DOCUMENTS 000200

ADVERTISEMENT FOR BIDS

Owner: Provo River Water Users Association
Address: 285 West 1100 North Pleasant Grove, UT 84062

Separate sealed Bids for the Construction of the Provo River Water Users Association – ULDC South Branch Pipeline Replacement will be received by Owner, until 1:00 pm February 25th, 2020.

Sealed proposals should be mailed or hand delivered to: PRWUA Association Office, 285 West 1100 North Pleasant Grove, UT 84062, and should be clearly marked “sealed proposal.” Please reference Provo River Water Users Association – ULDC South Branch Pipeline Replacement on all documents pertaining to the proposal. Bids will be opened and read out loud at 1:30 pm February 25th, 2020 at the PRWUA Association Office, 285 West 1100 North Pleasant Grove, UT 84062

NO LATE PROPOSALS WILL BE ACCEPTED.

The principal items of work are approximately as follows:

- Removal and disposal of the current 48” welded steel pipe and associated concrete structures.
- Installation of 48” HDPE DR-26 pipe.

Plans will be available on February 14th, 2020.

The CONTRACT DOCUMENTS, consisting of Advertisement for Bids, Information for Bidders, Bid, Bid Bond, Agreement, Payment Bond, Performance Bond, Notice of Award, Notice to Proceed, Change Order, General Conditions, Supplemental General Conditions, Specifications, Drawings, and Addenda, may be examined at the following locations:

- Horrocks Engineers, 2162 West Grove Parkway, Suite 400, Pleasant Grove, Utah, 84062
- PRWUA Association Office, 285 West 1100 North Pleasant Grove, UT 84062

Copies of the CONTRACT DOCUMENTS may be obtained through PRWUA Association Office, 285 West 1100 North Pleasant Grove, UT 84062.

A pre-bid site visit will be held at the project site, 17040 South 985 West Bluffdale, UT 84065 on Wednesday February 19th, 2020 at 2:00 pm.

All BIDDERS are required to have payment and performance bonds underwritten by a Surety Company approved by the U.S. Department of the Treasury. (Circular 570, latest edition).

OWNER RESERVES THE RIGHT TO ACCEPT OR REJECT ANY OR ALL PROPOSALS, OR ANY PART OF ANY PROPOSAL. OWNER RESERVES THE RIGHT TO WAIVE ANY INFORMALITY IN PART OR IN WHOLE IF IT IS DEEMED TO BE IN THE BEST INTEREST OF OWNER.

Date: Jeffrey D. Budge, P.E.
Operations & Engineering Manager
TABLE OF CONTENTS

Division 00 – Procurement and Contracting Requirements
000200 Advertisement for Bids
001000 Information for Bidders
002000 Information Required of Bidders
003000 Bid
003500 Bid Bond
003560 Non-Collusion Affidavit
003600 Notice of Award
004200 Contract Considerations
005000 Agreement
005100 Notice to Proceed
005700 Work Directive Change
006000 Payment Bond
006100 Performance Bond
007000 General Conditions
007314 Supplementary Conditions
007500 Special Provisions
009900 Contract Change Order
009950 Waiver of Lien

Division 01 – General Requirements
010100 Summary of Work
012500 Substitution Procedures
013000 Administrative Requirements
013300 Submittal Procedures
014000 Quality Requirements
014500 Testing and Process Control
015000 Temporary Facilities and Controls
015526 Traffic Regulation
016000 Material and Equipment
017000 Execution and Closeout Requirements

Division 02 – Existing Conditions
024113 Site Demolition

Division 03 – Concrete
031100 Concrete Formwork
032000 Concrete Reinforcement
033000 Concrete Work
033040 Portland Cement Concrete
033900 Concrete Curing

Division 05 – Metals
050523 Bolts, Washers, Drilled Anchors, and Eyebolts
051210 Miscellaneous Structural Steel and Aluminum
Division 31 – Earthwork
312323 Common Fill
312324 Select Fill
312327 Soil Compaction
312333 Excavation and Backfill Operations
312343 Restoration of Surface Improvements
313500 Geotextiles

Division 32 – Exterior Improvements
329219 Seeding

Division 33 – Utilities
331100 Water Distribution and Transmission Systems
331111
331112 Basic Piping Materials and Methods
331113 Ductile Iron Piping
331114 High Density Polyethylene Pipe
331125 Pipeline Testing
331216 Valves

In case of a conflict the most restrictive standard shall apply.
BIDS will be received by Provo River Water Users Association (PRWUA), (herein called the "OWNER"), at the PRWUA Association Office, 285 West 1100 North Pleasant Grove, UT 84062, until 1:00 p.m., then opened and read out loud at PRWUA Association Office, 285 West 1100 North Pleasant Grove, UT 84062.

Each BID must be submitted in a sealed envelope, addressed to Provo River Water Users Association, 285 West 1100 North Pleasant Grove, UT 84062. Each sealed envelope containing a BID must be plainly marked on the outside as BID for Provo River Water Users Association – PRWUA – ULDC South Branch Pipeline Replacement and the envelope should bear on the outside the name of the BIDDER, his address, his license number if applicable and the name of the project for which the BID is submitted. If forwarded by mail, the sealed envelope containing the BID must be enclosed in another envelope addressed to the OWNER at PRWUA Association Office, 285 West 1100 North Pleasant Grove, UT 84062.

These instructions are to be considered with and made a part of the contract.

All BIDS must be made on the required BID form. All blank spaces for BID Prices must be filled in, in ink or typewritten, and the BID form must be fully completed and executed when submitted. Only one copy of the BID form is required.

The OWNER may waive any informalities or minor defects or reject any and all BIDS. Any BID may be withdrawn prior to the above scheduled time for the opening of BIDS or authorized postponement thereof. Any BID received after the time and date specified shall not be considered. No BIDDER may withdraw a BID within 60 days after the actual date of the opening thereof. Should there be reasons why the contract cannot be awarded within the specified period, the time may be extended by mutual agreement between the OWNER and the BIDDER.

BIDDERS must satisfy themselves of the accuracy of the estimated quantities in the Bid Schedule by examination of the site and a review of the plans and specifications including Addenda. After BIDS have been submitted, the BIDDER shall not assert that there was a misunderstanding concerning the quantities of work or of the nature of the work to be done.

The CONTRACT DOCUMENTS contain the provisions required for the construction of the project. Information obtained from an officer, agent, or employee of the OWNER or any other person shall not affect the risks or obligations assumed by the CONTRACTOR or relieve him from fulfilling any of the conditions of the Contract.

Each BID must be accompanied by a Bid Bond payable to the OWNER for five (5) percent of the total amount of the BID. As soon as the BID prices have been compared, the OWNER will return the bonds of all except the three lowest responsible BIDDERS. When the Agreement is executed, the bonds of the two remaining unsuccessful BIDDERS will be returned. The Bid Bond of the successful BIDDER will be retained until the Payment Bond and Performance Bond have been executed and approved, after which it will be returned. A certified check may be used in lieu of a Bid Bond.

A Performance Bond and a Payment Bond, each in the amount of 100 percent of the CONTRACT PRICE, with a corporate surety approved by the U.S. Department of the Treasury (Circular 570, latest edition) will be required for the faithful performance of the contract.

Attorneys-in-fact who sign Bid Bonds or Payment Bonds and Performance Bonds must file with each bond a certified and effective dated copy of their power of attorney.

The party or parties to whom the contract is awarded will be required to execute the Agreement and obtain the Performance Bond and Payment Bond within ten (10) calendar days from the date when Notice of Award is
delivered to the bidder. The Notice of Award shall be accompanied by the necessary Agreement and bond forms. In case of failure of the BIDDER to execute the Agreement, the OWNER may at his option consider the BIDDER in default, in which case the Bid Bond accompanying the proposal shall become the property of the OWNER.

The OWNER within eight (8) days of receipt of acceptable Performance Bond, Payment Bond, and Agreement signed by the party to whom the Agreement was awarded will sign the Agreement and return to such party an executed duplicate of the Agreement. Should the OWNER not execute the Agreement within such period, the BIDDER may by written notice withdraw his signed Agreement. Such notice of withdrawal shall be effective upon receipt of the notice by the OWNER.

The Notice to Proceed will be issued within eight (8) days of the execution of the Agreement by the OWNER. Should there be reasons why the Notice to Proceed cannot be issued within such period, the time may be extended by mutual agreement between the OWNER and CONTRACTOR. If the Notice to Proceed has not been issued within the eight (8) day period or within the period mutually agreed upon, the CONTRACTOR may terminate the Agreement without further liability on the part of either party.

The OWNER may make such investigations as he deems necessary to determine the ability and character of the BIDDER to perform the work, and the BIDDER shall furnish to the OWNER all such information and data for this purpose as the OWNER may request. The OWNER reserves the right to reject any BID if the evidence submitted by, or investigation of, such BIDDER fails to satisfy the OWNER in any way that such BIDDER is properly responsible and qualified to carry out the obligations of the Agreement and to complete the work contemplated therein.

A conditional or qualified BID will not be accepted.

All applicable laws, ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the project shall apply to the contract throughout.

Each BIDDER is responsible for inspecting the site and for reading and being thoroughly familiar with the CONTRACT DOCUMENTS. The failure or omission of any BIDDER to do any of the foregoing shall in no way relieve any BIDDER from any obligation in respect to his BID.

Bidders are cautioned that they must inform themselves of the character of the work to be performed under this contract and that a deviation to any extent either way may be made from the approximate quantities, which are stated for the purpose of showing the class of work required and as a basis for determining the amount of the bid, but not to fix the amount of work to be done.

The Contractor will be paid for work actually done at the unit prices bid, regardless of differences in the estimated quantities listed in the bid proposal and the actual quantities. Final payments will be based on quantities in place, measured or determined by the Engineer at the site where work has been constructed or accomplished.

Award will be made to the lowest responsive, responsible BIDDER, for each schedule.

When a proposal is made by a firm, the firm name, and also the individual name(s) of the member(s) of the firm must be signed in full.

No alterations by erasure will be allowed and permission will not, in any case, be given for the withdrawal, modifications, or explanation of any bid.

The Owner reserves the right to reject any and all proposals and to waive any informality or defects in the proposal received.
Transfers of contract, or of interest in contracts, are prohibited. The General Contractor will be responsible for all subcontractors.

A pre-bid site visit will be held at the project site, 17040 South 985 West Bluffdale, UT 84065 on Wednesday, February 19th, 2020 at 2:00 p.m.

Fifty-one (51) percent of all work completed shall be performed by the General Contractor.

All proposals shall be made and received with the express understanding that the bidder accepts the terms and conditions contained in the complete contract bound herewith.

Neither the Engineer nor Owner shall be held responsible for any oral instructions. Any changes to the Plans and Specifications will be in the form of a written Addendum which will be furnished to all plan holders.

Additional information can be obtained, prior to submitting your bid, from Horrocks Engineers in Pleasant Grove, Utah. The ENGINEER is Kasey Chesnut, P.E. at 2162 West Grove Parkway, Suite 400, Pleasant Grove, Utah 84062, telephone number (801) 763-5296.
The bidder shall furnish the following information. Failure to comply with the requirement may render the BID non-responsive and may cause its rejection. Additional sheets shall be attached as required.

(1) Contractor's name and address:

(2) Contractor's telephone number:

(3) Contractor's license: Primary classification:
State License No.:
Supplemental classifications held, if any:

(4) Number of years as a contractor in construction work of this type:

(5) Names and titles of all officers of contractor's firm:

(6) Name of person who inspected site of proposed work for your firm:
Name: Date of Inspection:

NOTE: THE FOLLOWING INFORMATION SHALL BE PROVIDED AS SEPARATE ATTACHMENTS AND SHALL BE SUBMITTED WITH BID.

(7) Name and telephone number of Surety Company and Agent who will provide the required bonds on the contract:
Name: Telephone:

(8) Individual experience resume of person who will be designated chief construction superintendent.

(9) List of subcontractors and major suppliers anticipated to be utilized during the contract.
The bidder must demonstrate the ability to perform at least fifty-one (51) percent of the work without subcontracting and complete the project within the specified time frame. Information on the bidder's ability to staff the project, both in the field and in his office, and the bidder's ability to directly supply major construction equipment to the project shall be submitted for review with the bidder's proposal.

List of completed projects similar in nature to this project, including a reference list of at least two construction contracts completed by the Contractor during the last four (4) years involving work of similar type, and complexity and the most recently completed project. This list shall include the following information for each project as a minimum:

- Name, address and telephone number of owner
- Name of Project
- Name, address and telephone number of project engineer
- Number of change orders
- Contract amount
- Date of completion of contract
- Brief description of the work involved, size, length, etc.
- Amount of change.

NOTE: THE FOLLOWING INFORMATION SHALL BE PROVIDED AS SEPARATE ATTACHMENTS AND SHALL BE SUBMITTED UPON REQUEST OF THE OWNER, PRIOR TO AWARDING BID.

A notarized and verified financial statement, references, and other information, sufficiently comprehensive to permit an appraisal of contractor's current financial condition.
DOCUMENT 003000

BID

ULDC South Branch Pipeline Replacement

Bid Documents which are required for a complete bid:

- Document 002000 INFORMATION REQUIRED OF BIDDER
  - Items 1 – 11 completed on enclosed forms or additional sheets as needed.
- Document 003000 BID
  - Completed on original enclosed form.
- Document 003500 BID BOND
  - Completed on enclosed form or Surety Company’s form.

CONTRACTOR ACKNOWLEDGES THAT ABOVE STATED DOCUMENTS ARE REQUIRED AND ENCLOSED AS PART OF THIS BID.

__________________________________________ ______________________
Signature Date

PART 1 GENERAL

Proposal of __________________________________ (hereinafter called "BIDDER", organized and existing under the laws of the State of Utah, doing business as ____________________________).*

*Insert "a corporation", "a partnership", or "an individual" as applicable.

To Provo River Water Users Association (PRWUA) (hereinafter called "OWNER").

In compliance with your Advertisement for Bids, BIDDER hereby proposes to perform all work for the construction of ULDC South Branch Pipeline Replacement in strict accordance with the CONTRACT DOCUMENTS, within the time set forth therein, and at the prices stated below.

By submission of this BID, each BIDDER certifies, and in the case of a joint BID, each party thereto certifies as to his own organization that this BID has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this BID with any other BIDDER or with any competitor.

BIDDER hereby agrees to commence work under this contract on or before a date to be specified in the Notice to Proceed and to fully complete the project by April 30th, 2020.

BIDDER further agrees to pay as liquidated damages, the sum of $1,000.00 for each consecutive calendar day thereafter as provided in section 1-29 of the SPECIAL PROVISIONS.

BIDDER acknowledges receipt of the following ADDENDUM:

__________________________________________ ______________________

BIDDER acknowledges having reviewed Section 007500 - Special Provisions (Initial)
The BIDDER agrees to perform all the work described in the specifications and shown on the plans for the following BID UNIT PRICES (Figures are to be typewritten or clearly and legibly printed in ink):

The BIDDER agrees that this bid shall be good and may not be withdrawn for 60 calendar days as stated in the specifications after the scheduled closing time for receiving bids.

The BID unit prices shall include all labor, materials, mobilization, rentals, bailing, shoring, removal, overhead, profit, insurance, sales tax, other applicable taxes and fees, etc., to cover the finished work of the several kinds called for.

Upon receipt of written notice of the acceptance of this bid, BIDDER will execute the formal contract attached within 10 days and deliver a Surety Bond or Bonds as required by the General Conditions. The bid security amounting to five (5) percent of the base bid is hereby attached in the sum of ($______________________) and is to become the property of the OWNER in the event the contract and bond are not executed within the time above set forth, as liquidated damages for the delay and additional expense to the OWNER caused thereby.

**BID SCHEDULE**

For a responsive bid, write in unit price for each item, multiply by respective units, and total for a lump sum price.

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Quantity</th>
<th>Units</th>
<th>Unit Price</th>
<th>Total Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mobilization</td>
<td>1</td>
<td>LS</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>2</td>
<td>48 Inch HDPE Waterline</td>
<td>280</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td>$</td>
<td>$</td>
</tr>
</tbody>
</table>

Measurement and Payment Descriptions are included at the end of this section.
<table>
<thead>
<tr>
<th>ATTEST:</th>
<th>Respectfully Submitted:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Utah License No.</td>
<td>Title</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PART 3 MEASUREMENT AND PAYMENT

Bid Items

1. Mobilization - Bid Item 1
   A. Payment covers cost of mobilization, demobilization, installation of temporary facilities, and bringing all necessary construction equipment to the site. Payment will be made on a percentage of the LUMP SUM BASIS as follows:

<table>
<thead>
<tr>
<th>Percent of Original Contract</th>
<th>Percent of Amount Bid for Mobilization to be Paid</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>40</td>
</tr>
<tr>
<td>35</td>
<td>20</td>
</tr>
<tr>
<td>50</td>
<td>30</td>
</tr>
<tr>
<td>70</td>
<td>10</td>
</tr>
</tbody>
</table>

   B. Payment also includes the cost of scheduling processes required per project specifications.
   C. Payment will include conforming to all applicable local, state and federal requirements.
   D. Payment will also include any necessary traffic control.
   E. Moving on the site any equipment required for first month operations.
   F. Installing temporary construction power and wiring.
   G. Developing construction water supply.
   H. Providing on-site sanitary facilities and potable water facilities as specified.
   I. Arranging for and erection of Contractor's work and storage yard.
   J. Contractor and Subcontractor insurance and bonds.
   K. Dust and Mud Control including UPDES storm water permit and fugitive dust control plan.
   L. Contract Closeout

2. Waterline - Bid Items 2
   A. Measurement shall be made on a PER LINEAL FOOT basis for installing the pipe as shown on the plans and described in the specifications.
   B. Payment covers the cost of the removal of existing pipe and installation of the new pipe; including, all cost of excavation, bedding material, connections to existing pipes, any necessary fittings and other appurtenances, thrust blocks, trench dams, locator wire, backfill and compaction of native material, and proper disposal of excess materials offsite. Payment will cover the cost of all labor, materials, equipment and tools to complete this item. Payment will also include the backfill and repair of retaining wall and native, asphalt, and trail surfaces. Payment will cover the erosion protection.
   C. Payment also covers the cost of pressure testing the waterline.

END OF SECTION
DOCUMENT 003500
BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned,

_________________________________________________________ as Principal, and

_________________________________________________________ as Surety, are hereby Held and firmly bound unto

_________________________________________________________ as Owner in the penal sum

of __________________________ for the payment of which, well and truly
to be made, we hereby jointly and severally bind ourselves, successors, and assigns. Signed, this

day of ________________ , 2018. The Condition of the above obligation is such that whereas the Principal
submitted to __________________________ a certain Bid, attached hereto and hereby made a part hereof to enter
into a contract in writing, for the __________________________ Project.

NOW, THEREFORE,

(a) If said Bid shall be rejected, or in the alternate.

(b) If said Bid shall be accepted and the Principal shall execute and deliver a contract in the Form of
Contract attached hereto (properly completed in accordance with said Bid) and shall furnish a bond for
his faithful performance of said contract, and for the payment of all persons performing labor or
furnishing materials in connection therewith, and shall in all other respects perform the agreement
created by the acceptance of said Bid, then this obligation shall be void, otherwise the same shall
remain in force and effect; it being expressly understood and agreed upon that the liability of the
Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation
as herein stated.

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

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

(Principal)

_________________________________________________________

(Surety)

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.
NON-COLLUSION AFFIDAVIT

__________________________, being the first duly sworn, deposes and says that:

1. He/she is ______________________ of __________________________
   (Owner, partner, etc.) (Company)
   the Bidder that has submitted the attached Bid;

2. He/she is fully informed respecting the preparation and contents of the attached Bid and of all pertinent
   circumstances respecting such Bid;

3. Such Bid is genuine and is not a collusive or sham Bid;

4. Neither the said Bidder nor any of its officers, partners, owners, subcontractors, agents, representatives,
   employees or parties in interest including this affiant, has in any way colluded, conspired, connived or agreed,
   directly or indirectly, with any other Bidder, firm or person to submit a sham Bid in connection with the Contract for
   which the attached Bid has been submitted or to refrain from bidding in connection with such Contract, or has in any
   manner, directly or indirectly sought by agreement or collusion or communication or conference with any other
   Bidder, firm or person to fix price or prices in the attached Bid or of any other Bidder, or to fix overhead, profit or
   cost element of the bid price or the bid price of any other bidder, or to secure through any collusion, conspiracy,
   connivance or unlawful agreement and advantage against the Provo River Water Users Association;

5. No member of the Association, or other Officers of the Provo River Water Users Association, or any person in the
   employ of the Association is directly or indirectly interested in the bid, or the work to which it relates, or in any
   portion of the profits thereof; and,

6. The prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy,
   connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees
   or parties in interest including this affiant;

7. I am/The Bidder is not indebted to the Provo River Water Users Association in any form or manner.

Signature: ________________________ Date: ______________

Title: ________________________ Witness: ________________________
NOTICE OF AWARD

To:

PROJECT Description: ULDC South Branch Pipeline Replacement

The OWNER has considered the BID submitted by you for the above described WORK in response to its Advertisement for Bids dated February 14th, 2020, and Information for Bidders.

You are hereby notified that your BID has been accepted for items in the amount of $________________.

You are required by the Information for Bidders to execute the Agreement and furnish the required CONTRACTOR’S Performance Bond, Payment Bond, and Certificates of Insurance within ten (10) calendar days from the date of this notice to you.

