptive Cover

Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.

D. Moisture-Retaining Cover

One of the following, comply with ASTM C 171.
   Waterproof paper.
   Polyethylene film.
   Polyethylene-coated burlap.

E. Bonding Compound

Polyvinyl acetate, or acrylic base, rewettable type.

1. Available Products
   Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

   "J-40 Bonding Agent"; Dayton Superior Corp.
   "Weldcrete"; Larsen Products.
   "Everbond"; L & M Construction Chemical.
   "Eucoweld"; Euclid Chemical Co.
   "Hornweld"; A. C. Horn.
   "Sonocrete"; Sonneborn-Contech.
   "Acrylic Bondcrete"; The Burke Co.

F. Epoxy Adhesive

ASTM C 881, two component material suitable for use on dry or damp surfaces. Provide material "Type", "Grade", and "Class" to suit project requirements.

1. Available Products
   Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

"Epoxtite"; A. C. Horn.
"Edoco 2118 Epoxy Adhesive"; Edoco Technical Prod.
"Sikadur Hi-Mod"; Sika Chemical Corp.
"Euco Epoxy 463 or 615"; Euclid Chemical Co.
"Patch and Bond Epoxy"; The Burke Co.
"Sure-Poxy"; Kaufman Products, Inc.

G. Waterstops

Provide flat, dumbbell type waterstops at construction joints and other joints as indicated. Sized to suit joints.

Rubber Waterstops: Corps of Engineers CRD-C 513.

1. Available Products
Subject to compliance with requirements, provide products of one of the following:

The Burke Co.
Progress Unlimited.
Williams Products.
Edoco Technical Products.

H. Moisture Barrier

Provide moisture barrier cover over prepared base material where indicated. Use only materials which are resistant to decay when tested in accordance with ASTM E 154, as follows:

Polyethylene sheet not less than 6 mils thick.

2.05 PROPORTIONING AND DESIGN OF MIXES

A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. If trial batch method used, use an independent testing facility acceptable to Engineer for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing unless otherwise acceptable to Engineer.

B. Submit written reports to Engineer of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until mixes have been reviewed by Engineer.

C. Design mixes to provide normal weight concrete with the following properties, as indicated on drawings and schedules:

4000 psi 28-day compressive strength; W/C ratio, 0.46 maximum (air-entrained).

D. Adjustment to Concrete Mixes

Mix design adjustments may be requested by contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, at no additional cost to Owner and as accepted by Engineer. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Engineer before using in work.

E. Admixtures

Use water-reducing admixture in concrete as required for placement and workability.

Use non-chloride accelerating admixture in concrete slabs placed at ambient temperatures below 50^{o} F. (10^{o} C).

Use air-entraining admixture in exterior exposed concrete, unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus-or-minus 1-1/2% within following limits:

Concrete structures and slabs exposed to freezing and thawing, deicer chemicals, or subjected to hydraulic pressure:

4.5% (moderate exposure); 6.0% (severe exposure)
1" max. aggregate.
5.0% (moderate exposure); 6.0% (severe exposure)
3/4" max. aggregate.
Other Concrete: 3% to 5% air.

Use admixtures for water-reducing and set-control in strict compliance with manufacturer's directions.

F. Water-Cement Ratio

Provide concrete for following conditions with maximum water-cement (WC) ratios as follows:

Subjected to freezing and thawing: WC 0.46.

G. Slump Limits

Proportion and design mixes to result in concrete slump at point of placement as follows:

Ramps, slabs, and sloping surfaces: Not more than 3".

Reinforced walls and foundation systems: Not less than 2" and not more than 5".

Other concrete: Not more than 6".

2.06 CONCRETE MIXES

A. Ready-Mix Concrete

Comply with requirements of ASTM C 94, as herein specified.

During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C 94 may be required.

When air temperature is between 85°F (30°C) and 90°F (32°C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90°F (32°C), reduce mixing and delivery time to 60 minutes.