If you fail to execute said Agreement and to furnish said Bonds within ten (10) days from the date of this Notice, said OWNER will be entitled to consider all your rights arising out of the OWNER’S acceptance of your BID as abandoned and as a forfeiture of your Bid Bond. The OWNER will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this Notice of Award to the OWNER.

Dated this_________ day of ___________ 2020.

Provo River Water Users Association_____
Owner

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE OF AWARD is hereby acknowledged

____________________________________________________________

By____________________________
this the_________ day of ___________, 2020.

By________________________________________
Title _________________________________
SECTION 004200

CONTRACT CONSIDERATIONS

PART

1.01 SECTION INCLUDES

A. Application for payment.

B. Change procedures.

C. Defect Assessment.

D. Clarification of Work Requirements.

E. Measurement and payment – general.

F. Measurement and payment - unit price.

G. Compensation for Altered Quantity.

H. Project Milestones

1.02 RELATED SECTIONS

A. Section 016000 - Material and Equipment: Product substitutions and options.

1.03 APPLICATIONS FOR PAYMENT

A. Submit three copies of each application.

B. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.

C. Payment Period: Monthly. Submit Pay Request by the 1st day of each month.

D. Include an updated construction progress schedule.

E. 5 percent retainage shall be held until construction is complete.

1.04 CHANGE PROCEDURES

A. The Engineer will advise of minor changes in the Work not involving an adjustment to Contract Price or Contract Time as authorized by EJCDC, 2013 Edition Article 11.

B. The Engineer may issue a Notice of Change 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 5 days.

C. The Contractor may propose changes by submitting a request for change to the Engineer, describing the proposed change and its full effect on the Work. Include a statement describing the reason for the change, and the effect on the Contract Price and Contract Time with full documentation.
D. Unit Price Change Order: For contract unit prices and quantities, the Change Order will be executed on a fixed unit price basis. For unit costs or quantities of units of work which are not pre-determined, execute Work under a Work Directive Change. Changes in Contract Price or Contract Time will be computed as specified for Force Account Change Order.

E. Work Directive Change: Engineer may issue a directive, signed by the Owner, instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work, and designate method of determining any change in Contract Price or Contract Time. Promptly execute the change.

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

1.05 DEFECT ASSESSMENT

A. Replace the Work, or portions of the Work, not conforming to specified requirements.

B. 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.

1.06 CLARIFICATION OF WORK REQUIREMENTS

A. Costs due to utility delays and relocations are to be borne by the Contractor.

B. All utilities have been reasonably drawn on plans to the best of the Owner’s knowledge and record. There is the potential for existing utilities to not be shown on the plans or profiles or to be shown in the profiles at an approximate depth. All utilities locations are the responsibility of the contractor.

C. Traffic control includes keeping the Jordan River Trail open to trail users. Ingress and egress for residents and businesses are to be maintained.

D. Contractor shall obtain an NOI permit from the State and submit a Storm Water Pollution Prevention Plan (SWPPP) to the Association. The SWPPP will need to contain provisions for sweeping and vacuuming the paved areas. PRWUA may suspend or shut down the project if these items are not maintained.

PART

2.01 GENERAL

A. The method of measurement and payment for the various items comprising the completed work follows: Payment for the items shall be compensation in full for the furnishing of all overhead, labor, material, tools, equipment, and appurtenances necessary to complete the work in a good, neat, and satisfactory manner as indicated on the Plans or as specified, with all cleanup and related work completed. Each item, fixture, piece of equipment, etc., shall be complete with all necessary connections and appurtenances for the satisfactory use and/or operation of said item. No additional payment will be made for work related to each item unless specifically noted or specified. Measurement will be in place in the completed work with no allowance for waste.

2.02 MEASUREMENT AND PAYMENT - UNIT PRICE

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

B. Unit Quantities: Quantities and measurements indicated in the Bid Form are for contract purposes only. Quantities and measurements supplied or placed in the Work shall determine payment.
C. Payment Includes: Full compensation for required labor, Products, tools, equipment, plant and facilities, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit.

2.03 COMPENSATION FOR ALTERED QUANTITIES

A. When the accepted quantities of work vary from the quantities in the bid schedule, the Contractor shall accept as payment in full, so far as contract items are concerned, payment at the original contract unit prices for the accepted quantities of work done. No allowance except as provided in Sub-Section 13 of Section 007000 of the General Conditions will be made for any increased expense, loss of expected reimbursement, or loss of anticipated profits suffered or claimed by the Contractor resulting either directly from such alterations or indirectly from unbalanced allocation among the contract items of overhead expense on the part of the Contractor and subsequent loss of expected reimbursement therefore, or from any other cause.

B. The Engineer reserves the right to make at any time during the progress of the work, such increases or decreases in quantities and such alterations in the details of construction, and the elimination of one or more items as may be found necessary or desirable. Such alterations shall not be considered as a waiver of any conditions of the contract nor invalidate any of the provisions thereof nor release the surety. The Contractor agrees to accept the work as altered the same as if it had been a part of the original contract.

PART

Not Used.

PART

Not Used.

END OF SECTION
THIS AGREEMENT is by and between Provo River Water Users Association (“Owner”) and __________________ (“Contractor”).

ARTICLE 1 – WORK

1.1 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:
   A. Removal and disposal of the current 48” welded steel pipe and associated concrete structures.
   B. Installation of 48” HDPE DR-26 pipe.

ARTICLE 2 – THE PROJECT

2.1 The Project, of which the Work under the Contract Documents is a part, is generally described as follows: ULDC SOUTH BRANCH PIPELINE REPLACEMENT.

ARTICLE 3 – ENGINEER

3.1 The Project has been designed by Horrocks Engineers

ARTICLE 4 – CONTRACT TIMES

HORROCKS ENGINEERS
PROVO RIVER WATER USERS ASSOCIATION
ULDC SOUTH BRANCH PIPELINE REPLACEMENT

AGREEMENT
PAGE 00 52 00
4.1 *Time of the Essence*
A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.2 *Contract Times: Dates*
A. The Work will be substantially completed on or before April 15th, 2020, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before April 30th, 2020.

4.3 *Liquidated Damages*
A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner, its shareholders and others will suffer direct, incidental and consequential financial and other losses if the Work is not completed and Milestones not achieved within the times specified in Paragraph 4.2 above, plus any extensions thereof allowed in accordance with the Contract. Such damages will include, but are not limited to, consequential damages resulting from the delay of delivery of water through the canal if substantial completion is not achieved by April 15th, 2020. The parties recognize that if there is a delay then assessing, calculating and proving actual damages after the fact will be difficult, expensive and time consuming for everyone involved, and that damages may accrue well into the future making a timely resolution difficult. The parties agree that the liquidated damages described below are agreed to as a good faith effort to estimate actual damages in advance in a situation where calculating actual damages after the fact will be difficult, uncertain, expensive and time consuming. Owner and Contractor therefore agree that as liquidated damages for delay (but not as a penalty):

1. **Substantial Completion:** Contractor shall pay Owner $1,000 for each day that expires after the time (as duly adjusted pursuant to the Contract) specified in Paragraph 4.2.A above for Substantial Completion until the Work is substantially complete.

2. **Completion of Remaining Work:** After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner $500 for each day that expires after such time until the Work is completed and ready for final payment.

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

4.4 *Special Damages*
In addition to the amount provided for damages, Contractor shall reimburse Owner for the actual costs reasonably incurred by Owner for engineering, construction observation, inspection, and administrative services needed after the time specified in Paragraph 4.2 for Substantial Completion (as duly adjusted pursuant to the Contract), until the Work is substantially complete.

**CONTRACT PRICE**

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

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

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

B. For all Work, at the prices stated in Contractor’s Bid, attached hereto as an exhibit.

**ARTICLE 5 – PAYMENT PROCEDURES**
5.1 **Submittal and Processing of Payments**

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

5.2 **Progress Payments; Retainage**

A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor’s Applications for Payment within 30 days of receipt of requests for payment for performance of the Work as provided in Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted on or before the 10th of the month and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established as provided in the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no Schedule of Values, as provided elsewhere in the Contract.

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Owner may withhold, including but not limited to retention or damages, in accordance with the Contract
   a. 95 percent of Work completed (with the balance being retainage). If the Work has been 50 percent completed as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, then as long as the character and progress of the Work remain satisfactory to Owner and Engineer, there will be no additional retainage; and
   b. 100 percent of cost of materials and equipment not incorporated in the Work and stored on the project site (with the balance being retainage)

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

5.3 **Final Payment**

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

**ARTICLE 6 – INTEREST**

6.1 All amounts not paid when due shall bear interest at ten percent (10%) per annum compounded annually.

**ARTICLE 7 – CONTRACTOR’S REPRESENTATIONS**

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

A. Contractor has examined and carefully studied the Contract Documents, and any data and reference items identified in the Contract Documents.

B. Contractor has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
C. Contractor is familiar with and is satisfied as to all Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Contractor has carefully studied all: (1) all drawings of physical conditions relating to existing surface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.

E. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (3) Contractor’s safety precautions and programs.

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

G. 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.

H. 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.

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

J. Contractor’s entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.
ARTICLE 8 – CONTRACT DOCUMENTS

8.1 Contents
A. The Contract Documents consist of the following:
   1. This Agreement.
   2. Performance bond.
   3. Payment bond.
   4. General Conditions.
   5. Supplementary Conditions.
   6. Specifications as listed in the table of contents of the Project Manual. Drawings (not attached but incorporated by reference) consisting of TBD sheets with each sheet bearing the following general title: ULDC SOUTH BRANCH PIPELINE REPLACEMENT
   7. Addenda
   8. Exhibits to this Agreement (enumerated as follows):
      a. Contractor’s Bid.
      b. Documentation submitted by Contractor prior to Notice of Award.
   9. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:
      a. Notice to Proceed.
      b. Work Change Directives.
      c. Change Orders.
      d. Field Orders.
B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).
C. There are no Contract Documents other than those listed above in this Article 8.1A.
D. The Contract Documents may only be amended, modified, or supplemented as provided in the General Conditions.

ARTICLE 9 – MISCELLANEOUS

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

9.2 Assignment of Contract
A. Unless expressly agreed to elsewhere in the Contract, no assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, money that may become due and money that is due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.
9.3 Successors and Assigns
A. Owner and Contractor each binds itself, its successors, assigns, and legal representatives to the other party hereto, its successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

9.4 Severability
A. 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.

9.5 Contractor’s Certifications
A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 9.5:
   1. “corrupt practice” means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process or in the Contract execution;
   2. “fraudulent practice” means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
   3. “collusive practice” means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and
   4. “coercive practice” means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

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

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

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

OWNER: Provo River Water Users Association  CONTRACTOR: TBD

By:  By:

Title:  Title:

(If Contractor is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)
Attest: ____________________________ Attest: ____________________________

Title: ____________________________ Title: ____________________________

Address for giving notices: ____________________________ Address for giving notices: ____________________________

License No.: ____________________________ (where applicable)

(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)

END OF SECTION
NOTICE TO PROCEED

To: ____________________________  
Date: ____________________________  

You are hereby notified to commence work in accordance with the Agreement dated ____________, 2020, on or before ________________, and you are to complete by ____________.

By ____________________________  
Title ____________________________  

ACCEPTANCE OF NOTICE

By ____________________________  
Title ____________________________  

Receipt of the above NOTICE TO PROCEED is hereby acknowledged

By ____________________________  
this the ___ day of ________, 2020

By ____________________________  
Title ____________________________
You are directed to proceed promptly with the following change(s):

**Description:**

**Purpose of Change Order:**

**Attachments:** (list documents supporting change)

If a claim is made that the above change(s) have affected Contract Price or Contract Time, any claim for a Change Order based thereon will involve one of the following methods of determining the effect of the change(s).

<table>
<thead>
<tr>
<th>Method of determining change in Contract Price:</th>
<th>Method of determining change in Contract Time:</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Time and materials</td>
<td>☐ Contractor's records</td>
</tr>
<tr>
<td>☐ Unit prices</td>
<td>☐ Engineer's records</td>
</tr>
<tr>
<td>☐ Cost plus fixed fee</td>
<td>☐ Other</td>
</tr>
<tr>
<td>☐ Other</td>
<td></td>
</tr>
</tbody>
</table>

Estimated increase(decrease) in Contract Price:

$ __________

If the change involves an increase, the estimated amount is not to be exceeded without further authorization.

**RECOMMENDED:**

by ____________________________

Engineer

**AUTHORIZED:**

by ____________________________

Owner

Estimated increase(decrease) in Contract Time: _____ days. If the change involves an increase, the estimated time is not be exceeded without further authorization.
DOCUMENT 006000
PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: that

______________________________
(Name of Contractor)

______________________________
(Address of Contractor)

______________________________
(Name of Surety)

______________________________
(Address of Surety)

hereinafter called Surety, are held and firmly bound unto

______________________________
(Name of Owner)

______________________________
(Address of Owner)

hereinafter called OWNER, in the penal sum of ________________________ Dollars ($________________________) in lawful money of the United States, for the payment of which sum, well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the OWNER, dated the ___ day of _____________, 20___, a copy of which is hereto attached and made a part hereof for the construction of:

______________________________

NOW THEREFORE, if the Principal shall promptly make payment to all persons, firms, SUBCONTRACTORS, and corporations furnishing materials for or performing labor in the prosecution of the WORK provided for in such contract, and any authorized extension or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such WORK, and all insurance premiums on said WORK, and for all labor, performed in such WORK whether by SUBCONTRACTOR or otherwise, then this obligation shall be void; otherwise to remain in full force and effect.
PROVIDED FURTHER, that the said Surety for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the WORK to be performed thereunder or in the SPECIFICATIONS accompanying the same shall in any wise affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the work or to the SPECIFICATIONS.

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

IN WITNESS WHEREOF, this instrument is executed in ________________ counterparts, each one of which shall be deemed an original, this the ________________ day of __________________, 20__. 

ATTEST: _____________________________________________________________________ Principal
______________________________________________________________________________ By ________________________________
Principal Secretary

______________________________________________________________________________ Address
(Seal)

______________________________________________________________________________ Witness as to Principal

______________________________________________________________________________ Address
______________________________________________________________________________ Surety

ATTEST: _____________________________________________________________________ Witness as to Surety
______________________________________________________________________________ By ________________________________ 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.
DOCUMENT 006100

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: that

_________________________________________, hereinafter called
(Name of Contractor)

_________________________________________, hereinafter called
(Address of Contractor)
(Corporation, Partnership, or Individual)
Principal, and

_________________________________________, hereinafter called
(Name of Surety)

_________________________________________, hereinafter called Surety, are held and firmly bound unto
(Address of Surety)

_________________________________________, hereinafter called OWNER, in the penal sum of
(Name of Owner)

_________________________________________, hereinafter called OWNER, in the penal sum of
(Address of Owner)

Dollars ($___________) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the OWNER, dated the ___ day of _____________, 20___, a copy of which is hereto attached and made a part hereof for the construction of:

_________________________________________,

NOW, THEREFORE if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extensions thereof which may be granted by the OWNER, with or without notice to the Surety and during the one year 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 the WORK to be performed thereunder or in the SPECIFICATIONS accompanying the same shall in any wise affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the work or to the SPECIFICATIONS.

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

IN WITNESS WHEREOF, this instrument is executed in _______________ counterparts, each one of which shall be deemed an original, this the ______________ day of ____________________, 20__.

ATTEST:

__________________________________________  Principal
__________________________________________  By _____________________________
Principal Secretary
__________________________________________  Address
(Seal)

__________________________________________  Witness as to Principal
__________________________________________
Address  Surety

ATTEST:

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

STANDARD GENERAL CONDITIONS
OF THE CONSTRUCTION CONTRACT

Prepared by

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

Issued and Published Jointly by

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AMERICAN COUNCIL OF ENGINEERING COMPANIES

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

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CSI

NUCA
These General Conditions have been prepared for use with the Agreement Between Owner and Contractor for Construction Contract (EJCDC® C-520, Stipulated Sum, or C-525, Cost-Plus, 2013 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other.

To prepare supplementary conditions that are coordinated with the General Conditions, use EJCDC’s Guide to the Preparation of Supplementary Conditions (EJCDC® C-800, 2013 Edition). The full EJCDC Construction series of documents is discussed in the Commentary on the 2013 EJCDC Construction Documents (EJCDC® C-001, 2013 Edition).

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## TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Article</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Definitions and Terminology</td>
<td>1</td>
</tr>
<tr>
<td>1.01</td>
<td>Defined Terms</td>
<td>1</td>
</tr>
<tr>
<td>1.02</td>
<td>Terminology</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>Preliminary Matters</td>
<td>6</td>
</tr>
<tr>
<td>2.01</td>
<td>Delivery of Bonds and Evidence of Insurance</td>
<td>6</td>
</tr>
<tr>
<td>2.02</td>
<td>Copies of Documents</td>
<td>6</td>
</tr>
<tr>
<td>2.03</td>
<td>Before Starting Construction</td>
<td>7</td>
</tr>
<tr>
<td>2.04</td>
<td>Preconstruction Conference; Designation of Authorized Representatives</td>
<td>7</td>
</tr>
<tr>
<td>2.05</td>
<td>Initial Acceptance of Schedules</td>
<td>7</td>
</tr>
<tr>
<td>2.06</td>
<td>Electronic Transmittals</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>Documents: Intent, Requirements, Reuse</td>
<td>8</td>
</tr>
<tr>
<td>3.01</td>
<td>Intent</td>
<td>8</td>
</tr>
<tr>
<td>3.02</td>
<td>Reference Standards</td>
<td>8</td>
</tr>
<tr>
<td>3.03</td>
<td>Reporting and Resolving Discrepancies</td>
<td>9</td>
</tr>
<tr>
<td>3.04</td>
<td>Requirements of the Contract Documents</td>
<td>9</td>
</tr>
<tr>
<td>3.05</td>
<td>Reuse of Documents</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>Commencement and Progress of the Work</td>
<td>10</td>
</tr>
<tr>
<td>4.01</td>
<td>Commencement of Contract Times; Notice to Proceed</td>
<td>10</td>
</tr>
<tr>
<td>4.02</td>
<td>Starting the Work</td>
<td>10</td>
</tr>
<tr>
<td>4.03</td>
<td>Reference Points</td>
<td>11</td>
</tr>
<tr>
<td>4.04</td>
<td>Progress Schedule</td>
<td>11</td>
</tr>
<tr>
<td>4.05</td>
<td>Delays in Contractor’s Progress</td>
<td>11</td>
</tr>
<tr>
<td>5</td>
<td>Availability of Lands; Subsurface and Physical Conditions; Hazardous Environmental Conditions</td>
<td>12</td>
</tr>
<tr>
<td>5.01</td>
<td>Availability of Lands</td>
<td>12</td>
</tr>
<tr>
<td>5.02</td>
<td>Use of Site and Other Areas</td>
<td>12</td>
</tr>
<tr>
<td>5.03</td>
<td>Subsurface and Physical Conditions</td>
<td>13</td>
</tr>
<tr>
<td>5.04</td>
<td>Differing Subsurface or Physical Conditions</td>
<td>14</td>
</tr>
<tr>
<td>5.05</td>
<td>Underground Facilities</td>
<td>15</td>
</tr>
</tbody>
</table>
Article 9 – Owner’s Responsibilities .............................................................................................41

9.01 Communications to Contractor ...........................................................................................41
9.02 Replacement of Engineer.....................................................................................................41
9.03 Furnish Data..........................................................................................................................41
9.04 Pay When Due .......................................................................................................................41
9.05 Lands and Easements; Reports, Tests, and Drawings ..........................................................41
9.06 Insurance ...............................................................................................................................42
9.07 Change Orders .......................................................................................................................42
9.08 Inspections, Tests, and Approvals .......................................................................................42
9.09 Limitations on Owner’s Responsibilities ..............................................................................42
9.10 Undisclosed Hazardous Environmental Condition ...............................................................42
9.11 Evidence of Financial Arrangements....................................................................................42
9.12 Safety Programs.....................................................................................................................42

Article 10 – Engineer’s Status During Construction......................................................................42

10.01 Owner’s Representative .....................................................................................................42
10.02 Visits to Site .......................................................................................................................42
10.03 Project Representative .......................................................................................................43
10.04 Rejecting Defective Work ..................................................................................................43
10.05 Shop Drawings, Change Orders and Payments ....................................................................43
10.06 Determinations for Unit Price Work ....................................................................................43
10.07 Decisions on Requirements of Contract Documents and Acceptability of Work .................43
10.08 Limitations on Engineer’s Authority and Responsibilities ..................................................44
10.09 Compliance with Safety Program.........................................................................................44

Article 11 – Amending the Contract Documents; Changes in the Work.......................................44

11.01 Amending and Supplementing Contract Documents ..........................................................44
11.02 Owner-Authorized Changes in the Work .............................................................................45
11.03 Unauthorized Changes in the Work .....................................................................................45
11.04 Change of Contract Price .....................................................................................................46
11.05 Change of Contract Times ...................................................................................................47
11.06 Change Proposals .................................................................................................................47
11.07 Execution of Change Orders ................................................................................................48
11.08 Notification to Surety...........................................................................................................48

Article 12 – Claims ........................................................................................................................48
12.01 Claims........................................................................................................................48

Article 13 – Cost of the Work; Allowances; Unit Price Work...............................................49
13.01 Cost of the Work.............................................................................................................49
13.02 Allowances......................................................................................................................52
13.03 Unit Price Work.............................................................................................................52

Article 14 – Tests and Inspections; Correction, Removal or Acceptance of Defective Work ....53
14.01 Access to Work .............................................................................................................53
14.02 Tests, Inspections, and Approvals..................................................................................53
14.03 Defective Work ...............................................................................................................54
14.04 Acceptance of Defective Work......................................................................................55
14.05 Uncovering Work ...........................................................................................................55
14.06 Owner May Stop the Work .............................................................................................55
14.07 Owner May Correct Defective Work..............................................................................56

Article 15 – Payments to Contractor; Set-Offs; Completion; Correction Period ....................56
15.01 Progress Payments...........................................................................................................56
15.02 Contractor’s Warranty of Title.........................................................................................59
15.03 Substantial Completion....................................................................................................60
15.04 Partial Use or Occupancy ...............................................................................................60
15.05 Final Inspection................................................................................................................61
15.06 Final Payment ..................................................................................................................61
15.07 Waiver of Claims ..........................................................................................................62
15.08 Correction Period..............................................................................................................63

Article 16 – Suspension of Work and Termination .................................................................64
16.01 Owner May Suspend Work .............................................................................................64
16.02 Owner May Terminate for Cause....................................................................................64
16.03 Owner May Terminate For Convenience ......................................................................65
16.04 Contractor May Stop Work or Terminate.......................................................................65

Article 17 – Final Resolution of Disputes .............................................................................66
17.01 Methods and Procedures...............................................................................................66

Article 18 – Miscellaneous.....................................................................................................66
18.01 Giving Notice...................................................................................................................66
18.02 Computation of Times ....................................................................................................66
18.03 Cumulative Remedies.....................................................................................................66
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>18.04</td>
<td>Limitation of Damages</td>
<td>67</td>
</tr>
<tr>
<td>18.05</td>
<td>No Waiver</td>
<td>67</td>
</tr>
<tr>
<td>18.06</td>
<td>Survival of Obligations</td>
<td>67</td>
</tr>
<tr>
<td>18.07</td>
<td>Controlling Law</td>
<td>67</td>
</tr>
<tr>
<td>18.08</td>
<td>Headings</td>
<td>67</td>
</tr>
</tbody>
</table>
ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 Defined Terms

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

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

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

3. **Application for Payment**—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

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

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

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

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

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

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

10. **Claim**—(a) A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein: seeking an adjustment in Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer’s decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract; or (b) a demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer’s decision
regarding a Change Proposal; or seeking resolution of a contractual issue that Engineer has declined to address. A demand for money or services by a third party is not a Claim.

11. **Constituent of Concern**—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to (a) the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §9601 et seq. (“CERCLA”); (b) the Hazardous Materials Transportation Act, 49 U.S.C. §§5101 et seq.; (c) the Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq. (“RCRA”); (d) the Toxic Substances Control Act, 15 U.S.C. §§2601 et seq.; (e) the Clean Water Act, 33 U.S.C. §§1251 et seq.; (f) the Clean Air Act, 42 U.S.C. §§7401 et seq.; or (g) any other federal, state, or local statute, law, rule, regulation, ordinance, resolution, code, order, or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.

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

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

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

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

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

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

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

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

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

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

22. **Hazardous Environmental Condition**—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated in the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, does not establish a Hazardous Environmental Condition.

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

24. **Liens**—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.
25. **Milestone**—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date or by a time prior to Substantial Completion of all the Work.

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

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

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

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

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

31. **Project Manual**—The written documents prepared for, or made available for, procuring and constructing the Work, including but not limited to the Bidding Documents or other construction procurement documents, geotechnical and existing conditions information, the Agreement, bond forms, General Conditions, Supplementary Conditions, and Specifications. The contents of the Project Manual may be bound in one or more volumes.

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

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

34. **Schedule of Submittals**—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer’s review of the submittals and the performance of related construction activities.

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

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

37. **Site**—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands furnished by Owner which are designated for the use of Contractor.
38. **Specifications**—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.

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

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

41. **Successful Bidder**—The Bidder whose Bid the Owner accepts, and to which the Owner makes an award of contract, subject to stated conditions.

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

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

44. **Technical Data**—Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (a) subsurface conditions at the Site, or physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) or (b) Hazardous Environmental Conditions at the Site. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then the data contained in boring logs, recorded measurements of subsurface water levels, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical or environmental report prepared for the Project and made available to Contractor are hereby defined as Technical Data with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06.

45. **Underground Facilities**—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including but not limited to those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, fiber optic transmissions, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

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

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

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

A. The words and terms discussed in the following paragraphs are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. **Intent of Certain Terms or Adjectives:**

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

C. **Day:**

1. The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.

D. **Defective:**

1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
   a. does not conform to the Contract Documents; or
   b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
   c. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or 15.04).

E. **Furnish, Install, Perform, Provide:**

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

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

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

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

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

ARTICLE 2 – PRELIMINARY MATTERS

2.01 Delivery of Bonds and Evidence of Insurance

A. Bonds: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.

B. Evidence of Contractor’s Insurance: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract), the certificates and other evidence of insurance required to be provided by Contractor in accordance with Article 6.

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

2.02 Copies of Documents

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

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

2.03 Before Starting Construction

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

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

2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.
2.04 **Preconstruction Conference; Designation of Authorized Representatives**

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

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

2.05 **Initial Acceptance of Schedules**

A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.03.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

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

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

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

2.06 **Electronic Transmittals**

A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may transmit, and shall accept, Project-related correspondence, text, data, documents, drawings, information, and graphics, including but not limited to Shop Drawings and other submittals, in electronic media or digital format, either directly, or through access to a secure Project website.

B. If the Contract does not establish protocols for electronic or digital transmittals, then Owner, Engineer, and Contractor shall jointly develop such protocols.

C. When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the recipient’s use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.
ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 Intent
A. The Contract Documents are complementary; what is required by one is as binding as if required by all.
B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents.
C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic or digital versions of the Contract Documents (including any printed copies derived from such electronic or digital versions) and the printed record version, the printed record version shall govern.
D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.

3.02 Reference Standards
A. Standards Specifications, Codes, Laws and Regulations
   1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
   2. No provision of any such standard specification, manual, reference standard, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

3.03 Reporting and Resolving Discrepancies
A. Reporting Discrepancies:
   1. Contractor's Verification of Figures and Field Measurements: Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.
2. **Contractor’s Review of Contract Documents**: If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

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

B. **Resolving Discrepancies**:

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:
   
   a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or
   
   b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 **Requirements of the Contract Documents**

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

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

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

A. Contractor and its Subcontractors and Suppliers shall not:

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

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

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

**ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK**

4.01 **Commencement of Contract Times; Notice to Proceed**

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

4.02 **Starting the Work**

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

4.03 **Reference Points**

A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer’s judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.04 **Progress Schedule**

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

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.
2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 11.

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

4.05 *Demands in Contractor’s Progress*

A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Times and Contract Price. Contractor’s entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor’s ability to complete the Work within the Contract Times.

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

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

1. severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;
2. abnormal weather conditions;
3. acts or failures to act of utility owners (other than those performing other work at or adjacent to the Site by arrangement with the Owner, as contemplated in Article 8); and
4. acts of war or terrorism.

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

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

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

G. Contractor must submit any Change Proposal seeking an adjustment in Contract Price or Contract Times under this paragraph within 30 days of the commencement of the delaying, disrupting, or interfering event.
ARTICLE 5 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 Availability of Lands

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

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

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

5.02 Use of Site and Other Areas

A. Limitation on Use of Site and Other Areas:

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

2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.12, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or at law; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part by, or based upon, Contractor’s performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.

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

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

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

5.03 **Subsurface and Physical Conditions**

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

1. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site;
2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities); and
3. Technical Data contained in such reports and drawings.

B. **Reliance by Contractor on Technical Data Authorized:** Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

1. the completeness of such reports and drawings for Contractor’s purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
3. any Contractor interpretation or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

5.04 **Differing Subsurface or Physical Conditions**

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

1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate; or
2. is of such a nature as to require a change in the Drawings or Specifications; or
3. differs materially from that shown or indicated in the Contract Documents; or
4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

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

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

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

D. Possible Price and Times Adjustments:

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

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

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

   c. Contractor’s entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor’s ability to complete the Work within the Contract Times.

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

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

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

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

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

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

5.05 Underground Facilities

A. Contractor’s Responsibilities: The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or adjacent to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer do not warrant or guarantee the accuracy or completeness of any such information or data provided by others; and

2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
   a. reviewing and checking all information and data regarding existing Underground Facilities at the Site;
   b. locating all Underground Facilities shown or indicated in the Contract Documents as being at the Site;
   c. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and
   d. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.

B. Notice by Contractor: If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer.

C. Engineer’s Review: Engineer will promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor’s resumption of Work in connection with the Underground Facility in question; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and advise Owner in writing of Engineer’s findings, conclusions, and
recommendations. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

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

E. **Possible Price and Times Adjustments:**
   1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, or both, to the extent that any existing Underground Facility at the Site that was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor’s cost of, or time required for, performance of the Work; subject, however, to the following:
      a. Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated the existence or actual location of the Underground Facility in question;
      b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;
      c. Contractor’s entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor’s ability to complete the Work within the Contract Times; and
      d. Contractor gave the notice required in Paragraph 5.05.B.
   2. If Owner and Contractor agree regarding Contractor’s entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.
   3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner’s issuance of the Owner’s written statement to Contractor regarding the Underground Facility in question.

5.06 **Hazardous Environmental Conditions at Site**

A. **Reports and Drawings:** The Supplementary Conditions identify:
   1. those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and
   2. Technical Data contained in such reports and drawings.

B. **Reliance by Contractor on Technical Data Authorized:** Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer,
or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

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

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

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

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

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

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

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

G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, then within 30 days of Owner’s written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off.

H. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special
conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner’s own forces or others in accordance with Article 8.

I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.I shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual’s or entity’s own negligence.

J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual’s or entity’s own negligence.

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

ARTICLE 6 – BONDS AND INSURANCE

6.01 Performance, Payment, and Other Bonds

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

B. All bonds shall be in the form prescribed by the Contract except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in “Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies” as published in Circular 570 (as amended and supplemented) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. A bond
signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual’s authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

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

D. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or its right to do business is terminated in any state or jurisdiction where any part of the Project is located, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the bond and surety requirements above.

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

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

6.02 Insurance—General Provisions

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

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

C. Contractor shall deliver to Owner, with copies to each named insured and additional insured (as identified in this Article, in the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Contractor has obtained and is maintaining the policies, coverages, and endorsements required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

D. Owner shall deliver to Contractor, with copies to each named insured and additional insured (as identified in this Article, the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Owner has obtained and is maintaining the policies, coverages, and endorsements required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Owner may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

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

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

G. If Contractor has failed to obtain and maintain required insurance, Owner may exclude the Contractor from the Site, impose an appropriate set-off against payment, and exercise Owner’s termination rights under Article 16.

H. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect to obtain equivalent insurance to protect such other party’s interests at the expense of the party who was required to provide such coverage, and the Contract Price shall be adjusted accordingly.

I. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor’s interests.

J. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor’s liability under the indemnities granted to Owner and other individuals and entities in the Contract.

6.03 Contractor’s Insurance

A. Workers’ Compensation: Contractor shall purchase and maintain workers’ compensation and employer’s liability insurance for:
   1. claims under workers’ compensation, disability benefits, and other similar employee benefit acts.
   2. United States Longshoreman and Harbor Workers’ Compensation Act and Jones Act coverage (if applicable).
   3. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor’s employees (by stop-gap endorsement in monopolist worker’s compensation states).
   4. Foreign voluntary worker compensation (if applicable).

B. Commercial General Liability—Claims Covered: Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against:
   1. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor’s employees.
   2. claims for damages insured by reasonably available personal injury liability coverage.
   3. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.

C. Commercial General Liability—Form and Content: Contractor’s commercial liability policy shall be written on a 1996 (or later) ISO commercial general liability form (occurrence form) and include the following coverages and endorsements:
   1. Products and completed operations coverage:
      a. Such insurance shall be maintained for three years after final payment.
b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.

2. Blanket contractual liability coverage, to the extent permitted by law, including but not limited to coverage of Contractor’s contractual indemnity obligations in Paragraph 7.18.

3. Broad form property damage coverage.

4. Severability of interest.

5. Underground, explosion, and collapse coverage.

6. Personal injury coverage.

7. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 01 and CG 20 37 10 01 (together); or CG 20 10 07 04 and CG 20 37 07 04 (together); or their equivalent.

8. For design professional additional insureds, ISO Endorsement CG 20 32 07 04, “Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured” or its equivalent.

D. Automobile liability: Contractor shall purchase and maintain automobile liability insurance against claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle. The automobile liability policy shall be written on an occurrence basis.

E. Umbrella or excess liability: Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer’s liability, commercial general liability, and automobile liability insurance described in the paragraphs above. Subject to industry-standard exclusions, the coverage afforded shall follow form as to each and every one of the underlying policies.

F. Contractor’s pollution liability insurance: Contractor shall purchase and maintain a policy covering third-party injury and property damage claims, including clean-up costs, as a result of pollution conditions arising from Contractor’s operations and completed operations. This insurance shall be maintained for no less than three years after final completion.

G. Additional insureds: The Contractor’s commercial general liability, automobile liability, umbrella or excess, and pollution liability policies shall include and list as additional insureds Owner and Engineer, and any individuals or entities identified in the Supplementary Conditions; include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds; and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby (including as applicable those arising from both ongoing and completed operations) on a non-contributory basis. Contractor shall obtain all necessary endorsements to support these requirements.

H. Contractor’s professional liability insurance: If Contractor will provide or furnish professional services under this Contract, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance shall provide protection against claims arising out of performance of professional design or related services, and caused by a negligent error, omission, or act for which the insured party is legally liable. It shall be maintained throughout the duration of the Contract and for a minimum of two years after Substantial
Completion. If such professional design services are performed by a Subcontractor, and not by Contractor itself, then the requirements of this paragraph may be satisfied through the purchasing and maintenance of such insurance by such Subcontractor.

I. General provisions: The policies of insurance required by this Paragraph 6.03 shall:

1. include at least the specific coverages provided in this Article.
2. be written for not less than the limits of liability provided in this Article and in the Supplementary Conditions, or required by Laws or Regulations, whichever is greater.
3. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least 10 days prior written notice has been given to Contractor. Within three days of receipt of any such written notice, Contractor shall provide a copy of the notice to Owner, Engineer, and each other insured under the policy.
4. remain in effect at least until final payment (and longer if expressly required in this Article) and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract Documents.
5. be appropriate for the Work being performed and provide protection from claims that may arise out of or result from Contractor’s performance of the Work and Contractor’s other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable.

J. The coverage requirements for specific policies of insurance must be met by such policies, and not by reference to excess or umbrella insurance provided in other policies.

6.04 Owner’s Liability Insurance

A. In addition to the insurance required to be provided by Contractor under Paragraph 6.03, Owner, at Owner’s option, may purchase and maintain at Owner’s expense Owner’s own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

B. Owner’s liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner’s liability policies for any of Contractor’s obligations to the Owner, Engineer, or third parties.

6.05 Property Insurance

A. Notice of Cancellation or Change: All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 6.05 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured.

B. Deductibles: The purchaser of any required builder’s risk or property insurance shall pay for costs not covered because of the application of a policy deductible.

C. Partial Occupancy or Use by Owner: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 15.04, then
Owner (directly, if it is the purchaser of the builder’s risk policy, or through Contractor) will provide notice of such occupancy or use to the builder’s risk insurer. The builder’s risk insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy; rather, those portions of the Work that are occupied or used by Owner may come off the builder’s risk policy, while those portions of the Work not yet occupied or used by Owner shall remain covered by the builder’s risk insurance.

D. **Additional Insurance**: If Contractor elects to obtain other special insurance to be included in or supplement the builder’s risk or property insurance policies provided under this Paragraph 6.05, it may do so at Contractor’s expense.

E. **Insurance of Other Property**: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, such as tools, construction equipment, or other personal property owned by Contractor, a Subcontractor, or an employee of Contractor or a Subcontractor, then the entity or individual owning such property item will be responsible for deciding whether to insure it, and if so in what amount.

### 6.06 Waiver of Rights

A. All policies purchased in accordance with Paragraph 6.05, expressly including the builder’s risk policy, shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any insureds thereunder, or against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all Subcontractors, all individuals or entities identified in the Supplementary Conditions as insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.

B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for:

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 perils whether or not insured by Owner; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06.

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 6.06.B 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 Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them.

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

6.07 Receipt and Application of Property Insurance Proceeds

A. Any insured loss under the builder’s risk and other policies of insurance required by Paragraph 6.05 will be adjusted and settled with the named insured that purchased the policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.

B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder’s risk and other policies of insurance required by Paragraph 6.05 shall distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.

C. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the money so received applied on account thereof, and the Work and the cost thereof covered by Change Order, if needed.

ARTICLE 7 – CONTRACTOR’S RESPONSIBILITIES

7.01 Supervision and Superintendence

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.

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

7.02 Labor; Working Hours

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

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

7.03 Services, Materials, and Equipment

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

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

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

7.04 “Or Equals”

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or “or equal” item is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment, or items from other proposed suppliers under the circumstances described below.

1. If Engineer in its sole discretion determines that an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer shall deem it an “or equal” item. For the purposes of this paragraph, a proposed item of material or equipment will be considered functionally equal to an item so named if:
   a. in the exercise of reasonable judgment Engineer determines that:
      1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
      2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;
      3) it has a proven record of performance and availability of responsive service; and
      4) it is not objectionable to Owner.
b. Contractor certifies that, if approved and incorporated into the Work:
   1) there will be no increase in cost to the Owner or increase in Contract Times; and
   2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

B. Contractor’s Expense: Contractor shall provide all data in support of any proposed “or equal” item at Contractor’s expense.

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

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

E. Treatment as a Substitution Request: If Engineer determines that an item of material or equipment proposed by Contractor does not qualify as an “or-equal” item, Contractor may request that Engineer considered the proposed item as a substitute pursuant to Paragraph 7.05.

7.05 Substitutes

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

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

2. The requirements for review by Engineer will be as set forth in Paragraph 7.05.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.

3. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:
   a. shall certify that the proposed substitute item will:
      1) perform adequately the functions and achieve the results called for by the general design,
      2) be similar in substance to that specified, and
3) be suited to the same use as that specified.

b. will state:

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

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

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

c. will identify:

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

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

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

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

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

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

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

F. Effect of Engineer’s Determination: If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer’s denial of a substitution request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.05.D, by timely submittal of a Change Proposal.
7.06 Concerning Subcontractors, Suppliers, and Others

A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner.

B. Contractor shall retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of designated parts of the Work if required by the Contract to do so.

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

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

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

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

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

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

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

J. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors, Suppliers, and all other individuals or entities performing or furnishing any of the Work.

K. Contractor shall restrict all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work from communicating with Engineer or Owner,
except through Contractor or in case of an emergency, or as otherwise expressly allowed herein.

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

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

N. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by the particular Subcontractor or Supplier.

O. Nothing in the Contract Documents:
   1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier, or other individual or entity; nor
   2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

7.07 Patent Fees and Royalties

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

B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.

C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the
Work of any invention, design, process, product, or device not specified in the Contract Documents.

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

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

7.10 Laws and Regulations
A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor’s compliance with any Laws or Regulations.

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

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

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

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

1. all persons on the Site or who may be affected by the Work;
2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify Owner; the owners of adjacent property, Underground Facilities, and other utilities; and other contractors and utility owners performing work at or adjacent to the Site, when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.

C. Contractor shall comply with the applicable requirements of Owner’s safety programs, if any. The Supplementary Conditions identify any Owner’s safety programs that are applicable to the Work.

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

E. All damage, injury, or loss to any property referred to in Paragraph 7.12.A.2 or 7.12.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

F. Contractor’s duties and responsibilities for safety and protection shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 15.06.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

G. Contractor’s duties and responsibilities for safety and protection shall resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.
7.13 **Safety Representative**  
A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

7.14 **Hazard Communication Programs**  
A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

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

7.16 **Shop Drawings, Samples, and Other Submittals**  
A. **Shop Drawing and Sample Submittal Requirements:**
   1. Before submitting a Shop Drawing or Sample, Contractor shall have:
      a. reviewed and coordinated the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
      b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
      c. determined and verified the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
      d. determined and verified all information relative to Contractor’s responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.
   2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor’s obligations under the Contract Documents with respect to Contractor’s review of that submittal, and that Contractor approves the submittal.
   3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review and approval of each such variation.

B. **Submittal Procedures for Shop Drawings and Samples:** Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals. Each submittal will be identified as Engineer may require.
1. **Shop Drawings:**
   a. Contractor shall submit the number of copies required in the Specifications.
   b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.D.

2. **Samples:**
   a. Contractor shall submit the number of Samples required in the Specifications.
   b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 7.16.D.

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

C. **Other Submittals:** Contractor shall submit other submittals to Engineer in accordance with the accepted Schedule of Submittals, and pursuant to the applicable terms of the Specifications.

D. **Engineer’s Review:**
   1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. 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.
   2. Engineer’s review and approval will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs incident thereto.
   3. Engineer’s review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
   4. Engineer’s review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order.
   5. Engineer’s review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 7.16.A and B.
   6. Engineer’s review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, shall not, under any circumstances, change
the Contract Times or Contract Price, unless such changes are included in a Change Order.