PART 3 EXECUTION

3.01 FORMS

A. Design, erect, support, brace, and maintain formwork to support vertical and lateral loads that might be applied until such loads can be supported by concrete structure. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position.

B. Design formwork to be readily removable without impact, shock or damage to cast-in-place concrete surfaces and adjacent materials.

C. Construct forms to sizes, shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide back-up at joints to prevent leakage of cement paste.

D. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like, to prevent swelling and for easy removal.

E. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous locations.

F. Chamfer exposed corners and edges as indicated, using wood, metal, PVC or rubber chamfer strips fabricated to product uniform smooth lines and tight edge joints.

G. Form Ties

Factory-fabricated, adjustable-length, removable or snapoff metal form ties, designed to prevent form deflection, to prevent spalling concrete surfaces upon removal, and to be watertight.

H. Provisions for Other Trades

Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.

I. Cleaning and Tightening

Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before concrete is placed. Retighten forms and bracing after concrete placement if required to eliminate mortar leaks and maintain proper alignment.

3.02 PLACING REINFORCEMENT

Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified.

A. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.

B. Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as required.

C. Place reinforcement to obtain at least minimum coverages for concrete protection. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

D. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

3.03 JOINTS

A. Construction Joints

Locate and install construction joints, as indicated or, if not indicated, locate so as not to impair strength and appearance of the structure, as acceptable to Engineer.

B. Provide keyways at least 1-1/2" deep in construction joints in walls, slabs, and between walls and footings; accepted bulkheads designed for this purpose may be used for slabs.

C. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints.

D. Isolation Joints in Slabs-on-Ground

Construct isolation joints in slabs-on-ground at points of contact between slabs on ground and vertical surfaces, such as column pedestals, foundation walls, grade beams, and elsewhere as indicated.

1. Premolded expansion joint filler shall conform to ASTM D1751-73.

E. Contraction (Control) Joints in Slabs-on-Ground

Construct contraction joints in slabs-on-ground to from panels of patterns as shown. Use inserts 1/8" to 1/4" wide X 1/4 of slab depth, unless otherwise indicated.

F. Form contraction joints by inserting premolded plastic, hardboard or fiberboard strip onto fresh concrete until top surface of strip is flush with concrete slab surface. Tool slab edges round on each side of insert. After concrete has cured, remove inserts and clean groove of loose debris.

1. Contraction joints may be formed by saw cuts as soon as possible after slab finishing as may be safely done without dislodging aggregate.

3.04 INSTALLATION OF EMBEDDED ITEMS

A. General

Set and build into work anchorage devices and other embedded items required for the lateral support of window mullions and for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached thereto.

B. Edge Forms and Screed Strips for Slabs

Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure units sufficiently strong to support types of screed strips by use of strike-off templates or accepted compaction type screeds.

3.05 Preparation of Form Surfaces

Clean re-used form surfaces of concrete matrix residue, repair and patch as required to return forms to acceptable surface condition.

Coat Contact surfaces of forms with a form-coating compound before reinforcement is placed.

Thin form-coating compounds only with thinning agent of type, and in amount, and under conditions of form-coating compound manufacturer's directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.

Coat steel forms with a non-staining, rust-preventative form oil or otherwise protect against rusting. Rust-stained steel formwork is not acceptable.

3.06 CONCRETE PLACEMENT

A. Preplacement Inspection

Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast-in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work. Moisten wood forms immediately before placing concrete where form coatings are not used.

B. Coordinate the installation of joint materials and moisture barriers with placement of forms and reinforcing steel.

C. General

Comply with ACI 304, "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete", and as herein specified.

Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation.

D. Placing Concrete in Forms

Deposit concrete in forms in horizontal layers not deeper than 24" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.

E. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI recommended practices.

F. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine.

Place vibrators to rapidly penetrate placed layer and at least 6" into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion limit duration of vibration to time necessary to consolidate concrete and complete embeddment of reinforcement and other embedded items without causing segregation of mix.