7. Neither Engineer’s receipt, review, acceptance or approval of a Shop Drawing, Sample, or other submittal shall result in such item becoming a Contract Document.

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

E. Resubmittal Procedures:

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

2. Contractor shall furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than three submittals. Engineer will record Engineer’s time for reviewing a fourth or subsequent submittal of a Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Engineer’s charges to Owner for such time. Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges.

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

7.17 Contractor’s General Warranty and Guarantee

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on Contractor’s warranty and guarantee.

B. Contractor’s warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
2. normal wear and tear under normal usage.

C. Contractor’s obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor’s obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;
2. recommendation by Engineer or payment by Owner of any progress or final payment;
3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
4. use or occupancy of the Work or any part thereof by Owner;
5. any review and approval of a Shop Drawing or Sample submittal;
6. the issuance of a notice of acceptability by Engineer;
7. any inspection, test, or approval by others; or
8. any correction of defective Work by Owner.

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

7.18 **Indemnification**

A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that 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 but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable.

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

C. The indemnification obligations of Contractor under Paragraph 7.18.A shall not extend to the liability of Engineer and Engineer’s officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:

1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

7.19 **Delegation of Professional Design Services**

A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor’s responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable Laws and Regulations.

B. If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of Contractor by the Contract Documents,
Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional’s written approval when submitted to Engineer.

C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.

D. Pursuant to this paragraph, Engineer’s review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer’s review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 7.16.D.1.

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

ARTICLE 8 – OTHER WORK AT THE SITE

8.01 Other Work

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

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

C. Contractor shall afford each other contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner’s employees, proper and safe access to the Site, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others’ work with the written consent of Engineer and the others whose work will be affected.

D. If the proper execution or results of any part of Contractor’s Work depends upon work performed by others under this Article 8, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor’s Work. Contractor’s failure to so report will constitute an acceptance of such other work as
fit and proper for integration with Contractor’s Work except for latent defects and deficiencies in such other work.

8.02 Coordination

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

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

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

3. the extent of such authority and responsibilities.

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

8.03 Legal Relationships

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

B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due to Contractor, and assign to such other contractor or utility owner the Owner’s contractual rights against Contractor with respect to the breach of the obligations set forth in this paragraph.

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

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

ARTICLE 9 – OWNER’S RESPONSIBILITIES

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

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

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

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

9.05 Lands and Easements; Reports, Tests, and Drawings
A. Owner’s duties with respect to providing lands and easements are set forth in Paragraph 5.01.
B. Owner’s duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.
C. Article 5 refers to Owner’s identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

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

9.07 Change Orders
A. Owner’s responsibilities with respect to Change Orders are set forth in Article 11.
9.08 Inspections, Tests, and Approvals
A. Owner’s responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.

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

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

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

9.12 Safety Programs
A. While at the Site, Owner’s employees and representatives shall comply with the specific applicable requirements of Contractor’s safety programs of which Owner has been informed.
B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

ARTICLE 10 – ENGINEER’S STATUS DURING CONSTRUCTION

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

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

B. Engineer’s visits and observations are subject to all the limitations on Engineer’s authority and responsibility set forth in Paragraph 10.08. Particularly, but without limitation, during or as a result of Engineer’s visits or observations of Contractor’s Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor’s means,
methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 Project Representative

A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 10.08. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer’s consultant, agent, or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

10.04 Rejecting Defective Work

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

10.05 Shop Drawings, Change Orders and Payments

A. Engineer’s authority, and limitations thereof, as to Shop Drawings and Samples, are set forth in Paragraph 7.16.

B. Engineer’s authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, are set forth in Paragraph 7.19.

C. Engineer’s authority as to Change Orders is set forth in Article 11.

D. Engineer’s authority as to Applications for Payment is set forth in Article 15.

10.06 Determinations for Unit Price Work

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

10.07 Decisions on Requirements of Contract Documents and Acceptability of Work

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

10.08 Limitations on Engineer’s Authority and Responsibilities

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

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

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

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

E. The limitations upon authority and responsibility set forth in this Paragraph 10.08 shall also apply to the Resident Project Representative, if any.

10.09 Compliance with Safety Program

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

ARTICLE 11 – AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK

11.01 Amending and Supplementing Contract Documents

A. The Contract Documents may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.

1. Change Orders:

a. If an amendment or supplement to the Contract Documents includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order. A Change Order also may be used to establish amendments and supplements of the Contract Documents that do not affect the Contract Price or Contract Times.

b. Owner and Contractor may amend those terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, without the recommendation of the Engineer. Such an amendment shall be set forth in a Change Order.

2. Work Change Directives: A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive’s effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive. Owner must submit any Claim seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.
3. **Field Orders**: Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

### 11.02 Owner-Authorized Changes in the Work

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Such changes shall be supported by Engineer’s recommendation, to the extent the change involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters. Such changes may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work shall be performed under the applicable conditions of the Contract Documents. Nothing in this paragraph shall obligate Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor’s safety obligations under the Contract Documents or Laws and Regulations.

### 11.03 Unauthorized Changes in the Work

A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.

### 11.04 Change of Contract Price

A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment of Contract Price shall comply with the provisions of Article 12.

B. An adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.04.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor’s fee for overhead and profit (determined as provided in Paragraph 11.04.C).

C. **Contractor’s Fee**: When applicable, the Contractor’s fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or
2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
   a. for costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor’s fee shall be 15 percent;
   b. for costs incurred under Paragraph 13.01.B.3, the Contractor’s fee shall be five percent;
   c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.04.C.2.a and 11.04.C.2.b is that the Contractor’s fee shall be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of five percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted work the maximum total fee to be paid by Owner shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the work;
   d. no fee shall be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;
   e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor’s fee by an amount equal to five percent of such net decrease; and
   f. when both additions and credits are involved in any one change, the adjustment in Contractor’s fee shall be computed on the basis of the net change in accordance with Paragraphs 11.04.C.2.a through 11.04.C.2.e, inclusive.

11.05 Change of Contract Times

   A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment in the Contract Times shall comply with the provisions of Article 12.
   B. An adjustment of the Contract Times shall be subject to the limitations set forth in Paragraph 4.05, concerning delays in Contractor’s progress.

11.06 Change Proposals

   A. Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; appeal an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; contest a set-off against payment due; or seek other relief under the Contract. The Change Proposal shall specify any proposed change in Contract Times or Contract Price, or both, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents.

   1. Procedures: Contractor shall submit each Change Proposal to Engineer promptly (but in no event later than 30 days) after the start of the event giving rise thereto, or after such initial decision. The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal. The supporting data shall be
accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event. Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal.

2. **Engineer’s Action:** Engineer will review each Change Proposal and, within 30 days after receipt of the Contractor’s supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer’s inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

3. **Binding Decision:** Engineer’s decision will be final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.

B. **Resolution of Certain Change Proposals:** If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice shall be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

11.07 **Execution of Change Orders**

A. Owner and Contractor shall execute appropriate Change Orders covering:

1. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;

2. changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;

3. changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.02, (b) required because of Owner’s acceptance of defective Work under Paragraph 14.04 or Owner’s correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer’s recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters; and

4. changes in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results under Paragraph 11.06, or Article 12.

B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of this Paragraph 11.07, it shall be deemed to be of full force and effect, as if fully executed.

11.08 **Notification to Surety**

A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be
Contractor’s responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

**ARTICLE 12 – CLAIMS**

**12.01 Claims**

**A. Claims Process:** The following disputes between Owner and Contractor shall be submitted to the Claims process set forth in this Article:

1. Appeals by Owner or Contractor of Engineer’s decisions regarding Change Proposals;

2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents; and

3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters.

**B. Submittal of Claim:** The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim shall rest with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, or both, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor’s knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.

**C. Review and Resolution:** The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim shall be stated in writing and submitted to the other party, with a copy to Engineer.

**D. Mediation:**

1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate shall stay the Claim submittal and response process.

2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process shall resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal and decision process shall resume as of the date of the conclusion of the mediation, as determined by the mediator.

3. Owner and Contractor shall each pay one-half of the mediator’s fees and costs.

**E. Partial Approval:** If the party receiving a Claim approves the Claim in part and denies it in part, such action shall be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.

**F. Denial of Claim:** If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does
not take action on the Claim within 90 days, then either Owner or Contractor may at any
time thereafter submit a letter to the other party indicating that as a result of the inaction,
the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial
of the Claim shall be final and binding unless within 30 days of the denial the other party
invokes the procedure set forth in Article 17 for the final resolution of disputes.

G. Final and Binding Results: If the parties reach a mutual agreement regarding a Claim, whether
through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is
approved in part and denied in part, or denied in full, and such actions become final and
binding; then the results of the agreement or action on the Claim shall be incorporated in a
Change Order to the extent they affect the Contract, including the Work, the Contract Times,
or the Contract Price.

ARTICLE 13 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

13.01 Cost of the Work

A. Purposes for Determination of Cost of the Work: The term Cost of the Work means the sum
of all costs necessary for the proper performance of the Work at issue, as further defined
below. The provisions of this Paragraph 13.01 are used for two distinct purposes:

1. To determine Cost of the Work when Cost of the Work is a component of the Contract
   Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or

2. To determine the value of a Change Order, Change Proposal, Claim, set-off, or other
   adjustment in Contract Price. When the value of any such adjustment is determined on
   the basis of Cost of the Work, Contractor is entitled only to those additional or
   incremental costs required because of the change in the Work or because of the event
giving rise to the adjustment.

B. Costs Included: Except as otherwise may be agreed to in writing by Owner, costs included
in the Cost of the Work shall be in amounts no higher than those prevailing in the locality of the
Project, shall not include any of the costs itemized in Paragraph 13.01.C, and shall include
only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of
   the Work under schedules of job classifications agreed upon by Owner and Contractor.
   Such employees shall include, without limitation, superintendents, foremen, and other
   personnel employed full time on the Work. Payroll costs for employees not employed
   full time on the Work shall be apportioned on the basis of their time spent on the Work.
   Payroll costs shall include, but not be limited to, salaries and wages plus the cost of
   fringe benefits, which shall include social security contributions, unemployment, excise,
   and payroll taxes, workers’ compensation, health and retirement benefits, bonuses, sick
   leave, and vacation and holiday pay applicable thereto. The expenses of performing
   Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be
   included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including
   costs of transportation and storage thereof, and Suppliers’ field services required in
   connection therewith. All cash discounts shall accrue to Contractor unless Owner
deposits funds with Contractor with which to make payments, in which case the cash
discounts shall accrue to Owner. All trade discounts, rebates, and refunds and returns
from sale of surplus materials and equipment shall accrue to Owner, and Contractor
shall make provisions so that they may be obtained.
3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor’s Cost of the Work and fee shall be determined in the same manner as Contractor’s Cost of the Work and fee as provided in this Paragraph 13.01.

4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:
   a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor’s employees incurred in discharge of duties connected with the Work.
   b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
   c. Rentals of all construction equipment and machinery, and the parts thereof, whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.
   d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
   e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
   f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 6.05), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor’s fee.
   g. The cost of utilities, fuel, and sanitary facilities at the Site.
   h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.
i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.

C. Costs Excluded: The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of Contractor’s officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor’s principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor’s fee.

2. Expenses of Contractor’s principal and branch offices other than Contractor’s office at the Site.

3. Any part of Contractor’s capital expenses, including interest on Contractor’s capital employed for the Work and charges against Contractor for delinquent payments.

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.

D. Contractor’s Fee: When the Work as a whole is performed on the basis of cost-plus, Contractor’s fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor’s fee shall be determined as set forth in Paragraph 11.04.C.

E. Documentation: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

13.02 Allowances

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. Cash Allowances: Contractor agrees that:

1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

2. Contractor’s costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.
C. **Contingency Allowance:** Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

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

13.03 **Unit Price Work**

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor’s overhead and profit for each separately identified item.

D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer’s preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer’s written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of the following paragraph.

E. Within 30 days of Engineer’s written decision under the preceding paragraph, Contractor may submit a Change Proposal, or Owner may file a Claim, seeking an adjustment in the Contract Price if:

1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement;
2. there is no corresponding adjustment with respect to any other item of Work; and
3. Contractor believes that it 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.

**ARTICLE 14 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK**

14.01 **Access to Work**

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor’s safety procedures and programs so that they may comply therewith as applicable.
14.02 Tests, Inspections, and Approvals

A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.

B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work shall be governed by the provisions of Paragraph 14.05.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:
   1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;
   2. to attain Owner’s and Engineer’s acceptance of materials or equipment to be incorporated in the Work;
   3. by manufacturers of equipment furnished under the Contract Documents;
   4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
   5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor’s purchase thereof for incorporation in the Work.

Such inspections and tests shall be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.

F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering shall be at Contractor’s expense unless Contractor had given Engineer timely notice of Contractor’s intention to cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 Defective Work

A. Contractor’s Obligation: It is Contractor’s obligation to assure that the Work is not defective.

B. Engineer’s Authority: Engineer has the authority to determine whether Work is defective, and to reject defective Work.

C. Notice of Defects: Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.
D. *Correction, or Removal and Replacement*: Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.

E. *Preservation of Warranties*: When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner’s special warranty and guarantee, if any, on said Work.

F. *Costs and Damages*: In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 **Acceptance of Defective Work**

A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer’s confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner’s evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work shall be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

14.05 **Uncovering Work**

A. Engineer has the authority to require additional inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.

B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer’s observation, and then replace the covering, all at Contractor’s expense.

C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer’s request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.

1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of
others); and pending Contractor’s full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.

2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 Owner May Stop the Work

A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

14.07 Owner May Correct Defective Work

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, then Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor’s services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner’s representatives, agents and employees, Owner’s other contractors, and Engineer and Engineer’s consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.

C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor’s defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner’s rights and remedies under this Paragraph 14.07.

ARTICLE 15 – PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

15.01 Progress Payments

A. Basis for Progress Payments: The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed during the pay period, as determined under the
provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.

B. Applications for Payments:

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens, and evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner’s interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor’s legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

C. Review of Applications:

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer’s reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer’s recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer’s observations of the executed Work as an experienced and qualified design professional, and on Engineer’s review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer’s knowledge, information and belief:

   a. the Work has progressed to the point indicated;

   b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and

   c. the conditions precedent to Contractor’s being entitled to such payment appear to have been fulfilled in so far as it is Engineer’s responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

   a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in
progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or

b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer’s review of Contractor’s Work for the purposes of recommending payments nor Engineer’s recommendation of any payment, including final payment, will impose responsibility on Engineer:

a. to supervise, direct, or control the Work, or

b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

c. for Contractor’s failure to comply with Laws and Regulations applicable to Contractor’s performance of the Work, or

d. to make any examination to ascertain how or for what purposes Contractor has used the money paid on account of the Contract Price, or

e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer’s opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.

6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer’s opinion to protect Owner from loss because:

a. the Work is defective, requiring correction or replacement;

b. the Contract Price has been reduced by Change Orders;

c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or

e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. Payment Becomes Due:

1. Ten days after presentation of the Application for Payment to Owner with Engineer’s recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.

E. Reductions in Payment by Owner:

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:

a. claims have been made against Owner on account of Contractor’s conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages on account of Contractor’s conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from
workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;

b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;

c. Contractor has failed to provide and maintain required bonds or insurance;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;

e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;

f. the Work is defective, requiring correction or replacement;

g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

h. the Contract Price has been reduced by Change Orders;

i. an event that would constitute a default by Contractor and therefore justify a termination for cause has occurred;

j. liquidated damages have accrued as a result of Contractor’s failure to achieve Milestones, Substantial Completion, or final completion of the Work;

k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;

l. there are other items entitling Owner to a set off against the amount recommended.

2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed shall be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

3. Upon a subsequent determination that Owner’s refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 15.01.C.1 and subject to interest as provided in the Agreement.

15.02 Contractor’s Warranty of Title

A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than seven days after the time of payment by Owner.
15.03 **Substantial Completion**

A. When Contractor considers the entire Work ready for its intended use, Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.

B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which shall fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.

E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.

F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 **Partial Use or Occupancy**

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose.
without significant interference with Contractor’s performance of the remainder of the Work, subject to the following conditions:

1. At any time Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through E for that part of the Work.

2. At any time Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.05 regarding builder’s risk or other property insurance.

15.05 Final Inspection

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

15.06 Final Payment

A. Application for Payment:

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents (as provided in Paragraph 7.11), and other documents, Contractor may make application for final payment.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

a. all documentation called for in the Contract Documents;

b. consent of the surety, if any, to final payment;

c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.

d. a list of all disputes that Contractor believes are unsettled; and
e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner’s property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.

B. Engineer’s Review of Application and Acceptance:

1. If, on the basis of Engineer’s observation of the Work during construction and final inspection, and Engineer’s review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor’s other obligations under the Contract have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer’s recommendation of final payment and present the Application for Payment to Owner for payment. Such recommendation shall account for any set-offs against payment that are necessary in Engineer’s opinion to protect Owner from loss for the reasons stated above with respect to progress payments. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to the provisions of Paragraph 15.07. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. Completion of Work: The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer’s written recommendation of final payment.

D. Payment Becomes Due: Thirty days after the presentation to Owner of the final Application for Payment and accompanying documentation, the amount recommended by Engineer (less any further sum Owner is entitled to set off against Engineer’s recommendation, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions above with respect to progress payments) will become due and shall be paid by Owner to Contractor.

15.07 Waiver of Claims

A. The making of final payment will not constitute a waiver by Owner of claims or rights against Contractor. Owner expressly reserves claims and rights arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 15.05, from Contractor’s failure to comply with the Contract Documents or the terms of any special guarantees specified therein, from outstanding Claims by Owner, or from Contractor’s continuing obligations under the Contract Documents.
B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted or appealed under the provisions of Article 17.

15.08 Correction Period

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents, or by any specific provision of the Contract Documents), any Work is found to be defective, or if the repair of any damages to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly, without cost to Owner and in accordance with Owner’s written instructions:

1. correct the defective repairs to the Site or such other adjacent areas;
2. correct such defective Work;
3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner’s written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).

C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

E. Contractor’s obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION

16.01 Owner May Suspend Work

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price
or an extension of the Contract Times, or both, directly attributable to any such suspension. Any Change Proposal seeking such adjustments shall be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 Owner May Terminate for Cause

A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:

1. Contractor’s persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule);

2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;

3. Contractor’s disregard of Laws or Regulations of any public body having jurisdiction; or

4. Contractor’s repeated disregard of the authority of Owner or Engineer.

B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) ten days written notice that Owner is considering a declaration that Contractor is in default and termination of the contract, Owner may proceed to:

1. declare Contractor to be in default, and give Contractor (and any surety) notice that the Contract is terminated; and

2. enforce the rights available to Owner under any applicable performance bond.

C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.

D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within seven days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.

E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

F. Where Contractor’s services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.
G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond shall govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 **Owner May Terminate For Convenience**

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and

3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

B. Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.

16.04 **Contractor May Stop Work or Terminate**

A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor’s stopping the Work as permitted by this paragraph.

**ARTICLE 17 – FINAL RESOLUTION OF DISPUTES**

17.01 **Methods and Procedures**

A. Disputes Subject to Final Resolution: The following disputed matters are subject to final resolution under the provisions of this Article:

1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full; and
2. Disputes between Owner and Contractor concerning the Work or obligations under the Contract Documents, and arising after final payment has been made.

B. Final Resolution of Disputes: For any dispute subject to resolution under this Article, Owner or Contractor may:

1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions; or
2. agree with the other party to submit the dispute to another dispute resolution process; or
3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18 – MISCELLANEOUS

18.01 Giving Notice

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended; or
2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the sender of the notice.

18.02 Computation of Times

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

18.03 Cumulative Remedies

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract. The provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

18.04 Limitation of Damages

A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 No Waiver

A. A party’s non-enforcement of any provision shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or of the remainder of this Contract.
18.06  **Survival of Obligations**

A. All representations, indemnifications, warranties, and guarantees made in, required by, or 
given in accordance with the Contract, as well as all continuing obligations indicated in the 
Contract, will survive final payment, completion, and acceptance of the Work or termination 
or completion of the Contract or termination of the services of Contractor.

18.07  **Controlling Law**

A. This Contract is to be governed by the law of the state in which the Project is located.

18.08  **Headings**

A. Article and paragraph headings are inserted for convenience only and do not constitute parts 
of these General Conditions.
These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract, EJCDC C-700 (2013 Edition). All provisions which are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions have the meanings stated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

The address system used in these Supplementary Conditions is the same as the address system used in the General Conditions, with the prefix "SC" added thereto.

SC-2.02 Delete Paragraph 2.02.A in its entirety and insert the following in its place:

H. Owner shall furnish to Contractor up to 5 printed or hard copies of the Drawings and Project Manual and one set in electronic format. Additional copies will be furnished upon request at the cost of reproduction.

SC-5.03 Add the following new paragraphs immediately after Paragraph 5.03.B:

C. The following reports of explorations and tests of subsurface conditions at or contiguous to the Site are known to Owner:

I. None

D. The reports and drawings identified above are not part of the Contract Documents, but the “technical data” contained therein upon which Contractor may rely, as expressly identified and established above, are incorporated in the Contract Documents by reference. Contractor is not entitled to rely upon any other information and data known to or identified by Owner or Engineer.

E. Copies of reports and drawings identified in SC-5.03.C and SC-5.03.D that are not included with the Bidding Documents may be examined at Horrocks Engineers, 2162 West Grove Parkway, Pleasant Grove, Utah during regular business hours.

SC-5.06 Delete Paragraphs 5.06.A and 5.06.B in their entirety and insert the following:

A. No reports or drawings related to Hazardous Environmental Conditions at the Site are known to Owner.

B. Not Used.

SC-6.03 Add the following new paragraphs immediately after Paragraph 6.03.J:
K. The limits of liability for the insurance required by Paragraph 6.03 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

1. Workers’ Compensation, and related coverages under Paragraphs 6.03.A.1 and A.2 of the General Conditions:
   a. State: Statutory
   b. Applicable Federal (e.g., Longshoreman’s): Statutory
   c. Employer’s Liability: $1,000,000

2. The Contractor hereby waives and relinquishes any right of subrogation against Association and its agents, representatives, employees, and affiliates they might possess for any policy of insurance provided under this Section or under any State or Federal Workers’ Compensation or Employer’s Liability Act.

3. The Contractor shall purchase and maintain the insurance required under this paragraph. This insurance shall include the specific coverages set out herein and be written for not less than the limits of liability and coverages provided below, or required by law, whichever is greater. The Contractor’s liabilities under the Agreement shall not be deemed limited in any way to the insurance coverage required.

<table>
<thead>
<tr>
<th>Workers’ Compensation</th>
<th>Utah Statutory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comprehensive General Liability</td>
<td></td>
</tr>
<tr>
<td>Bodily Injury (including completed operations and products liability)</td>
<td></td>
</tr>
<tr>
<td>Each Occurrence</td>
<td>$2,000,000</td>
</tr>
<tr>
<td>Annual Aggregate</td>
<td>$2,000,000</td>
</tr>
<tr>
<td>Property Damage:</td>
<td></td>
</tr>
<tr>
<td>Each Occurrence</td>
<td>$2,000,000</td>
</tr>
<tr>
<td>Annual Aggregate</td>
<td>$2,000,000</td>
</tr>
<tr>
<td>Property Damage liability insurance will provide Explosion, Collapse and Underground coverages where applicable.</td>
<td></td>
</tr>
<tr>
<td>Personal Injury, with employment exclusion deleted</td>
<td></td>
</tr>
<tr>
<td>Annual Aggregate</td>
<td>$2,000,000</td>
</tr>
</tbody>
</table>

| Comprehensive Automobile Liability       |                |
| Bodily Injury                            |                |
| Each Occurrence                         | $1,000,000     |
| Annual Aggregate                        | $1,000,000     |
Property Damage

Each Occurrence $ 1,000,000
Annual Aggregate $ 1,000,000

Owner, its directors, officers, and employees are to be covered as additional insureds as respects: liability arising out of, connected with, or relating to, Work of the Contractor. Such coverage shall be primary to any other coverage available to the Owner.

L. Insurance certificate to include:

1. The location of the operations to which the insurance applies;

2. A statement that the carrier agrees to the terms of the indemnification provision in the Contract;

M. Policy shall not exclude coverage for the following:

1. Injury to or destruction of any property arising out of the collapse of/or structural injury to any building or structure due:
   a. To grading of land excavation, burrowing, filling, backfilling, tunneling, pile driving, cofferdam work, or caisson work; or
   b. To moving, shoring, underpinning, raising or demolition of any building or structure or removal or rebuilding of any structural support thereof;

2. Injury to or destruction of wires, conduits, pipes, mains, sewers, or other similar property or any apparatus in connection therewith, below the surface of the ground, if such injury or destruction is caused by and occurs during the use of mechanical equipment for the purpose of grading of land, paving, excavating, drilling; or injury to or destruction of any property at any time resulting therefrom

N. Owner shall not be obligated to review any of the Contractor's Certificates of Insurance, insurance policies or endorsements or to advise Contractor of any deficiencies in such documents and any receipt of copies or review by the Owner of such documents shall not relieve Contractor from or be deemed a waiver of the Owner's right to insist on strict fulfillment of Contractor's obligations under this Paragraph.

SC-7.06 Add a new paragraph immediately after Paragraph 7.06.O:

P. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by a particular Subcontractor or Supplier.

SC-10.03 Add the following new paragraphs immediately after Paragraph 10.03.A:
B. The Resident Project Representative (RPR) will be Engineer's employee or 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 Work in general shall be with Engineer and Contractor. RPR's dealings with Subcontractors shall be through or with the full knowledge and approval of Contractor. The RPR shall:

1. **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.

2. **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.

3. **Liaison:**
   a. Serve as Engineer’s liaison with Contractor, working principally through Contractor’s authorized representative, assist in providing information regarding 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.

4. **Interpretation of Contract Documents:** Report to Engineer when clarifications and interpretations of the Contract Documents are needed and transmit to Contractor clarifications and interpretations as issued by Engineer.

5. **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.

6. **Modifications:** Consider and evaluate Contractor’s suggestions for modifications in Drawings or Specifications and report such suggestions, together with RPR’s recommendations, to Engineer. Transmit to Contractor in writing decisions as issued by Engineer.

7. **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 imperil the integrity of the
8. Inspections, Tests, and System Startups:
   a. 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.
   b. Observe, record, and report to Engineer appropriate details relative to the test procedures and systems start-ups.

9. Records:
   a. Record names, addresses, fax numbers, e-mail addresses, web site locations, and telephone numbers of all Contractors, Subcontractors, and major Suppliers of materials and equipment.
   b. Maintain records for use in preparing Project documentation.

10. 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. Immediately notify Engineer of the occurrence of any Site accidents, emergencies, acts of God endangering the Work, damage to property by fire or other causes, or the discovery of any Hazardous Environmental Condition.

11. Payment Requests: 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.

12. Certificates, Operation and Maintenance Manuals: 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.
13. Completion:
   a. Participate in a Substantial Completion inspection, assist in the determination of Substantial Completion and the preparation of lists of items to be completed or corrected.
   b. Participate in a final inspection in the company of Engineer, Owner, and Contractor and prepare a final list of items to be completed and deficiencies to be remedied.
   c. Observe whether all items on the final list have been completed or corrected and make recommendations to Engineer concerning acceptance and issuance of the Notice of Acceptability of the Work.

C. The RPR shall not:
   1. Authorize any deviation from the Contract Documents or substitution of materials or equipment (including “or-equal” items).
   2. Exceed limitations of Engineer’s authority as set forth in the Contract Documents.
   3. Undertake any of the responsibilities of Contractor, Subcontractors, Suppliers, or Contractor’s superintendent.
   4. 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.
   5. Advise on, issue directions regarding, or assume control over safety practices, precautions, and programs in connection with the activities or operations of Owner or Contractor.
   6. Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by Engineer.
   7. Accept Shop Drawing or Sample submittals from anyone other than Contractor.
   8. Authorize Owner to occupy the Project in whole or in part.

SC-13.01.B.5.c Delete Paragraph 13.01.B.5.c in its entirety and insert the following in its place:

C. Construction Equipment and Machinery:
   1) Rentals of all construction equipment and machinery, and the parts thereof in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.
   2) Costs for equipment and machinery owned by Contractor will be paid at a rate shown for such equipment in the RENTAL RATE BLUE BOOK, published by
EQUIPMENT WATCH. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs. Costs will include the time the equipment or machinery is in use on the changed Work and the costs of transportation, loading, unloading, assembly, dismantling, and removal when directly attributable to the changed Work. The cost of any such equipment or machinery, or parts thereof, shall cease to accrue when the use thereof is no longer necessary for the changed Work. Equipment or machinery with a value of less than $1,000 will be considered small tools.

SC-13.03.C Delete Paragraph 13.03.C in its entirety and insert the following in its place:

C. The unit price of an item of Unit Price Work shall be subject to reevaluation and adjustment under the following conditions:

1. if the Bid price of a particular item of Unit Price Work amounts to 5 percent or more of the Contract Price and the variation in the quantity of that particular item of Unit Price Work performed by Contractor differs by more than 20 percent from the estimated quantity of such item indicated in the Agreement; and

2. if there is no corresponding adjustment with respect to any other item of Work; and

3. if Contractor believes that Contractor has incurred additional expense as a result thereof or if Owner believes that the quantity variation entitles Owner to an adjustment in the unit price, either Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Article 10 if the parties are unable to agree as to the effect of any such variations in the quantity of Unit Price Work performed.

END OF SECTION
DOCUMENT 007500

SPECIAL PROVISIONS

1-1 GENERAL

The Contractor shall furnish all labor, materials excluding that which is provided by the Owner, and equipment necessary or required to complete the work in all respects as shown on the plans, as hereinafter specified, or both. If there is a conflict between requirements of this section and requirements of other sections of these specifications, then the requirements contained in the Special Provisions shall govern.

The CONTRACTOR shall not award WORK to SUBCONTRACTOR(S) in excess of fifty (50%) percent of the CONTRACT PRICE, without prior written approval of the OWNER.

1-2 PROGRESS OF CONSTRUCTION

It is the intention of these contract documents that the progress of the work shall proceed in a systematic manner so that a minimum of inconvenience will result to the public in the course of construction.

Clean-up of all construction debris, excess excavation, excess materials, and complete restoration of all fences, irrigation structures, ditches, culverts, and similar items shall be completed immediately following final grading. The Contractor shall stockpile the excavated material so as to do the least damage to adjacent grassed areas, or fences, regardless of whether these are on private property or public rights-of-way. All excavated materials shall be removed from grassed and planted areas, and these surfaces shall be left in a condition equivalent to their original surface and free from all rocks, gravel, boulders, or other foreign materials. All excavated material 3 inches and larger shall be removed or covered.

Cleanup and grading shall be contingent with and carried on at the same time as pipeline installation, backfill, and excavation. Cleanup and grading activities shall not be further than 200 feet behind the excavation and pipe laying operations. Excavation and backfill and pipeline installation will not be deemed complete until cleanup and grading is approved and satisfactory to the Engineer and property owner.

1-3 CONSTRUCTION SEQUENCE

The Contractor shall give special consideration to scheduling his work to allow traffic to be rerouted where the construction is located in the City's and County's Roads. Adequate signing will be required.

1-4 INTERFERING STRUCTURES AND UTILITIES

The Contractor shall exercise all possible caution to prevent damage to existing structures and utilities, whether above ground or underground. An attempt has been made to show these structures and utilities on the plans. While the information has been compiled from the best available sources, its completeness and accuracy cannot be guaranteed, and it is presented simply as a guide to possible difficulties. The Contractor shall notify all utility offices concerned at least 48 hours in advance of construction operations in which a utility's facilities may be involved. This shall include, but not be limited to irrigation, water, telephone, electric, and gas.

It shall be the responsibility of the Contractor to locate and expose all existing underground structures and utilities in advance of excavation. Any structure or utilities damaged by the work shall be repaired or replaced in a condition equal to or better than the condition prior to the damage. Such repair or replacement shall be accomplished at the Contractor's expense without additional compensation from the Owner.
The Contractor shall remove and replace such small miscellaneous structures as fences and culverts at his own expense without additional compensation from the Owner. The Contractor shall replace these structures in a condition as good or better than their original conditions.

If the Contractor encounters existing structures which will prevent construction and which are not properly shown on the plans, he shall notify the Engineer before continuing with the construction in order that the Engineer may make such field revisions as necessary to avoid conflict with the existing structures. The cost of waiting or "down" time during such field revision shall be borne by the Contractor without additional cost to the Owner. If the Contractor shall fail to so notify the Engineer when an existing structure is encountered, but shall proceed with the construction despite this interference, he shall do so at his own risk. In particular, when the location of a new construction, as shown on the Plans, will prohibit the restoration of existing structures to their original conditions, he shall notify the Engineer so a field relocation may be made to avoid the conflict.

1-5 FIELD RELOCATION

During the progress of construction, it is possible that minor relocations may be necessary. Such relocations shall be made only by direction of the Engineer. Unforeseen obstructions encountered as a result of such relocations will not be subject to claims for additional compensation to the Contractor for any greater extent than would have been the case had the obstructions been encountered along the original location.

1-6 PUBLIC SAFETY AND CONVENIENCE

The Contractor shall comply with all rules and regulations of the County and State authorities regarding the closing of public streets or highways to the use of the public traffic. No road shall be closed by the Contractor to the public except by express permission of the Engineer. Traffic must be kept open on those roads and streets where no detour is possible. The Contractor shall, at all times, conduct his work so as to assure the least possible obstructions to traffic and normal commercial pursuits. All obstructions within traveled roadways shall be protected by approved signs, barricades, and lights where necessary or ordered by the Engineer for the safety of the traveling public. The convenience of the general public and residents and the protection of persons and property is of prime importance and shall be provided for by the Contractor in an adequate and satisfactory manner.

The Contractor shall use every reasonable precaution to safeguard the persons and property of the traveling public. Failure of the Engineer to notify the Contractor to maintain barricades, barriers, lights, flares, danger signals, or watchmen shall not relieve the Contractor from his responsibility. All barricades and obstructions shall be protected at night by signal lights which shall be suitably distributed across the roadway and kept burning from sunset to sunrise. Barricades shall be of substantial construction.

Whenever the Contractor's operations create a hazardous condition, he shall furnish flagmen and guards as necessary or as ordered by the Engineer to give adequate warning to the public of any dangerous conditions to be encountered. He shall furnish, erect, and maintain approved fences, barricades, lights, signs, and any other devices that may be necessary to prevent accidents and to avoid damage and injury to the public. Flagmen and guards, while on duty and assigned to give warning to the public, shall be equipped with approved red wearing apparel and a red flag which shall be kept clean and in good repair.

The Contractor will be required to confine construction operations within the dedicated rights-of-way for public thoroughfares or within areas for which construction easements have been obtained unless he has made special arrangements with the affected property owners in advance. The Contractor will be required to protect stored materials, cultivated trees and crops, and other items located adjacent to the proposed construction site. Property owners affected by the construction shall be notified by the Contractor at least 48 hours in advance of the time construction begins. During all construction operations, the Contractor shall construct and maintain such facilities as may be required to provide access by all property owners to their property. No person shall be cut off from access to his residence or place of business for a period exceeding eight hours unless the Contractor has made special arrangements with the affected persons. The Contractor shall provide for access at all times for livestock.
through farm areas; specifically, no portion of farmlands in which livestock are pastured shall be cut from ready access by the farm animals.

1-7  **EASEMENTS**

Portions of the construction may be located on private property. Easements and permits have been obtained by the Owner. Easements shall provide for the use of property for construction purposes to the extent indicated on the easements. Copies of these easements and permits are available at the office of the Owner for inspection by the Contractor. The Contractor shall confine his construction operations to within the easement limits or street right-of-way limits or make special arrangements with the property owners for the additional area required. Any damage to private property, either inside or outside the limits of the easements provided by the Owner, shall be the responsibility of the Contractor. Before final payment will be authorized by the Engineer at the completion of the construction, the Contractor shall obtain from the permit or easement grantors a release indicating that the work of restoration has been satisfactorily completed in accordance with the terms of the permit or easement. Should it be found impossible for the Contractor to obtain any of the required releases, either because of the absence of the grantors or because of impractical demand by the grantors, then the Engineer may waive this requirement, if, in his opinion, the Contractor has fulfilled his obligations.

1-8  **CONTRACTOR’S RESPONSIBILITY FOR UTILITY PROPERTY AND SERVICES**

At points where the Contractor’s operations are adjacent to or across properties of railway, telegraph, telephone, irrigation or canal, power, gas, and water, or adjacent to other property (damage to which might result in considerable expense, loss and inconvenience), no work shall be started until all arrangements necessary for the protection thereof have been made.

The Contractor shall be solely and directly responsible to the Owners and operators of such properties for any damage, injury, expense, loss, inconvenience, delay, suits, actions, or claims of any character brought because of an injury or damage which may result from the carrying out of the work to be done under the contract.

In the event of interruption to either domestic or irrigation water or to other utility services as a result of accidental breakage or as a result of being exposed or unsupported, the Contractor shall promptly notify the proper authority.

He shall cooperate with the said authority in restoration of services as promptly as possible and shall bear all costs of repair. In no case shall interruption of any water, sewer, or utility service be allowed to exist outside working hours unless prior approval is received.

The locations of the major existing water lines, as shown on the Plans, were taken from City maps, and preliminary investigations have indicated they are generally reliable. However, it should be expected that some location discrepancies will occur.

Neither the Owner nor its officers or agents shall be responsible for damages to the Contractor as a result of the locations of the utilities being other than those shown on the plans or for the existence of utilities not shown on the plans.

1-9  **LAND MONUMENTS**

The Contractor shall preserve existing City, County, State, and Federal land monuments wherever possible. When these monuments cannot be preserved, the Contractor shall notify the Engineer in writing at least two (2) weeks in advance of the proposed construction in order that the Engineer will have ample opportunity to reference these monuments. The Contractor shall replace all monuments as directed by the Engineer.
1-10 **SOURCE AND COST OF MATERIALS**

All materials furnished or incorporated in this project shall conform to the requirements of these Specifications hereof as a part.

The Owner may select areas for disposal of surplus material; however, said area must be approved by the Engineer, and the Contractor will be responsible for acquiring the necessary right, at his own expense, to use the property for such purpose.

1-11 **STATE AND FEDERAL INSPECTING AGENCIES**

The site of construction is to be open at all reasonable times and places for inspection by accredited representatives of the State or Federal agencies who have regulatory or supervisory authority over any part of the work proposed or related thereto.

1-12 **COMPLIANCE WITH SPECIFICATIONS OF MATERIALS OR EQUAL CLAUSE**

Unless otherwise specifically provided in the Specifications, all workmanship, equipment, materials, and articles incorporated in the work covered by this contract are to be of the best available grade of their respective kinds. Whenever in the Specifications any material, article, device, product, fixture, form, type of construction, or process is indicated or specified by patent or proprietary name, by name of manufacturer, or by catalog number, such Specifications shall be deemed to be used for the purpose of establishing a standard of quality and facilitating the description of the material or process desired, and shall be deemed to be followed by the words, "or approved equal," and the Contractor may in such case, after the Engineer's approval, purchase and use any time, type, or process which shall be substantially equal in every respect to that so indicated or specified. The Engineer shall be the sole judge as to the equality of the substituted article.

1-13 **WATER AND POWER**

The Contractor shall be responsible to arrange for and pay all costs for water and power required.

1-14 **LINES, GRADES, AND CONSTRUCTION STAKING**

All work under this contract shall be built in accordance with the lines and grades as indicated in the Contract Documents. Distances and measurements except elevations and structural dimensions are given and made on horizontal planes.

Basic construction staking for the facilities will be performed by the Engineer. Line and grade stakes for pipelines will be set at a distance 100 foot spacing with an offset that is mutually agreeable to the Contractor and the Engineer. Centerline staking will be provided when warranted at 100 foot intervals and referenced for clearing and grubbing operation. Line and grade stakes for ditches will be set at 100 foot spacing with a mutually agreeable offset. Structures will be staked with two offset points locating two major external corners of the structure.

The Contractor shall be responsible for setting any additional stakes as may be required for the performance of the work.

The Contractor shall make every effort to maintain and protect the survey control points and the construction stakes. If control points or stakes are damaged, or destroyed they will be replaced by the Engineer at the Contractor's expense.
1-15 PERMITS

The Contractor is responsible to obtain all additional required business licenses, building permits, and fees with respect to this Project. It shall be the Contractor's responsibility to notify the respective proprietor for each right-of-way at least 48 hours prior to beginning any work within their right-of-way. The Contractor shall provide bonds as are required by the proprietors of each right-of-way and the Contractor is responsible for fees or charges the proprietors may assess. The cost of the above mentioned items shall be included in the lump sum bid price.

1-16 CONSTRUCTION SCHEDULE AND SCHEDULE OF VALUES

1-16.1 CONSTRUCTION SCHEDULE. The Contractor shall submit to the Engineer three (3) copies of a Critical Path Method, (CPM), type Construction Schedule generally as outlined in the Associated General Contractors Publication "The Use of CPM in Construction", within 15 days of the date of award of the contract. If revisions are required to this initially submitted schedule a revised schedule shall be re-submitted within 7 days after the Contractor receives the review copy.

Prior to the award of the contract, the Contractor shall submit a written statement of his CPM capability, verifying that the Contractor has qualified CPM consultant.

The completed schedule shall include a graphic network and tabulated schedules with the graphic network displayed on a sheet with a minimum size of 11" x 17" and a maximum size off 36" x 60". The graphic network shall be the activity on arrow type form of a time scaled arrow diagram. It may be divided into two or more sheets, if necessary, provided that all sheets are properly referenced. Notation on each activity arrow shall include a brief work description and an estimate of the time duration of the work. A calendar shall be shown along the full length of each sheet. Each activity arrow shall be plotted so that the beginning and completion dates can be readily determined by comparison to the calendar scale. All activities shall be shown using symbols and/or color which clearly designate whether it is a critical path or non-critical activity. All non-critical path activities shall show estimated work time and free float time. Time shall be displayed at the top of the schedule, reading left to right, with no greater than weekly divisions.

The schedule shall indicate dates for all important activities including:

1. Shop drawing submittals and reviews
2. Decisions
3. Product procurement and delivery
4. Beginning and completion of each element of construction
5. Critical coordination dates with Utility Companies, etc.
6. Submittal of Record Drawings and Equipment Manuals
7. Cleanup, Final Inspection, etc.