G. Placing Concrete Slabs

Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.

H. Consolidate concrete during placing operation so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.

I. Bring slab surfaces to correct level with straight-edged and strikeoff. Use bull floats or darbies to smooth surfaces prior to beginning finishing operations.

J. Maintain reinforcing in proper position during concrete placement operations.

K. Cold Weather Placing

Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified.

When air temperature has fallen to or is expected to fall below 40^{o}F (4^{o}C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50^{o}F (10^{o}C) and not more than 80^{o}F (27^{o}C) at point of placement.

L. Do not use calcium chloride, salt and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.

M. Hot Weather Placing

When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.

N. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90^{o}F (32^{o}C). Mixing water may be chilled, or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing water. Use of liquid nitrogen to cool concrete is Contractor's option.

O. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embeddment in concrete.

Fog spray forms, reinforcing steel and subgrade just before concrete is placed.

P. Use water-reducing retarding admixture (Type D) when required by high temperatures, low humidity or other adverse placing conditions.

3.07. FINISH OF FORMED SURFACES

A. Rough Form Finish

For formed concrete surfaces not exposed-to-view in the finish work or by other construction, unless otherwise indicated. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4" in height rubbed down or chipped off.

B. Smooth Form Finish

For formed concrete surfaces exposed-to-view, or that are to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, painting, or other similar system. This is as-cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed.

C. Smooth Rubbed Finish

Provide smooth rubbed finish to scheduled concrete surfaces, which have received smooth form finish treatment, no later than one day after form removal.

Moisten concrete surfaces and rub with carborundum brick or other abrasive until a uniform color and texture is produced. Do not apply cement grout other than that created by the rubbing process.

D. Related Unformed Surfaces

At tops of walls, horizontal offsets and similar unformed surfaces occurring adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.08 MONOLITHIC SLAB FINISHES

A. Scratch Finish

Apply scratch finish to monolithic slab surfaces that are to receive concrete floor topping or mortar setting beds for tile, portland cement terrazzo, and other bonded applied cementitious finish flooring material, and as otherwise indicated.

After placing slabs, plane surface so that depressions between high spots do not exceed 1/2" under a 10' straightedge. After leveling, roughen surface before final set, with stiff

brushes, brooms, or rakes.

B. Float Finish

Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo, and as otherwise indicated.

After screening, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Check and level surface plane, so that depressions between high spots do not exceed 5/16" under a 10' straightedge. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.

C. Trowel Finish

Apply trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint or other thin film finish coating system.

After floating, begin first trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and with a level surface plane so that depressions between high spots do not exceed 1/4" under a 10' straightedge. Grind smooth surface defects which would telegraph through applied floor covering system.

D. Trowel and Fine Broom Finish

Where ceramic or quarry tile is to be installed with thin-set mortar, apply trowel finish as specified, then immediately follow with slightly scarifying surface by fine brooming.

E. Non-Slip Broom Finish

Apply non-slip broom finish to exterior concrete platforms, steps and ramps, and elsewhere as indicated.

Soon after float finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route. Coordinate required final finish with Engineer before application.

F. Chemical-Hardener Finish

Apply chemical-hardener finish to interior concrete floors where indicated. Apply liquid

chemical-hardener after complete curing and drying of the concrete surface. Dilute liquid hardener with water (parts of hardener/water as follows), and apply in 3 coats; first coat, 1/3-strength; second coat, 1/2-strength; third coat, 2/3 strength. Evenly apply each coat, and allow 24 hours for drying between coats.

Apply proprietary chemical hardeners, in accordance with manufacturer's printed instructions.

After final coat of chemical-hardener solution is applied and dried, remove surplus hardener by scrubbing and mopping with water.

3.09 CONCRETE CURING AND PROTECTION

A. General

Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.

Begin final curing procedures immediately following initial curing and before concrete has dried.

Continue final curing for at least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.

B. Curing Methods

Perform curing of concrete by curing and sealing compound, by moist curing, by moisture-retaining cover curing, and by combinations thereof, as herein specified.

C. Provide moisture curing by following methods.

Keep concrete surface continuously wet by covering with water.

Continuous water-fog spray.

Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.

D. Provide moisture-cover curing as follows:

Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover

material and waterproof tape.

E. Provide curing and sealing compound to interior slabs with resilient flooring, carpet over cushion, or left exposed; and to exterior slabs, walks, and curbs, as follows:

Apply specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours). Apply uniformly in continuous operation by power-spray or roller in accordance with manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.

Do not used membrane curing compounds on surfaces which are to be covered with coating material applied directly to concrete, liquid floor hardener, waterproofing, dampproofing, membrane roofing, flooring, (such as ceramic or quarry tile,glue-down carpet), painting, and other coatings and finish materials, unless otherwise acceptable to Engineer.

F. Curing Formed Surfaces

Cure formed concrete surfaces, including undersides of beams, supported slabs and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

G. Curing Unformed Surfaces

Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by application of appropriate curing method.

Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture-retaining cover, unless otherwise directed.

H. Sealer and Dustproofer

Apply a second coat of specified curing and sealing compound only to surfaces given a first coat.

3.10 REMOVAL OF FORMS

A. Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50^{o}F (10^{o}C) for 24 hours after placing concrete, provide concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained.

3.11 RE-USE OF FORMS

Clean and repair surfaces of forms to be re-used in work, Split, frayed, delaminated or

otherwise damage form facing material will not be acceptable for exposed surfaces. Apply new form coating compound as specified for new formwork.

When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces, except as acceptable to Engineer.

3.12. MISCELLANEOUS CONCRETE ITEMS

A. Filling-In

Fill in holes and opening left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place, and cure concrete as herein specified, to blend with inplace construction. Provide other miscellaneous concrete filling shown or required to complete work.

B. Curbs

Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners intersections and terminations slightly rounded.

C. Equipment Bases and Foundations

Provide machine and equipment bases and foundations, as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevation, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.

D. Grout base plates and foundations as indicated, using specified non-shrink grout. Use non-metallic grout for exposed conditions, unless otherwise indicated.

E. Steel Pan Stairs

Provide concrete fill for steel pan stair treads and landings and associated items. Cast-in safety inserts and accessories as shown on drawings. Screed, tamp, and finish concrete surfaces as scheduled.

F. Reinforced Masonry

Provide concrete grout for reinforced masonry lintels and bond beams where indicated on drawings and as scheduled. Maintain accurate location of reinforcing steel during concrete placement.

3.13 CONCRETE SURFACE REPAIRS

A. Patching Defective Areas

Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to Engineer.

Cut out honeycomb, rock pockets, voids over 1/4" in any dimension, and holes left by tie rods and bolts, down to solid concrete but, in no case to a depth of less than 1". Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water and brush-coat the area to be patched with specified bonding agent. Place patching mortar after bonding compound has dried.

B. For exposed-to-view surfaces, blend white portland cement and standard portland cement so that, when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.

C. Repair of Formed Surfaces

Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Engineer. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets; fins and other projections on surface; and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes, fill with dry pack mortar, or precast cement cone plugs secured in place with bonding agent.

D. Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.

E. Repair of Unformed Surfaces

Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness, using a template having required slope.

F. Repair finished unformed surfaces that contain defects which affect durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.01" wide regardless of width, spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions.

G. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days.

H. Correct low areas in unformed surfaces during, or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to Engineer.

I. Repair defective areas, except random cracks and single holes not exceeding 1"

diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4" clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact and finish to blend with adjacent finish concrete. Cure in same manner as adjacent concrete.

J. Repair isolated random cracks and single holes not over 1" in diameter by dry-pack method. Groove top of cracks and cut-out holes to sound concrete and clean of dust, compound. Mix dry-pack, consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No.16 mesh sieve, using only enough water as required for handling and placing. Place dry pack after bonding compound has dried. Compact dry-pack mixture inplace and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.