Constraints between inter-related activities shall be shown.

Where float time exists in activities, the activities shall be shown with early start/early finish times. Float time belongs to the Owner.

The schedule shall include a title block with the project title, the Contractor's business name, the date of submittal or revision, and the signature of the Contractor's authorized representative.

If the Contractor's progress has fallen behind the acceptable Construction Schedule, the Contractor shall take such steps as may be required, including but not limited to, increasing the number of personnel, shifts, overtime operations, days of work, and amount of construction equipment until such time as the work is back on schedule. All increased costs of any accelerated work program shall be paid for by the Contractor.
1-16.2 REVISIONS TO CONSTRUCTION SCHEDULE. The Contractor shall submit a revised Construction Schedule by the third day of each month and within five days of the occurrence of any of the following:

A. When delay in completion of any activity or group of activities indicates an overrun of the Contract time or control point requirement, by 10 working days or ten percent (10 percent) of the remaining duration, whichever is less.

B. Delays in submittals, deliveries, or work stoppage are encountered which make replanning or rescheduling of the work necessary.

C. The schedule does not represent the actual prosecution and progress of the project as being performed in the field and progress for any activity is five working days behind the current schedule.

D. The Contractor will be performing work at an earlier date than is shown on the schedule and the work will require additional inspection and/or testing personnel.

Acceptance of the revised Construction Schedule and all supporting data is contingent upon compliance with other related requirements specified in the Special Conditions.

The cost of revisions to the Construction schedule resulting from Contract changes will be included in the cost for the change in the work, and will be based on the complexity of the revision or Change Order, and the total cost of the change.

The cost of revisions to the construction schedule not resulting from authorized changes in the work shall be the responsibility of the Contractor.

1-16.3 SCHEDULE OF VALUES. In conjunction with the submittal of the Construction Schedule, the Contractor shall submit a cash flow projection indicating his estimated earnings by month during the entire contract period and a schedule of values of the work, using the attached form, or approved alternate, including quantities and unit prices. The aggregate of these extended prices shall equal the Lump Sum Contract Price. This schedule shall be satisfactory in form and substance to the Engineer and shall subdivide the work into the specified component parts. In addition, the schedule will be used as a basis for negotiating change orders. Upon approval by the Engineer, the schedule shall be incorporated into the form for Application for Payment, and shall become the basis for preparing monthly pay estimates.

Where so specified, a structure, system, or facility shall be broken down into components of work related to the Divisions of the Specifications. The cost for work specified in each Division shall be listed and the sum of the Division costs shall represent the total cost for such structure, system, or facility.

1-17 APPROVAL OF WORKING DRAWINGS

The Contractor shall submit, in quadruplicate, to the Engineer for his approval such shop or working drawings and/or catalog cuts for fabricated items and manufactured items, including mechanical and electrical equipment, as may, in the opinion of the Engineer be required for the construction of the work or any part thereof.

Drawings shall be submitted sufficiently in advance to allow the Engineer not less than ten regular working days for examining the drawings.
These drawings shall be accurate, distinct and complete and shall contain all required information, including satisfactory identification of items, units and assemblies in relation to the contract drawings and/or specifications.

When the shop drawings are approved by the Engineer, two sets of prints will be returned to the Contractor. If changes or corrections are necessary, one set will be returned to the Contractor with such changes or corrections indicated by a brief statement and the Contractor shall correct and resubmit the drawings, in triplicate, when requested by the Engineer.

The approval of such drawings and/or catalog cuts by the Engineer shall not relieve the Contractor from the responsibility for correctness of dimensions, fabrication details and space requirements, or for deviations from the contract drawings or specifications, unless the Contractor has called attention to such deviations in writing by a letter accompanying the drawings and the Engineer approves the change or deviations in writing at the time of submission; nor shall approval by the Engineer relieve the Contractor from the responsibility for errors in the shop drawings. When the Contractor does call such deviations to the attention of the Engineer, the Contractor shall state in his letter whether or not such deviations involve any deduction or extra cost adjustment.

1-18 MANUFACTURER'S DIRECTIONS

All manufactured items, articles, materials, and equipment, shall be applied, installed, connected, erected, used, cleaned, and conditioned as directed by the manufacturer's written instructions, unless herein specified to the contrary.

At the termination of the work, the Contractor shall submit three complete sets bound in the best grade, hard-backed binder of all operating and maintenance instructions presenting full details for care and maintenance of all visible surfaces and all mechanical and electrical equipment installed. The sets shall include the following information:

- Complete description of items including catalog numbers.
- Complete parts list for each item.
- Name and address of local supplier.
- Name and address of manufacturer.
- Complete operating instructions.
- Complete maintenance instructions.

1-19 EQUIPMENT AND MATERIALS SELECTION

Equipment and materials specified by name in these specifications or on the plans have been investigated and found suitable for the service and/or construction conditions anticipated. However, names are given primarily as a guide; bidding is not intended to be restrictive only to the extent of obtaining equipment and materials which will properly and effectively do the job. Manufacturers of competitive equipment are invited to submit requests to the Engineer for permission to bid their equipment. Such requests must be received by the Engineer at least 2 days prior to the bid opening and must be complete with the information necessary to properly evaluate the ability of the alternate equipment to meet the requirements of the project. Information should include specification date, materials of construction, dimensions, performance curves and data, location of nearest representative and service personnel, and all other pertinent information. If alternative equipment or materials are approved, the Contractor shall, at his expense, make any changes in the structures, buildings, piping or other necessary to accommodate the alternate items.

1-20 ENGINEER

Any reference in these specifications or on the plans to the "Engineer" shall be interpreted to mean "Horrocks Engineers", Consulting Engineers for the project. This may be a principal of the firms or an authorized representative.
1-21 INCIDENTAL WORK

Work which is intended or required, whether described and detailed specifically in these specifications or not, but which is required to complete the work shall be paid for by the Contractor. Cost for incidental work shall be included in unit prices or lump sums bid according to the Bid Schedule.

1-22 GUARANTEE PERIOD

Should any defect arise with the work such as leaks, breaks, etc., for a period of one (1) years from the date of project acceptance, the Contractor shall restore the work to the complete satisfaction of the Owner at the expense of the Contractor.

In the event of settlement of trenches or excavated areas for a period of one (1) years after written acceptance of the work, the Contractor shall restore the work in accordance with these Specifications including importing select backfill, grading of trench areas and/or replacement of pavement to the satisfaction of the Owner.

Performance bonds shall remain in full force and effect until expiration of the guarantee period and written release by the Owner.

1-23 COMPLIANCE WITH GOVERNMENTAL REGULATIONS

The Contractor's equipment and operations shall comply fully with all applicable standards, regulations and requirements of existing Federal, Utah State and Local governmental agencies. This shall include, but not necessarily be limited to, the following:

UTAH OCCUPATIONAL SAFETY AND HEALTH ACT (1973) and EMPLOYER-EMPLOYEE SAFE PRACTICES FOR EXCAVATIONS AND TRENCHING OPERATIONS (Jan. 1, 1974) as published by Industrial Commission of Utah, including any and all amendments or revisions effective prior to performance of the work.

In compliance with Section 34-30-1 and as revised in 71-10-1 of the Utah Code, in employing individuals to perform work under this contract, the contractor shall give preference to citizens of the United States or those having declared their intention of becoming citizens. If the contractor fails to comply with the requirements of Section 34-30-1 of the Utah Code, this contract shall be void.

In compliance with Section 34-30-11 of the Utah Code, in employing individuals for work under this contract, the contractor shall give preference to honorably discharged veterans and unremarried surviving spouses of honorably discharged veterans, provided that such veterans or surviving spouses are qualified for the employment position and are residents of the State of Utah.

1-24 UNEMPLOYMENT INSURANCE

In addition to insurance elsewhere specified, the Contractor shall secure and maintain UNEMPLOYMENT INSURANCE to cover all persons he employs on the project.

1-25 EXAMINATION OF THE SITE

The Bidder shall examine the site before submitting his proposal and inform himself regarding existing facilities and conditions affecting the proposed work. Failure to make such inspection shall in no way relieve the Contractor of any of the obligations or conditions of this specification or serve in any way as a basis for extra enumeration to the Contractor for conditions arising from unfamiliarity with the site or conditions affecting the work.
1-26 CONTRACT LIMITS

"Qualified" or "All or nothing" type bids may be rejected by the Owner.

The Contractor agrees that no additional compensation is due above and beyond what is represented in the Bid, whether optional bid items are included in the award of the project or not.

Upon award of Contracts to more than one Contractor, it shall automatically become binding upon each Contractor or Subcontractor to coordinate his work with the other Contractor or Subcontractors. Each Contractor agrees, that upon signing a Construction Contract with the Owner, he will assume the responsibility of coordinating his part of the work with other Contractors, and that he will make no charges against the Owner for delays resulting from lack of coordination and/or scheduling.

1-27 CONSTRUCTION SCHEDULING AND COMPLETION TIME

The Contractor shall schedule his work in a manner to provide minimal disruption to all utilities and users on those systems, to the general public, and to neighboring property owners. The Contractor shall propose an acceptable method of completing this task in the construction schedule with substantial completion by April 15th, 2020 and Operational by April 30th, 2020.

1-28 LIQUIDATED DAMAGES

Contractor and Owner recognize that time is of the essence as stated in Paragraph 1-27 above and that Owner, its shareholders and others will suffer direct, incidental and consequential financial and other losses if the Work is not completed and Milestones not achieved within the times specified in Paragraph 1-27 above, plus any extensions thereof allowed in accordance with the Contract. Such damages will include, but are not limited to, consequential damages resulting from the delay of delivery of water through the canal if substantial completion is not achieved by April 15th, 2020. The parties recognize that if there is a delay then assessing, calculating and proving actual damages after the fact will be difficult, expensive and time consuming for everyone involved, and that damages may accrue well into the future making a timely resolution difficult. The parties agree that the liquidated damages described below are agreed to as a good faith effort to estimate actual damages in advance in a situation where calculating actual damages after the fact will be difficult, uncertain, expensive and time consuming. Owner and Contractor therefore agree that as liquidated damages for delay (but not as a penalty):

1. Substantial Completion: Contractor shall pay Owner $ 1,000 for each day that expires after the time (as duly adjusted pursuant to the Contract) specified in Paragraph 1-27 above for Substantial Completion until the Work is substantially complete.
2. Completion of Remaining Work: After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner $ 500 for each day that expires after such time until the Work is completed and ready for final payment.
3. Liquidated damages for failing to timely attain Substantial Completion and final completion are not additive and will not be imposed concurrently.

1-29 INSPECTIONS

The Contractor shall keep the Engineer informed a reasonable time in advance of the times and places at which he intends to do work in order that lines and grades may be furnished, that inspection may be provided, and that necessary measurements for record and payment may be made with the minimum of inconvenience to the Engineer or of delay to the Contractor. Prior to inspection the Contractor shall check his work to assure that quality and tolerances of work specified have been met.
Prior to the construction of any phase or portion of work that will be a finished product, an inspection will be performed by the Engineer and the Engineer or his agent will sign an inspection report indicating location, time, date and any changes from the plans, that the Contractor is in compliance with the plans and specifications at this phase or portion of the work. If the Contractor's work is found not to be in compliance, corrections shall be made and the Engineer shall make another inspection.

1-30 PROJECT RECORD DOCUMENTS

The Contractor shall maintain at the site, available to the Owner and Engineer, one copy of all Drawings, Specifications, Addenda, accepted Shop Drawings, Change Orders, and other modifications in good order and marked to record all changes made during construction. These shall be delivered to the Engineer for the Owner upon completion of the Project.

1-31 EXISTING SERVICE TO PROPERTY OWNERS

Existing water service and access to all property owners shall be maintained and be uninterrupted as is possible.

Before connections that require disruption of the water supply to all or part of the system users are made, 24 hour notice must be given to the Engineer and affected users. Disruptions shall not exceed 6 hours in length of time. Major disruptions, as defined by the Engineer shall only be made between the hours of 11 p.m. and 5 a.m.

1-32 SUSPENSION OF WORK

The Engineer shall have the authority to suspend the work wholly or in part, for such period as he may deem necessary, due to unsuitable weather, or to such other conditions as are considered unfavorable for the suitable prosecution of the work, or for such time as he may deem necessary due to the failure on the part of the Contractor to carry out orders given, or to perform any provisions of the Contract. The Contractor shall immediately comply with the written order of the Engineer to suspend the work wholly or in part. The suspended work shall be resumed when conditions are favorable and methods are corrected, as ordered or approved in writing by the Engineer.

In case of suspension of work, the Contractor shall be responsible for all materials and shall properly store them as necessary.

1-33 CHARACTER OF WORKMEN

Whenever, in the opinion of the Engineer any superintendent, foreman, or workman employed by the Contractor or his subcontractor is disrespectful, intemperate, disorderly, or otherwise objectionable, he shall, at the written request of the Engineer, be removed and not again be employed on the work without written consent of the Engineer.

Convict labor shall not be used in State-assisted construction unless it is labor performed by convicts who are on work release, parole, or probation.

1-34 SANITARY FACILITIES

The Contractor shall provide suitable chemical toilets or water closets at points acceptable to the Engineer for use of employees on this work. At the end of the job such toilets shall be removed completely.

1-35 PROTECTION OF ANTIQUITIES

Attention is called to State and Federal laws pertaining to the protection and preservation of sites or objects of archeological, paleontological, or historic interest.
It is a provision of this contract and shall be a provision of every subcontract that when features of archeological, paleontological, or historic interest are encountered or unearthed in material pits, the roadway prism, or other excavation the contractor shall stop work in the immediate vicinity of such feature, protect it from damage or disturbance, and report promptly to the state and local officials having jurisdiction. Work shall not be resumed in the immediate area until the contractor is advised by the authorities having jurisdiction that study and/or removal of the feature or features has been completed. The contractor will be allowed an appropriate contract time extension as provided in the GENERAL CONDITIONS for construction time lost.

1-36 DUST CONTROL/PROJECT CLEANUP

   During the performance of work required by these specifications, or any operations appurtenant thereto, and whether on rights-of-way provided or elsewhere, comply with applicable Federal, State, and local laws and regulations, regarding the prevention, control, and abatement of dust pollution. Should a conflict exist in the requirements for dust abatement, the most stringent requirement shall apply. The Contractor is responsible for all damages resulting from dust originating from any construction operations under these Specifications.

   The Contractor shall provide all labor, equipment, and materials, and shall use efficient methods wherever and whenever required to prevent dust nuisance or damage to persons, property, or activities, including, but not limited to, crops, orchards, cultivated fields, wildlife habitats, dwellings and residences, agricultural activities, recreational activities, traffic and similar conditions. This will primarily consist of periodic watering of equipment staging areas and dirt roads used during construction. Methods of mixing, handling, and storing cement, pozzolan, and concrete aggregate shall include means of eliminating atmospheric discharges of dust.

   The Engineer has authority to stop any construction activity contributing to dust levels which are excessive or in violation of Federal, State, or local laws. All expenses resulting from such a work stoppage is the responsibility of the Contractor.

   Throughout the period of construction keep the work site free and clean of all rubbish and debris, and promptly remove from any portion of the site, or from property adjacent to the site of the work and properly dispose of, all unused materials, surplus earth and debris, excepting select material which may be required for refilling or grading. Comply with applicable Federal, State and local laws and regulations. Should a conflict exist in the requirements for cleanup and disposal of waste materials, the most stringent requirement shall apply. Roads shall be swept prior to completing each day’s construction activities by sweeping or other approved method.

   Contractor progress cleaning program will include using sweeper with vacuum truck as necessary to keep the streets clean. The OWNER or ENGINEER reserves the right to shut down the CONTRACTOR with no extension of time or cost to the contract if in their opinion the project progress cleaning is not being done satisfactorily.

   Upon completion of the work and prior to final acceptance of the project the Contractor shall remove from the vicinity of the completed work and properly dispose of all plant and other waste, surplus material, and equipment belonging to him or used under his direction during construction.

1-37 NOISE LEVELS IN THE CONSTRUCTION AREA

   Comply with applicable Federal, State, and local laws, orders, and regulations concerning the prevention, control, and abatement of excessive noise. The Contractor will monitor construction noise levels and will take corrective action if noise levels are greater than 85 dBA within the construction area.

   The location of “sensitive receptors” such as schools, churches, nursing homes, and residential areas will be considered when scheduling construction activities with significant noise levels, and in siting temporary and stationary post-project noise emission sources.
1-38 **DRAINAGE CONTROL**

In excavation, fill, and grading operations care shall be taken to disturb the pre-existing pattern as little as possible. Particular care shall be taken not to direct drainage water onto private property or drainage ways inadequate for the increased flow.

1-39 **TRAFFIC SAFETY SUPERVISOR**

The Contractor shall assign one person to be a traffic safety supervisor. The person’s primary responsibility shall be to ensure that traffic signals, signs, barricades, and any other traffic control devices are placed, moved, and maintained as needed. Refer to Section 015526.

1-40 **COMPLIANCE WITH ENVIRONMENTAL REGULATIONS**

A. Comply with applicable Federal and State laws, orders, and regulations concerning the control and abatement of water pollution. This includes the following federal and state standards for water pollution control.

1. **UPDES Permit**

Discharge of wastewater or other pollutants, as a result of construction activities, into navigable waters in Utah, requires a 402 or UPDES permit defined under Section 402 of the Clean Water Act, Public Law 92-500, as amended by Public Law 95-217. The UPDES permit process is administered by the State of Utah, Utah Department of Environmental Quality (UDWQ), Division of Water Quality, 288 North 1460 West, Salt Lake City, Utah 84116, (801) 538-6146.

Submit a Notice of Intent to comply with the Federal Clean Water Act, Section 402 UPDES General Permit during the construction of the Project. The Contractor shall complete any project specific permit applications and other requirements specified by UDWQ and obtain any project specific UPDES permits. The UDWQ has indicated that it may take about one month to process a project specific UPDES permit. No construction dewatering may be performed until the project specific UPDES permit is obtained. The Contractor shall abide by the conditions and standards required by the UPDES General Permit and any UPDES project specific permit during all phases of construction.

a. Prepare a Storm Water Pollution Prevention Plan (SWPPP) as required by the permit. Comply with all terms and conditions to obtain and maintain this general permit.

b. Provide all monitoring and water treatment, if necessary, to achieve compliance with applicable Water Quality Standards, and shall provide the record keeping required by the general permit associated with construction activity.

2. **Turbidity and pH Control**

Turbid wastewater resulting from aggregate processing, excavation, dewatering, and other construction activities shall be treated prior to discharge into any watercourse by the use of methods approved by the Construction Manager and UDWQ. No discharge of human waste will be allowed; portable toilets shall be provided by the Contractor for workers. The portable toilets shall be serviced on a regular basis.

a. **Construction Activities.** Excavation, road construction, stream diversion activities, and all other construction activities shall be conducted in a manner to prevent muddy water and eroded materials from entering other streams and rivers and tributaries, any watercourse, canal, ditch or storm drain facility by the construction of intercepting ditches, barriers, settling ponds, or other approved means. Provide sumps, pumps, and associated facilities, as described in Water Quality Management Plan.
Excavated materials will be hauled to a storage area on the pipeline or canal alignments, out of the floodplain and not within 25 feet (7.6 meters) of wetlands. When necessary to perform required construction in the stream channel or in flowing water, such work will be conducted during periods of low flow. Work in the stream channel shall be scheduled and completed in the shortest practicable time period.

Mechanized equipment shall not operate in flowing water except as necessary to construct crossings or to perform the construction. Such work shall be approved by the Engineer prior to the equipment entering a stream or other water body.

The Contractor's methods of dewatering and stockpiling earth shall include preventive measures to control silting and erosion and to intercept any runoff originating in construction areas.

b. Construction Wastewater. Construction wastewater resulting from materials processing, placement of concrete, dewatering, excavations, drainage at the excavated material disposal and storage sites, drainage water from constructing water control equipment, waste sludge, the cleaning of heavy equipment used in construction, and other construction operations shall be conveyed to the treatment facility prior to the discharge to waters of the United States, or to any storm drain collection system. Any such discharge of wastewater shall be treated by use of the proposed treatment facility described in this document. The Contractor may propose an alternative method of wastewater treatment. Alternative methods must be approved by Owner and UDWQ and shall be fully described in the Contractor's Storm Water Pollution Prevention Plan (SWPPP). All discharge shall be in compliance with the Federal Clean Water Act, Section 402 UPDES General Permit.

The acceptable water treatment method furnished shall have a minimum capacity to (1) treat up to a minimum of 5 cubic feet per second (cfs) (0.14 cubic meter per second) of wastewater, (2) be able to reduce the turbidity in the effluent to no more than 10 NTU over background levels of the receiving water, (3) be able to maintain a pH of the effluent between 6.5 and 9.0, and (4) be able to remove accumulations of oil or other petroleum products from the wastewater to a level of 10 parts per million (milligrams per liter).

Flows from the dewatering operation may require holding ponds to provide the necessary detention period. If construction wastewater can be contained in ponds or other holding facilities and allowed to seep into the ground or evaporate, then no treatment will be necessary.

The pond dikes shall be constructed of impervious materials and adequately compacted with 2 feet of freeboard to provide protection from accidental discharges. The location, size, and method of construction of ponds shall be submitted to the Engineer and the UDWQ as part of the Water Quality Management Plan. Construction of the ponds shall not commence until receipt of approval.