K. Perform structural repairs with prior approval of Engineer for method and procedure, using specified epoxy adhesive and mortar.

L. Repair methods not specified above may be used, subject to acceptance of Engineer.

3.14 QUALITY CONTROL TESTING DURING CONSTRUCTION

The Owner will employ a testing laboratory to perform tests and to submit test reports.

Sampling and testing for quality control during placement of concrete may include the following, as directed by Engineer.

A. Sampling Fresh Concrete

ASTM C 172, except modified for slump to comply with ASTM C 94.

1. Slump
   ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.

2. Air Content
   ASTM C 173, volumetric method for lightweight or normal weight concrete' ASTM C 231 pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.

3. Concrete Temperature
   Test hourly when air temperature is 40^{o}F (4^{o}C) and below, and when 80^{o}F (27^{o}C) and above; and each time a set of compression test specimens are made.

4. Compression Test Specimen
   ASTM C 31; one set of 4 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.

5. Compressive Strength Tests
   ASTM C 39; one set for each day's pour exceeding 5 cu. yds. plus additional sets for each 50 cu. yds. over and above the first 25 cu. yds. of each concrete class placed in any one day; one specimen tested at 7 days, one specimen tested at 28 days, and one specimen retained in reserve for later testing if required.
   When frequency of testing will provide less than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.

B. Test results will be reported in writing to Engineer and Contractor within 24 hours that tests are made. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7-day tests and 28-day tests.

C. Nondestructive Testing

   Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.

D. Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Engineer. Testing service, may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Contractor shall pay for such tests conducted, and any other additional testing as may be required, when unacceptable concrete is verified.

-- END OF SECTION --

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SECTION 03320
CAST IN PLACE CONCRETE

1.01 General:

A. The General Conditions and Special Conditions of the Specification are incorporated herein. Also incorporated herein is ACI Standard 301-72, "Specifications for Structural Concrete for Buildings," and ACI Standard 318-63, "Building Code Requirements for Reinforced Concrete."

B. ACI Standard 301-72 mentioned above is incorporated in its entirety with modifications, exclusions, expansions, noted hereinafter. Items noted thus (*_____) refer to the indicated section of ACI Standard 301-72.

C. Copies of ACI Standard 301-72 are obtainable at a nominal cost from the American Concrete Institute, P.O. Box 4754, Redford Station, Detroit, Michigan 38219. A copy of this standard will be maintained in the Contractor's job site office at all times.

D. Shop Drawings: Submit in accordance with General Conditions; obtain final corrections and review prior to fabrication.

1. Reinforcing Steel: Show dimensions, schedule, bending details, bar lists, and placing plans. Shop drawings showing all dimensions necessary for fabrication and placing of the reinforcing steel and accessories, with out reference to the project drawings, shall be submitted for approval. Approval shall be obtained before fabrication.

2. Checking: The Contractor shall require that the material supplier submit a signed written statement, in conjunction with the shop drawing submittal, that the drawings have been checked for compliance with the contract requirements. Such checking shall include but not be limited to size, shape, length, quantity, and location. The checking shall have been performed by a person or persons regularly engaged in drawing checking, and shall not be the person or persons who prepare the drawings.

1.02 Admixtures: Air-entraining admixtures (ASTM C260-77) are required in all concrete unless noted. Calcium chloride admixture (ASTM D98-80) will not be permitted. Use of "Pozzolith" water-reducing admixture (manufactured by the Master Builders Company) will be required in all concrete used in the base slabs, interior division walls, and perimeter walls. (*2.2)

1.03 Type: Concrete shall be ultimate stress type.

1.04 Strength: All concrete shall develop 3000 psi compressive strength at 28 days. All concrete shall be of normal weight. (*3.2).

1.05 Durability: All concrete exposed to the weather shall contain an air-entraining agent for protection against potentially destructive exposure. (*3.4).

1.06 Slump: Concrete shall be vibrated and slump shall be in accord with Table 305(a) of ACI 301-66.

1.07 Proportioning of Ingredients: Mix designs shall be established by Method 2 or Alternate Procedure (d), but all 3000 psi concrete shall contain not less than 5.8 bags of cement per cubic yard of concrete except that the 3000 psi O" slump concrete shall contain not less than 4-3/4 nor more than 5-1/4 bags of cement per cubic yard of concrete, and not more than 7.5 gallons of water per bag of cement. (*3.8).

1.08 Formwork: Earth cuts may be used as forms for footings only where sides of cut will stand without danger or caving.

1.09 Removal Strength: Shoring shall be removed from formed slabs when concrete attains 75% of design strength, but not earlier than 7 days after placing. Testing of field cured cylinders is required to established strength for form removal. Cylinders shall be molded and tested as specified ASTM C31-69 (Reapproved 1980), ACI 301-72. Testing to determine field strength shall be made at no extra cost to the Owner.

1.10 Reinforcing Steel: All reinforcing steel shall be of 60,000 psi yield point strength. (*chapter 5). Welded wire mesh shall conform to ASTM A185-79.

1.11 Expansion Joints: Premolded expansion joint filler shall conform to ASTM D1751-73 (Reapproved 1978) (*6.2).

1.12 Cast In Anchors:

A. Dovetail Slots & Anchors: Provide anchors for each 8-inch (or fraction thereof) of masonry abutting concrete, at 16-inches o.c. vertical spacing. Slots shall be continuous. Slots shall be 16 gauge, galvanized, 1-inch wide back x 5/8 inch wide face x 1 inch deep (Hohmann & Barnard #305). Anchors shall be corrugated, galvanized, 1 inch wide x 5-1/2 inches long, 16 gauge, (Hohmann & Barnard #303).

1.13 Curing: Use of compounds as noted in (b) (5) is prohibited for curing. All curing shall be damp curing. Where floors are scheduled for cement finish, floors shall be treated, after final curing, with 3 full, even coats of Sonneborn Building Products, Inc.'s Lapidolith Liquid Floor Hardener, Euclid Chemical Company's Euco Liquid Floor Hardener, or A.C. Horn Products' Hornolith. (*Chapter 12).

1.14 Testing:

A. The Engineer will select a recognized commercial testing laboratory.

B. The following functions shall be performed by personnel who have been qualified by the Georgia Qualification Committee for Field Test of Concrete, and shall be provided by the Contractor at no extra cost to the Owner.

1. Sampling of fresh concrete and making compression test specimens. Specimens shall be tested by the selected laboratory and the cost thereof shall

be the responsibility of the contractor.

2. Performing tests for slump, air content, and unit weight of concrete required by the Project Specifications.

3. Protecting and initially curing test specimens for the first 24 hours after sampling.

4. Transporting or preparing and shipping test specimens to designated laboratory.

5. Completing Field Test Data sheet for each set of concrete test specimens and transmitting same to designated laboratory. Data sheets shall include slump, air content and unit weight, and the name and qualification number of the person responsible for their preparation.

C. In addition to the number of cylinders required by ACI Standard 301-72, the Contractor shall mold and the laboratory will test one extra cylinder at 7 days, which will be solely for advance information (*Chapter 16).

1.15 Mill Test Reports: Mill test reports on cement and reinforcing steel shall be furnished by the Contractor (*16.7.4.4).

1.16 Payment: No separate payment will be made for work done or materials furnished under this section since compensation therefor shall be included in the price bid for the item to which the work pertains.

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SECTION 03330

CONCRETE UNIT MASONRY

A. General: See Drawings for locations and quantity of hollow concrete masonry units required in this project. Include all exterior work.

B. Materials:

1. Standard Concrete Masonry Unit: 2 or 3 cell, Type 1, Grade N above grade and below grade conforming to ASTM C-90-75, Medium Texture. no cinder block will be acceptable.