Any turbidity control methods shall be provided with bypass equipment to discharge clear wastewater flows to the stream if such water has turbidity levels less than 10 NTUs above background level of the receiving water and a pH value between 6.5 and 9.0. The decision to bypass water treatment facilities shall be subject to approval by the Engineer and UDWQ as provided in the UPDES permit.

All chemicals used for treating wastewater must be approved by the EPA for use in potable water. Also, the types and amounts of chemicals used in any approved method for the control of turbidity or pH shall not cause the effluent to be toxic or in any way harmful to terrestrial wildlife or aquatic life.

Skim and properly dispose of any oil or other petroleum product on any settling pond when an oil film on the surface of any pond covers more than one-third of the surface area of the pond. When sludge or settled materials in ponds accumulate so as to impair the effectiveness of the facilities, the materials shall be removed and transported to a waste disposal area.
Satisfactorily operate any wastewater treatment facilities such that they provide effluent that meets required UPDES permit limitations. The approval of the Contractor's proposal by the Engineer shall not be construed to relieve the Contractor from this responsibility. The Contractor shall repair, at his expense, any damage to or failure of the facilities and equipment caused by floods or storm runoff.

Should the wastewater discharge exceed a turbidity measurement (10 NTUs), or the pH limitations, or limitations on oil and grease within the general UPDES permit, the Construction Engineer will have the authority to immediately halt the discharge from the facilities until the effluent meets the limitations of the UPDES permit.

B. Stream Alteration Permit

A stream alteration permit if required for this project, will be furnished by the Owner.

C. Spill Prevention Control and Countermeasure (SPCC) Plan

Where the location of a construction site is such that inadvertent spills of petroleum or other toxic substances could reasonably be expected, a SPCC plan will be developed. These areas shall include, but not be limited to, fuel storage sites, equipment maintenance areas, and equipment fueling and lubricating sites.

The SPCC plan shall include as a minimum the following:

1. **Agency Notification Requirements.** A listing of persons and/or offices to be notified immediately following an oil spill together with the appropriate telephone numbers. The following agencies and/or individuals shall be included in that list:

   Utah Department of Environmental Quality
   Division of Environmental Response and Remediation
   289 North 1950 West
   Salt Lake City, Utah (801) 538-6146
   24-hour Emergency Phone: (801) 536-4123

   Environmental Protection Agency
   Attn: Water Management Division
   999 18th Street, Suite 500
   Denver, Colorado 80202-2466
   24-hour Emergency Phone: (800) 424-8802
   (Failure to notify EPA of an accidental spill within 24 hours of its occurrence may result in the levying of a fine against the responsible party.)

   U.S. Fish and Wildlife Service
   145 East 1300 South, Suite 404
   Salt Lake City, Utah 84115
   (801) 524-5001
   After hours contact National Response Center (800)424-8802

2. **Spill Prevention Measures.** Spill prevention measures shall include the following:

   a. A site plan indicating oil fuel storage areas, refueling areas, and other areas where oil and other petroleum products would be used or handled. The site plan will also show the distance to all watercourses (perennial or intermittent) or other bodies of water where oil could be directly or indirectly spilled. Oil and fuel storage areas and refueling areas shall not be located within the 200-foot (61 meter) buffer zone of any live
or dry watercourse. No petroleum products (gasoline, oils, hydraulic fluid, lubricants, etc.) shall be stored within the area of construction or materials marshaling areas. Use a vehicle designed for refueling and lubricating construction equipment. During refueling, lubricating, and other maintenance, construction vehicles and equipment shall be moved at least 200 feet (61 meter) from the edge of any live or dry watercourse.

b. The plan shall include appropriate containment methods to prevent oil or other petroleum products from reaching any watercourse. At a minimum, the preventive system shall include:

- No oil, oil storage areas, or areas for refueling equipment will be located in construction and materials storage areas.
- Refueling and lubricating of equipment will be performed by a vehicle designed for this activity.

c. The plan shall include a complete discussion of conformance with the following guidelines:

- Job-site drainage system shall flow into ponds, lagoons, or other catchment basins that are not subject to periodic flooding and engineered to prevent oil from reaching any watercourse or adjacent shorelines in the event of equipment failures or human error.
- All oil or fuel leaks from equipment shall be promptly cleaned up.

d. Contingency and Countermeasures. In the event of an oil spill into a watercourse, other body of water, or adjacent shorelines of watercourses, contingency and countermeasures shall include as a minimum the following:

- A commitment of manpower, materials, and equipment to expeditiously control and remove the spilled oil or fuel.
- A commitment to place all available manpower, materials, and equipment into immediate use to cleanup and restore the affected watercourses and their adjoining shorelines.
- A sampling-monitoring program to document the effectiveness of the spill cleanup program. Proper sampling equipment, sampling procedures, and name of the certified laboratory analyzing the samples shall be included.


- Prepare a Pollution Prevention Plan as required by the permit. Comply with all terms and conditions to obtain and maintain this general permit.
- Provide all monitoring and water treatment, if necessary, to achieve compliance with applicable Water Quality Standards, and provide the record keeping required by the general permit associated with construction activity.

D. Water Quality Management Plan

Prepare a Water Quality Management Plan which shall include, but not be limited to, the following:

a. Identification of a Pollution Control and Water Quality Coordinator responsible for implementing the control measures in the management plan.
b. Treatment of nonpoint discharges:

A list of materials, machinery, and manpower available for erosion control. Erosion control materials may include bales of straw, dikes, riprap, gabions, culverts, pipe, sandbags, gravel, plastic, and flexible downdrains. Quantities of material and equipment shall be included.

Site-specific control plan for:

- contractor's camps, yards, and all work areas
- equipment washing areas
- fueling
- excavated material storage areas and waste disposal areas
- stream diversion

Methods for diversion and care of stream during construction:

- projected schedule for all work in streams
- identification and location of stream diversion structures such as cofferdams and dikes
- sources of materials for stream diversion structures

c. Treatment of point discharges:

Methods for treatment of water used and/or encountered during construction.

Proposed plan for water treatment facilities including:

- location, capacity, size, and method of constructing ponds and water conveying system
- complete design and construction details of the water treatment plant, if proposed
- arrangement for the turbidity and pH control structures
- method for conveying untreated water to the control structures or treatment plant and water from these facilities to the authorized discharge point
- method of storing and disposing of sludge, settling pond residue, or backwater residue accumulation
- description of chemicals to be used in the water treatment facilities
- methods of handling and disposing of oil and other petroleum products, chemicals, and similar industrial wastes collected within the treatment facility
- other salient features

d. Monitoring Program. A complete description of a daily and weekly water quality monitoring program developed to meet the UPDES permit requirements.

1-41 TEMPORARY ACCESS ROADS AND BORROW AREAS

Except for those access roads and borrow areas specifically covered in these specifications, the approval of the Engineer must be obtained in advance before locating additional access roads or borrow areas on any land. Mark on the ground proposed locations for approval by the Engineer in advance of construction.

A. Temporary access road. To prevent excessive erosion, no grades in excess of 8 percent shall be used, except those which are approved in writing by the Engineer. Generally, back slopes of cut banks shall be stable and compatible with existing topography, except where rock is encountered and such slopes shall be flattened and
rounded into the natural ground surface so far as practicable. Suitable devices and drainage structures shall be installed in sufficient number to prevent accumulation of excessive water and erosion of the road surface, drainage ditches, and scarred areas.

B. Borrow areas for temporary access roads. Borrow areas shall be treated as follows: Topsoil shall be stripped from the excavated areas and deposited in storage piles apart from other excavated material. After the desired amount of material has been removed, evenly grade and properly slope the sides and bottom of all borrow pits, as directed by the Construction Manager. Tracks or marks of heavy equipment or other disturbed earth shall be smoothed or filed to the surrounding level. After the pit has been graded and properly sloped, the stored topsoil shall be evenly spread over the subsoil exposed by the excavation. All materials unsuitable for construction purpose shall be disposed of as directed by the Engineer.

Certain areas are reserved for recreational development. These areas are marked on the ground or indicated on drawings or maps. Do not operate mechanized equipment or vehicles within these restricted areas without written authorization from the Engineer. The Contractor is responsible for all restoration costs and all damages resulting from any unauthorized operations within these areas.

END OF SECTION
### DOCUMENT 009900

**CONTRACT CHANGE ORDER**

**Project:** Owner – Project  
Date __________  

**Location:**  
Change Order No.:  

**To:**  

You are hereby requested to comply with the following changes from the contract plans and specifications:

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description of Changes, Quantities, Units, Unit Prices, Change in Completion Schedule, etc.</th>
<th>Decrease In Contract Price</th>
<th>Increase In Contract Price</th>
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<td>Change in contract price due to this Change Order:</td>
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<td>Difference between Col. 3 &amp; 4</td>
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<td></td>
<td>Net (increase) (decrease)</td>
<td></td>
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</table>

The sum of $______________ is hereby added to (deducted from), the total contract price and the total adjusted contract price to date thereby is $______________.

The time provided for completion in the contract is unchanged, increased (decreased) by _____ calendar days. This Document shall become an amendment to the contract & all provisions of the contract will apply hereto.

**Accepted by:**  
Contractor ______________ Date __________

**Recommended by:**  
Project Engineer ______________ Date __________

**Approved by:**  
Owner ______________ Date __________


DOCUMENTS 009950

WAIVER OF LIEN

Contractor is required to comply in all respects to the State Construction Registry requirements for preserving lien rights as established by House Bills 136 (2004) and 105 (2005). Contractors are required to inform all subcontractors and suppliers of their need to comply with the same requirements in order to protect their right to file a lien. Please see the State Construction Registry at www.scr.utah.gov for additional information.

At project closeout and prior to final payment the contractor shall provide full and final release using the following format for themselves and all subcontractors and suppliers on the project.

FULL AND FINAL RELEASE

FROM: ("Contractor/Developer")

PROJECT:

(name of person or firm responsible for project)

(Please see the State Construction Registry at www.scr.utah.gov for additional information.)

street address)

(Project street address)

(City, State, Zip Code)

(City, State, Zip Code)

TO: Provo River Water Users Association

285 West 1100 North

Pleasant Grove, Utah 84062

The above named person or firm (herein called the ("Contractor/Developer"), by the person signing below, hereby certifies that it has made payment in full for all labor, subcontract work, equipment, and materials supplied to the above-described Project, and hereby waives and releases all mechanics liens, stop notices, equitable liens, and labor and material bond rights on the Project for all materials, supplies, labor, and services purchased, acquired, or furnished by or for the Contractor/Developer and used on the Project up to and including:

The Contractor/Developer further agrees to furnish a good and sufficient waiver of lien on the Project from every person or entity furnishing labor or materials for the Contractor/Developer. The Contractor/Developer also agrees to indemnify, defend, and hold harmless Provo River Water Users Association from and against any and all claims or liability whatsoever that may arise as a result of the Contractor/Developer’s failure to properly, timely, and/or fully pay all laborers, suppliers, subcontractors, or other parties performing work on the Project on behalf of, through, or at the request of the Contractor/Developer.

In signing this document, I hereby represent and warrant that I am fully authorized by the Contractor/Developer named first above to represent and bind it by my signature below.

CONTRACTOR/DEVELOPER

WITNESS: BY:

ADDRESS: DATE:
SECTION 010100

SUMMARY OF WORK

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Identification and summary description of the Work, location, products furnished by Owner, activities by others, coordination, and early occupancy by Owner.

1.02 THE WORK

A. The Work consists of construction of the ULDC South Branch Replacement. Generally the work will consist of removing, properly disposing of, and replacing approximately 280 linear feet of the ULDC South Branch with a 48” HDPE pipe.

B. Except as specifically noted otherwise, provide and pay for:

1. Insurance and bonds.
2. Labor, materials, and equipment.
3. Tools, equipment, and machinery required for construction.
4. Utilities required for construction.
5. Temporary facilities including sheeting and shoring.
6. Traffic control and dust control measures.
7. Other facilities and services necessary for proper execution and completion of the Work.

C. Secure and pay for all permits including County and OSHA excavation permits, Department of Transportation permits, government fees and licenses.

D. Comply with codes, ordinances, regulations, orders, and other legal requirements of public authorities having bearing on the performance of the Work.

1.03 LOCATION OF PROJECT

A. The Work is located at 17040 S 985 W Bluffdale, UT 84065

1.04 PRODUCTS FURNISHED BY OWNER

• 280 LF of DR-26 HDPE Pipe
• 48”x30” DR-26 HDPE Tee

1.05 ACTIVITIES BY OTHERS

A. Owner, utilities, and others may perform activities within Project area while the Work is in progress.

1. Schedule the Work with Owner, utilities, and others to minimize mutual interference.

1.06 COORDINATION OF WORK
A. Maintain overall coordination of the Work.
B. Obtain construction schedules from each subcontractor, and require each subcontractor to maintain schedules and coordinate modifications.
C. Coordinate traffic control measures with Engineer on a weekly basis.
D. Attend weekly progress/coordination meetings with City, Engineer, other contractors, and affected parties.

PART 2 PRODUCTS
Not Used.

PART 3 EXECUTION
Not Used.

END OF SECTION
SECTION 012500

SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Quality assurance.
B. Product options.
C. Product substitution procedures.

1.2 QUALITY ASSURANCE

A. Contract is based on products and standards established in Contract Documents without consideration of proposed substitutions.

B. Products specified define standard of quality, type, function, dimension, appearance, and performance required.

C. Substitution Proposals: Permitted for specified products except where specified otherwise. Do not substitute products unless substitution has been accepted and approved in writing by Owner.

1.3 PRODUCT OPTIONS

A. Not Used.

1.4 PRODUCT SUBSTITUTION PROCEDURES

A. Engineer will consider requests for substitutions only within 30 days after date established in Notice to Proceed.

B. Substitutions may be considered when a product becomes unavailable through no fault of Contractor.

C. Document each request with complete data, substantiating compliance of proposed substitution with Contract Documents, including:
   1. Manufacturer's name and address, product, trade name, model, or catalog number, performance and test data, and reference standards.
   2. Itemized point-by-point comparison of proposed substitution with specified product, listing variations in quality, performance, and other pertinent characteristics.
   3. Reference to Article and Paragraph numbers in Specification Section.
   4. Cost data comparing proposed substitution with specified product and amount of net change to Contract Sum.
   5. Changes required in other Work.
   6. Availability of maintenance service and source of replacement parts as applicable.
   7. Certified test data to show compliance with performance characteristics specified.
   8. Samples when applicable or requested.
   9. Other information as necessary to assist Architect/Engineer's evaluation.
D. A request constitutes a representation that Bidder or Contractor:
   1. Has investigated proposed product and determined that it meets or exceeds quality level of specified
      product.
   2. Will provide same warranty for substitution as for specified product.
   3. Will coordinate installation and make changes to other Work that may be required for the Work to be
      complete with no additional cost to Owner.
   4. Waives claims for additional costs or time extension that may subsequently become apparent.
   5. Will coordinate installation of the accepted substitute, making such changes as may be required for
      the Work to be complete in all respects.
   6. Will reimburse Owner for review or redesign services associated with re-approval by authorities
      having jurisdiction.

E. 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 Contract
   Documents.

F. Substitution Submittal Procedure:
   1. Submit three copies of Request for Substitution for consideration. Limit each request to one proposed
      substitution.
   2. Submit Shop Drawings, Product Data, and certified test results attesting to proposed product
      equivalence. Burden of proof is on proposer.
   3. Engineer will notify Contractor in writing of decision to accept or reject request.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION
SECTION 013000

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Coordination and project conditions.
B. Coordination with private and public agencies.
C. Field engineering.
D. Preconstruction meeting.
E. Progress meetings.
F. Closeout meeting.

1.02 COORDINATION AND PROJECT CONDITIONS

A. Coordinate scheduling, submittals, and Work of the various sections of the Project to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

B. Verify 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.

C. Coordinate space requirements, supports, 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 lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

D. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

E. Coordinate completion and clean-up of Work of separate sections in preparation for Substantial Completion.

1.03 COORDINATION WITH PRIVATE AND PUBLIC AGENCIES

A. Notify private and public agencies affected by the proposed construction, coordinate required adjustments, and arrange for all necessary adjustments of utilities within or adjacent to the limits of construction.

B. Obtain utility locations from the one-call center (Blue Stake) or other utility coordination service 2 to 7 working days prior to any excavation. Locations must be updated every 14 days.

C. All utilities and utility appurtenances within the limits of the Work which are to be relocated or adjusted shall be moved by the affected utility company, unless specified otherwise.
D. Notify police, fire and transit authority.
E. Coordinate with water master in maintaining adjacent land owner’s irrigation water turns.

1.04 FIELD ENGINEERING
A. Engineer will provide general survey control.
B. Contractor shall locate and protect survey control and reference points. Promptly notify Engineer of any discrepancies discovered.
C. Control datum for survey is that shown on Drawings.
D. Verify set-backs and easements; confirm drawing dimensions and elevations.
E. Provide field engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.

1.05 PRECONSTRUCTION MEETING
A. Engineer will schedule a meeting after Notice of Award.
B. Attendance Required: Owner, Engineer, and Contractor.
C. Agenda:
   1. Execution of Owner-Contractor Agreement.
   2. Submission of executed bonds and insurance certificates.
   4. Submission of list of Subcontractors, list of products, schedule of values, and progress schedule.
   5. Designation of personnel representing the parties in Contract and the Engineer.
   6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
   7. Scheduling.
D. Engineer will record minutes and distribute copies within five days after meeting to participants.

1.06 PROGRESS MEETINGS
A. Schedule and administer meetings throughout progress of the Work on a weekly basis.
B. Engineer will make arrangements for meetings, prepare agenda with copies for participants, and preside at meetings.
C. Attendance Required: Job superintendent, major subcontractors and suppliers, Owner, Engineer, as appropriate to agenda topics for each meeting.
D. Agenda:
   1. Review minutes of previous meetings.
   2. Review of Work progress.
   3. Field observations, problems, and decisions.
   4. Identification of problems which impede planned progress.
   5. Review of submittals schedule and status of submittals.
   6. Review of off-site fabrication and delivery schedules.
   7. Maintenance of progress schedule.
   8. Corrective measures to regain projected schedules.
   9. Planned progress during succeeding work period.
  10. Coordination of projected progress.
  11. Maintenance of quality and work standards.
  12. Effect of proposed changes on progress schedule and coordination.
  13. Other business relating to Work.

E. Engineer will record minutes and distribute copies within five days after meeting to participants.

1.07 CLOSEOUT MEETING

A. Schedule Project closeout meeting with sufficient time to prepare for requesting Substantial Completion. Preside over meeting and be responsible for minutes.

B. Attendance Required: Contractor, major Subcontractors, Engineer, Owner, and others appropriate to agenda.

C. Notify Engineer four days in advance of meeting date.

D. Minimum Agenda:
   1. Start-up of facilities and systems.
   2. Operations and maintenance manuals.
   3. Testing, adjusting, and balancing.
   4. System demonstration and observation.
   5. Operation and maintenance instructions for Owner's personnel.
   6. Contractor's inspection of Work.
7. Contractor's preparation of an initial "punch list."
8. Procedure to request Engineer inspection to determine date of Substantial Completion.
9. Completion time for correcting deficiencies.
10. Inspections by authorities having jurisdiction.
11. Certificate of Occupancy and transfer of insurance responsibilities.
12. Partial release of retainage.
13. Final cleaning.
14. Preparation for final inspection.
15. Closeout Submittals:
   a. Project record documents.
   b. Operating and maintenance documents.
   c. Operating and maintenance materials.
   d. Affidavits.
16. Final Application for Payment.
17. Contractor's demobilization of Site.
18. Maintenance.

E. Contractor Record minutes and distribute one copy to participants within two days after meeting, with one copy each to Engineer, Owner, and those affected by decisions made.

PART 2 PRODUCTS
Not used.

PART 3 EXECUTION
Not used.

END OF SECTION
SECTION 013300

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Definitions.
B. Submittal procedures.
C. Construction progress schedules.
D. Proposed product list.
E. Product data.
F. Shop Drawings.
G. Samples.
H. Other submittals.
I. Test reports.
J. Certificates.
K. Manufacturer's instructions.
L. Manufacturer's field reports.
M. Erection Drawings.
N. Contractor review.
O. Engineer review.

1.2 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Engineer's responsive action.
B. Informational Submittals: Written and graphic information and physical samples that do not require Engineer's responsive action. Submittals may be rejected for not complying with requirements.

1.3 SUBMITTAL PROCEDURES

A. Transmit each submittal with Engineer-accepted form.
B. Sequentially number transmittal forms. Mark revised submittals with original number and sequential alphabetic suffix.
C. Identify: Project, Contractor, Subcontractor and supplier, pertinent Drawing and detail number, and Specification Section number appropriate to submittal.

D. Apply Contractor's stamp, signed or initialed, certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is according to requirements of the Work and Contract Documents.

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

F. For each submittal for review, allow 15 days excluding delivery time to and from Contractor.

G. Identify variations in Contract Documents and product or system limitations that may be detrimental to successful performance of completed Work.

H. Allow space on submittals for Contractor and Architect/Engineer review stamps.

I. When revised for resubmission, identify changes made since previous submission.

J. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report inability to comply with requirements.

K. Submittals not requested will not be recognized nor processed.

L. Incomplete Submittals: Engineer will not review. Complete submittals for each item are required. Delays resulting from incomplete submittals are not the responsibility of Engineer.