2. Premoulded Expansion Joint Fill: Asphaltic Impregnated vegetable fiber board.

C. Joints and Bond:

1. Joints: 1 unit and 1 mortar joint equal 8" resulting in horizontal joints of 3/8". Lay headers and stretchers to produce vertical joint of approximately 3/8". All vertical joints shall center on joint below. Joint type shall be a modified "V" groove.

2. Bond: Running, with vertical joints aligned perpendicular at alternate courses.

D. Laying Concrete Masonry Units:

1. Erection in General:

a. Laying shall be by mechanics experienced in concrete block work. Do not use wet blocks at any time. If suction due to block dryness is excessive use high water-retentive mortar. Work to be plumb, level, uniformly coursed, in true plane and having intersections and corners true 90° angle except as otherwise indicated or specified. Tops of concrete masonry walls and partitions where noted "seal to deck" shall be wedged and grouted to metal deck.

b. Where pressed metal door frames occur in concrete block masonry, heads, and jambs shall be filled solid with mortar.

c. Where anchor bolts and flat straps occur in concrete block masonry

cells above and below the anchors shall be filled solid with mortar.

d. Where structural items are anchored into concrete block masonry, fill the cells for two courses below the bolts and one course above.

e. Erect masonry only when temperature is above 35° F and rising. Any work where joints become frozen more than 1/2" deep from face shall be removed entirely and rebuilt. Protect masonry from freezing for 48 hours after being laid.

f. At the stoppage of work at any time, cover the tops of walls exposed to weather with a strong water proof membrane firmly secured in place.

g. Provide recesses in walls as required for cabinets or other built-in or recessed equipment. Provide lintels over recesses and keep shored until well set. Install built-in flashings, pipes, sleeves, anchors, metal nailing plugs and any other built-in items of other trades as masonry laying progresses.

h. Provide all closings and openings in walls as required for the work included under other Divisions. Leave openings as required to receive future installations. After such work has been installed, fill in masonry to close up openings.

i. Where cells of block are to be filled with mortar contain the mortar in the bottom joint with metal lath or hardware cloth.

j. Cutting and fitting of concrete block shall be done by masonry mechanics with proper masonry saws. Cut-outs required for installation of electric outlets, conduits, pipe sleeves, and various accessories of the different trades shall have the required opening cut, not broken, out.

k. At control joints noted on the drawings, joints shall be raked 3/4" and caulked.

l. Units which have been wetted shall not be used until allowed to air dry for seven days and only then may be used if freshly broken web and face surfaces of a typical unit show no visible evidence of moisture.

2. Concrete Masonry Lintels:

a. Concrete fill for reinforced concrete channel block lintels shall be as specified under Division 3. Reinforcement bars shall be as indicated and schedules on the drawings.

b. Provide 8" minimum bearing for lintels.

c. Vertical joints of lintel blocks and texture of lintel block surfaces shall be same as wall blocks.

d. Shore up under lintels that are poured in place. Keep shores in place for a minimum of 3 days after placing concrete fill in lintel block.

3. Defective Work: Damages or defective masonry work shall be removed and reconstructed. This includes defective units (cracks, chipped edges, spalls, or other defects) that impair structural strength or finished appearance of the masonry work.

4. Cleaning:

a. Exercise care to prevent smearing mortar into surface of block. Keep wall surfaces clean during construction. Mortar droppings that stick to block walls shall be allowed to dry before removal with a trowel. Remove remaining mortar by rubbing with a small piece of block and then brush clean.

b. Use fresh mortar to fill nail holes or lime pins. Clean down exposed surfaces of all concrete block walls, using dry fiber brushes, unit all dirt, stains, mortar or other defacements are removed, or when necessary, rubbing surfaces with a piece of block material. Protect adjacent materials from damage from cleaning operations.

E. Payment: Labor and materials furnished in this section shall be paid for as part of contract lump sum price in the Proposal.

END OF SECTION

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SECTION 11100

ALTITUDE VALVE

1. Scope: This item shall govern for the furnishing and installing the altitude valve assembly as shown in the plans and herein specified.

2. General: The altitude control valve shall be a OCV Control Valve, Model 3331-3, 8" Globe Valve with tow way flow, or approved equal.

3. Valve Construction:

   a. The altitude valve shall be a full ported, single-seated, line pressure operated, diaphragm actuated, pilot controlled 8 inch globe valve.

   b. The valve shall seal by means of a corrosion-resistant seat and resilient, rectangular seat disc. These and other parts shall be replaceable in the field; all such service and adjustments to be possible without removing the valve from the line.

   c. The stem of the main valve shall be guided top and bottom by integral bushings.

   d. Alignment of the body, bonnet and diaphragm assembly shall be by precision dowel pins.

   e. The main valve and its control system shall contain no packing glands or stuffing boxes.

   f. The diaphragm shall not be used as a seating surface, nor shall pistons be used as an operating means.

   g. The pilot system shall be furnished complete and installed on the main valve, and shall include a speed control, a Y-strainer, and ball valves for isolating the control system from the main valve.

   h. The altitude valve shall be operationally and hydrostatically tested prior to shipment.

END OF SECTION

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SECTION 11200

PRESSURE REDUCING VALVE

1. Scope: This item shall govern for the furnishing and installing the Pressure Reducing Valve assembly as shown in the plans and herein specified.

2. General:

   a. The pressure reducing valve shall function to reduce a higher upstream pressure to a constant, lower downstream pressure regardless of fluctuations in supply or demand.

   b. The valve shall also be equipped with an adjustable pressure sustaining pilot which shall prevent upstream (supply) pressure from falling below a predetermined minimum.

   c. The valve shall also include an adjustable pressure sustaining pilot which shall prevent system pressure from falling below a predetermined minimum.

   d. The pressure reducing valve shall be a Model 127-2, 8 inch globe pattern by OCV Control Valves, Tulsa, Oklahoma, USA.

3. Valve Construction:

   a. The pressure reducing valve shall be a single seated, diaphragm actuated, pilot controlled globe valve.

   b. The valve shall seal by means of a corrosion-resistant seat, and resilient, rectangular seat disc. These and other parts shall be replaceable in the field without removing the valve from the line.

   c. The stem of the main valve shall be guided top and bottom by integral bushings.

   d. Alignment of the body, bonnet and diaphragm assembly shall be by precision dowel pins.

   e. The main valve and its control system shall contain no packing glands or stuffing boxes.

   f. The diaphragm shall not be used as a seating surface, nor shall pistons be used as an operating means.

   g. The pilot system shall be complete and installed on the main valve,

and shall include a Y-strainer and ball valves for isolating the pilot system from the main valve.

h. The pressure reducing valve shall be operationally and hydrostatically tested prior to shipment.

4. Materials

a. The main valve body and bonnet shall be Ductile Iron per ASTM A536, Grade 65-45-12.

b. End connections shall be Class 150 flanges per ANSI B16.42, suitable for a maximum working pressure of 250 psi.

c. All internal ferrous surfaces shall be coated with 4 mils of NSF61-approved epoxy.

d. External surfaces shall be coated with 4-mils of epoxy.

e. The main valve seat ring shall be bronze per ASTM B61.

f. Elastomers (diaphragms, resilient seats, and O-rings) shall be BUNA-N.

g. Control pilots shall be ASTM B61 bronze with stainless steel internals.

h. The speed control(s), Y-strainer, isolation ball valves, and fittings shall be brass, and control line tubing shall be copper.

5. Operating Conditions

a. The pressure reducing valve(s) shall be suitable for reducing from inlet pressures of 65 PSI to a constant outlet pressure of 45 PSI at flow rates ranging from 500 to 1000 GPM.

END OF SECTION