1.4 CONSTRUCTION PROGRESS SCHEDULES

A. Comply with Section 007500 - Construction Progress Schedule

1.5 PROPOSED PRODUCT LIST

A. Within 15 days after date of Notice to Proceed, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, indicate manufacturer, trade name, model or catalog designation, and reference standards.

1.6 PRODUCT DATA

A. Product Data: Action Submittal: Submit to Architect/Engineer for review for assessing conformance with information given and design concept expressed in Contract Documents.

B. Submit number of copies Contractor requires, plus two copies Engineer will retain.

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

D. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

E. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 017000 - Execution and Closeout Requirements.
1.7 SHOP DRAWINGS

A. Shop Drawings: Action Submittal: Submit to Architect/Engineer for assessing conformance with information given and design concept expressed in Contract Documents.

B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. When required by individual Specification Sections, provide Shop Drawings signed and sealed by a professional Engineer responsible for designing components shown on Shop Drawings.
   1. Include signed and sealed calculations to support design.
   2. Submit Shop Drawings and calculations in form suitable for submission to and approval by authorities having jurisdiction.
   3. Make revisions and provide additional information when required by authorities having jurisdiction.

D. Submit number of opaque reproductions Contractor requires, plus two copies Engineer will retain.

E. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 017000 - Execution and Closeout Requirements.

1.8 SAMPLES

A. Samples: Action Submittal: Submit to Engineer for assessing conformance with information given and design concept expressed in Contract Documents.

B. Samples for Selection as Specified in Product Sections:
   1. Submit to Architect/Engineer for aesthetic, color, and finish selection.
   2. Submit Samples of finishes, textures, and patterns for Engineer selection.

C. Submit Samples to illustrate functional and aesthetic characteristics of products, with integral parts and attachment devices. Coordinate Sample submittals for interfacing work.

D. Include identification on each Sample, with full Project information.

E. Submit number of Samples specified in individual Specification Sections; Engineer will retain one Sample.

F. Reviewed Samples that may be used in the Work are indicated in individual Specification Sections.

G. Samples will not be used for testing purposes unless specifically stated in Specification Section.

H. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 017000 - Execution and Closeout Requirements.

1.9 OTHER SUBMITTALS

A. Closeout Submittals: Comply with Section 017000 - Execution and Closeout Requirements.

B. Informational Submittal: Submit data for Engineer's knowledge as Contract administrator or for Owner.

C. Submit information for assessing conformance with information given and design concept expressed in Contract Documents.
1.10 TEST REPORTS

A. Informational Submittal: Submit reports for Architect/Engineer's knowledge as Contract administrator or for Owner.

B. Submit test reports for information assessing conformance with information given and design concept expressed in Contract Documents.

1.11 CERTIFICATES

A. Informational Submittal: Submit certification by manufacturer, installation/application Subcontractor, or Contractor to Architect/Engineer, in quantities specified for Product Data.

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

C. Certificates may be recent or previous test results on material or product but must be acceptable to Architect/Engineer.

1.12 MANUFACTURER'S INSTRUCTIONS

A. Informational Submittal: Submit manufacturer's installation instructions for Architect/Engineer's knowledge as Contract administrator or for Owner.

B. Submit printed instructions for delivery, storage, assembly, installation, startup, adjusting, and finishing, to Architect/Engineer in quantities specified for Product Data.

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

1.13 MANUFACTURER'S FIELD REPORTS

A. Informational Submittal: Submit reports for Engineer's knowledge as Contract administrator or for Owner.

B. Submit report within 5 days of observation to Engineer for information.

C. Submit reports for information assessing conformance with information given and design concept expressed in Contract Documents.

1.14 ERECTION DRAWINGS

A. Informational Submittal: Submit Drawings for Architect/Engineer's knowledge as Contract administrator or for Owner.

B. Submit Drawings for information assessing conformance with information given and design concept expressed in Contract Documents.

C. Data indicating inappropriate or unacceptable Work may be subject to action by Architect/Engineer or Owner.

1.15 CONTRACTOR REVIEW

A. Review for compliance with Contract Documents and approve submittals before transmitting to Engineer.
B. Contractor: Responsible for:
1. Determination and verification of materials including manufacturer's catalog numbers.
2. Determination and verification of field measurements and field construction criteria.
3. Checking and coordinating information in submittal with requirements of Work and of Contract Documents.
4. Determination of accuracy and completeness of dimensions and quantities.
5. Confirmation and coordination of dimensions and field conditions at Site.
6. Construction means, techniques, sequences, and procedures.
7. Safety precautions.
8. Coordination and performance of Work of all trades.

C. Stamp, sign or initial, and date each submittal to certify compliance with requirements of Contract Documents.

D. Do not fabricate products or begin Work for which submittals are required until approved submittals have been received from Architect/Engineer.

1.16 ENGINEER REVIEW

A. Do not make "mass submittals" to Engineer. "Mass submittals" are defined as six or more submittals or items in one day or 15 or more submittals or items in one week. If "mass submittals" are received, Engineer's review time stated above will be extended as necessary to perform proper review. Engineer will review "mass submittals" based on priority determined by Engineer after consultation with Owner and Contractor.

B. Informational submittals and other similar data are for Architect/Engineer's information, do not require Engineer's responsive action, and will not be reviewed or returned with comment.

C. Submittals made by Contractor that are not required by Contract Documents may be returned without action.

D. Submittal approval does not authorize changes to Contract requirements unless accompanied by Change Order.

E. Owner may withhold monies due to Contractor to cover additional costs beyond the second submittal review.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION
SECTION 014000
QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Quality control.
B. Tolerances.
C. References.
D. Labeling.
E. Manufacturers' field services.

1.2 QUALITY CONTROL

A. Monitor quality control over suppliers, manufacturers, products, services, Site conditions, and workmanship, to produce Work of specified quality.

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

C. Perform Work using persons qualified to produce required and specified quality.

D. Products, materials, and equipment may be subject to inspection by Engineer at place of manufacture or fabrication. Such inspections shall not relieve Contractor of complying with requirements of Contract Documents.

E. Supervise performance of Work in such manner and by such means to ensure that Work, whether completed or in progress, will not be subjected to harmful, dangerous, damaging, or otherwise deleterious exposure during construction period.

1.3 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' recommended tolerances and tolerance requirements in reference standards. When such tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.
1.4 REFERENCES

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

B. Conform to reference standard by date of issue current as of date of Contract Documents except where specific date is established by code.

C. Obtain copies of standards and maintain on Site when required by product Specification Sections.

D. When requirements of indicated reference standards conflict with Contract Documents, request clarification from Engineer before proceeding.

E. Neither contractual relationships, duties, or responsibilities of parties in Contract nor those of Engineer shall be altered from Contract Documents by mention or inference in reference documents.

1.5 LABELING

A. Attach label from agency approved by authorities having jurisdiction for products, assemblies, and systems required to be labeled by applicable code.

B. Label Information: Include manufacturer's or fabricator's identification, approved agency identification, and the following information, as applicable, on each label:
   1. Model number.
   2. Serial number.
   3. Performance characteristics.

C. Manufacturer's Nameplates, Trademarks, Logos, and Other Identifying Marks on Products: Not allowed on surfaces exposed to view in public areas, interior or exterior.

1.6 MANUFACTURER'S FIELD SERVICES

A. When specified in individual Specification Sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe Site conditions, conditions of surfaces and installation, quality of workmanship, startup of equipment, testing, adjusting, and balancing of equipment as applicable, and to initiate instructions when necessary.

B. Submit qualifications of observer to Engineer 30 days in advance of required observations. Observer is subject to approval of Engineer.

C. Report observations and Site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturer's written instructions.

D. Refer to Section 01 33 00 - Submittal Procedures, "Manufacturer's Field Reports" Article.
PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION
SECTION 014500
TESTING AND PROCESS CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. This section defines the responsibility of the Contractor and the Engineer to adequately test native materials and construction materials, and to furnish the Engineer with manufacturer's certifications of material quality.

1.02 QUALITY ASSURANCE
   A. The Contractor shall be responsible for all sampling, delivery of samples to a qualified testing agency, testing, and delivery of test results or materials certifications to Engineer at no charge to the Engineer. Testing and certifications reports shall be approved by the Engineer as to conformance to Engineer standard specifications prior to final inspection and/or acceptance by the Engineer of any materials or workmanship.

1.03 SUBMITTALS
   A. Field Test Report: When possible submit original report immediately to Engineer or inspector, but in no case later than end of current day.
   B. Laboratory Test Report: Submit original report to Engineer within 48 hours after test results are determined.

PART 2 EXECUTION

2.01 SAMPLING
   A. Sampling of materials shall be as specified in each test.
   B. The Engineer may require that sampling be performed in their presence, in which case the Developer or Contractor shall be notified of this requirement in writing at the time the building permit is issued, or at the preconstruction meeting, or when construction drawings are released by the Engineer for construction, as applicable.
   C. The presence of the Engineer shall not relieve the Developer/Contractor of any requirement in Section 014500.
   D. Each sample or test shall be accompanied by the following written data, which shall be reported to the Engineer with test results:
      1. Name of Project
      2. Name of Contractor
      3. Project Street Address
      4. Appropriate Test Name
      5. Date of Sampling
6. Sample Number (if more than one sample per day)
7. Name of technician who performed the testing
8. Location of sample

2.02 TESTING AGENCY

A. All materials testing, whether in a laboratory or in the field, shall be conducted by a testing agency approved by Engineer.

2.03 SOIL CLASSIFICATION TEST

A. The soil classification test shall be conducted to determine the suitability of native soils for road subbase and building foundations.
B. The soil classification test shall conform to AASHTO M-146 of latest revision.
C. The soil shall be classified according to AASHTO soil classifications.
D. One soil classification test shall be required for each test area. A test area shall be limited to one parcel of one soil type, a maximum 1,000 feet long and maximum 5 acres.
E. In test areas of less than 2 acres, the Engineer may waive this requirement.
F. The soil sample shall be taken from a test area at a minimum depth of 24 inches below the future design grades, of native soil, and shall be free from foreign material, asphalt, concrete, ice or manmade materials.
G. Where deep footings or pile foundations are proposed, soil classification tests at several depths may be required in each test area.

2.04 COMPACTION TEST OF SOIL AND UNTREATED BASE COURSE

A. Laboratory tests to establish maximum laboratory density shall be determined in accordance with AASHTO T-180, Method D for A-1 classification soils and AASHTO T-99, Method D for all other soils.
B. Samples to determine laboratory density shall be taken from the stockpiled backfill or from the uncompacted base course in place.
C. The acceptance of soil and base course with respect to compaction, shall be based upon the average density of all density tests made in a lot.

1. Field density tests shall be as specified by AASHTO T-191 or by use of a portable nuclear density testing device. Field density tests shall be taken at a depth equal to ½ the maximum depth of the lift tested.
2. A lot shall equal the amount of soil or untreated base course compacted in each production day.
3. A test lot shall be divided into sublots and one density test shall be taken within each sublot.
4. The location of sampling sites within the sublot shall be chosen on a random basis by use of a suitable random number table.
5. Each test lot shall have a minimum of two (2) sublots. A sublot shall be no larger than 1,000 cubic yards for embankment, no larger than 200 cubic yards for backfill over pipe or against structures and no larger 1,000 cubic yards for untreated road base.

D. The test results of all samples tested shall be reported to the Engineer. A test lot shall be accepted when the average of the density determinations is not less than the density required for that improvement in these specifications and when no one density determination is less than 95% of the density required by these specifications.

2.05 GRADATION TEST OF UNTREATED BASE COURSE

A. The gradation of untreated base course shall be determined in accordance with AASHTO T-27.

B. The total amount of material passing the No. 200 sieve shall be determined by washing in water in accordance with AASHTO T-11.

C. The acceptance of road base with respect to gradation shall be based upon the average of all determinations in a lot. A lot shall be limited to one source of borrow and limited to one subdivision plat or one development. One sample shall be required for each 1,000 tons of untreated base course in a test lot. When the test lot is less than 100 tons, the requirement for the gradation test may be waived by the Engineer.

D. The location of sampling sites within a test lot shall be chosen on a random basis by a suitable random number table.

E. All material not conforming to the specified gradations may be rejected at the Contractor’s expense

2.06 EXTRACTION - GRADATION TESTING OF BITUMINOUS SURFACE COURSE

A. Samples of the bituminous surface course or asphalt concrete shall be tested with respect to gradation and bitumen content in accordance with Utah Department of Highways Test Procedure 8-946 and 8-947 if required by the Engineer.

B. Mix design shall be submitted to the Engineer for approval 5 days before work is to begin.

C. Acceptance of bituminous surface course with respect to gradation and bitumen content shall be based upon the average of the determinations made in a lot.

1. A lot shall equal the amount of bituminous surface course placed in each production day.

2. When a lot exceeds 1,000 tons, a minimum of three (3) samples shall be taken in each lot.

3. When a lot is 1,000 tons or less, a minimum of two (2) samples shall be taken.

4. Samples shall be taken at the time of lay-down of bituminous surface course and before compaction. Samples shall be taken from the mat behind the lay-down machine.

5. Sampling shall be timed to represent the entire production day. The time of day, date of sample, station and offset location shall be clearly marked with the sample.

6. If the average oil is less than 2.5% of optimal content, the Contractor may be required to lay an additional lift or slurry seal, based on the Engineer’s recommendation.

2.07 COMPACTION TESTING OF BITUMINOUS SURFACE COURSE

A. Laboratory tests to establish the maximum laboratory density of bituminous surface course shall be determined by the "Marshall Test" in accordance to ASTM D-1559.
B. Samples to determine maximum laboratory density shall be taken at the time of lay-down of bituminous surface course and before compaction.

C. Acceptance of bituminous surface course with respect to compaction shall be based upon the average determination of field density tests made in a lot.
   1. Field density tests shall be by a portable nuclear density testing device or by laboratory density analysis of core samples.
   2. A test lot shall be the quantity of surface course placed and compacted in each construction day.
   3. The test lot shall be subdivided into sublot(s) of approximately equal size and no larger than 1,600 square yards in area.
   4. One field density test shall be taken in each sublot, randomly located in the test lot by use of a suitable random number table.

D. The test lot shall be accepted with respect to density when the average of all density determinations is not less than the density required by Section 025040 Hot Mix Asphalt.

E. Core Tests
   1. Acceptance of the completed bituminous surface course with respect to thickness shall be based on the average thickness of a test lot.
      a. A test lot shall equal approximately 4,000 square yards of completed roadway.
      b. A lot shall be divided into sublots of approximately 2,000 square yards.
   2. One thickness test, randomly selected by use of a random number table, shall be taken within each sublot. A minimum of three core tests will be taken.
   3. A lot shall be accepted when the average thickness of all sublots is not less than 3/8 inch the total designated bituminous surface course thickness and when no individual sublot shows a deficient thickness of more than ½ inch.
   4. Lots or sublots that are not acceptable because of deficient thickness shall be brought into compliance by placing additional surface course as directed by the Engineer.
   5. The removed core will be replaced with low strength concrete.

2.08 COMPRRESSIVE STRENGTH TESTING OF CONCRETE CYLINDERS

A. Samples of concrete shall be taken at the construction site, molded in standard cylinder shapes, allowed to cure, and tested with respect to comprehensive strength when required by the Engineer.

B. All samples of concrete shall be taken in conformance to AASHTO T-141 of the latest revision.

C. Acceptance of concrete with respect to compressive strength shall be based upon the average determination of all "strength tests" made in a lot.
   1. A test lot shall be the quantity of concrete placed at one job in a construction day.
   2. For each 50 cubic yards of concrete in a test lot, three (3) compressive "strength tests" shall be run, except that for lots of less than 5 cubic yards, the number of "strength tests" per lot shall be the average strength of three standard cylinders.
3. The making, curing and compressive strength testing of concrete cylinders shall conform to AASHTO T-22 and AASHTO T-23.

D. Concrete may be rejected, if desired strengths are not obtained, at the Contractor’s expense.

2.9 ADDITIONAL CONCRETE TESTING

A. Slump Test: Determine slump in accordance with ASTM C 231.

B. Air Test: Determine normal weight concrete air content; ASTM C 231 and light weight concrete air content; ASTM C 173.

C. When requested by Engineer, test concrete in place by impact hammer, sonoscope, or other nondestructive device:
   1. To determine relative strengths in various locations in Work.
   2. To aid in evaluating concrete strength.
   3. To select areas to be cored.

2.10 CERTIFICATIONS FOR WATER SYSTEM VALVES

A. In certain water system equipment, steel items and pipe listed below, a manufacturer’s certificate shall be furnished with each unit of equipment, certifying conformance to the applicable requirements of Standard Specifications:
   1. Gate Valves
   2. Butterfly Valves
   3. Steel Reinforcing Bars
   4. Structural Steel
   5. Corrugated Metal Pipe
   6. Polyvinyl Chloride Pipe
   7. ABS Composite (Truss) and Solid Wall Pipe

2.11 SUMMARY TABLE OF TESTS AND CERTIFICATIONS

A. The following is a summary of the tests, number of samples per test and certificates that are required for construction work. This summary is provided as a reference guide. For details governing each item, refer to the appropriate test specification herein.

<table>
<thead>
<tr>
<th>Test Subject</th>
<th>Specific Test</th>
<th>Number of Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil Classification</td>
<td>AASHTO M-145</td>
<td>1 test per test area of uniform soil type and 5 acres maximum.</td>
</tr>
<tr>
<td>Test Subject</td>
<td>Specific Test</td>
<td>Number of Tests</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>------------------------------------------------------</td>
</tr>
<tr>
<td>Compaction of Soil &amp; Base Course</td>
<td>Lab Density- AASHTO T-99 Method D или AASHTO T-180 Method D</td>
<td>As needed to establish laboratory density</td>
</tr>
<tr>
<td></td>
<td>Embankment &amp; Base Course Field Density- Portable Nuclear Equipment or AASHTO T-191</td>
<td>1 test plus minimum one test per 1,000 cu.yds.</td>
</tr>
<tr>
<td></td>
<td>Backfill Field Density- Portable Nuclear Equipment or AASHTO T-191</td>
<td>1 test plus minimum one test per 200 cu.yds.</td>
</tr>
<tr>
<td>Base Course Gradation</td>
<td>Sieve Analysis- AASHTO T-27 Passing No. 200 Sieve- AASHTO T-11</td>
<td>1 test per 1,000 tons</td>
</tr>
<tr>
<td>Extraction-Gradation Test of</td>
<td>UDOT Test Procedure 8-946 &amp; 8-947</td>
<td>3 tests per pavement construction day</td>
</tr>
<tr>
<td>Bituminous Surface Course</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compaction of Bituminous Surface Course</td>
<td>Lab Density- Marshall Test, ASTM D-1559 Field Density- Portable Nuclear Equipment</td>
<td>1 test per pavement construction day</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 test per 1600 square yards subplot</td>
</tr>
<tr>
<td>Core Tests</td>
<td>4&quot; Core Sample</td>
<td>1 thickness test per 2,000 square yards or 3 test minimum</td>
</tr>
<tr>
<td>Concrete Test Cylinders</td>
<td>AASHTO T-23</td>
<td>3 cylinders per 50 cubic yards or minimum of 3 cylinders on placements less than 50 cubic yards</td>
</tr>
<tr>
<td>Pressure Reducing &amp; Regulating Valves</td>
<td>Manufacturer's Certificate</td>
<td>1 for each valve</td>
</tr>
<tr>
<td>Gate Valve</td>
<td>Manufacturer's Certificate</td>
<td>1 for each valve over 12&quot; diameter</td>
</tr>
<tr>
<td>Butterfly Valves</td>
<td>Manufacturer's Certificate</td>
<td>1 for each valve</td>
</tr>
<tr>
<td>Steel Re-Bar</td>
<td>Manufacturer's Certificate</td>
<td>1 for each 1,000 pounds of one grade</td>
</tr>
<tr>
<td>Structural Steel</td>
<td>Manufacturer's Certificate</td>
<td>1 for each lot of one shape, one grade</td>
</tr>
<tr>
<td>Corrugated Metal Pipe</td>
<td>Manufacturer's Certificate</td>
<td>1 for each 500 lineal feet of one size, one class</td>
</tr>
<tr>
<td>Polyvinyl Chloride Pipe</td>
<td>Manufacturer's Certificate</td>
<td>1 for each 500 lineal feet of one size, one class</td>
</tr>
<tr>
<td>A.B.S. Pipe</td>
<td>Manufacturer's Certificate</td>
<td>1 for each 500 lineal feet of one size, one class</td>
</tr>
</tbody>
</table>

PART 3 EXECUTION

Not Used.

END OF SECTION
SECTION 015000
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Temporary Utilities:
   1. Temporary electricity.
   2. Temporary heating.
   3. Temporary ventilation.
   4. Communication services.
   5. Temporary water service.
   6. Temporary sanitary facilities.

B. Construction Facilities:
   1. Vehicular access.
   2. Parking.
   3. Progress cleaning and waste removal.

C. Temporary Controls:
   2. Water control.
   3. Dust control.
   4. Erosion and sediment control.
   5. Noise control.

D. Removal of utilities, facilities, and controls.

1.2 REFERENCES

A. ASTM International:

1.3 TEMPORARY ELECTRICITY

A. Provide and pay for power service required from local source as needed for construction operation.

B. Provide temporary electric feeder from electrical service at location as approved by Engineer. Do not disrupt Owner's use of service.

1.4 TEMPORARY HEATING

A. Provide and pay for heating devices and heat as needed to maintain specified conditions for construction operations.
B. Before operating permanent equipment for temporary heating purposes, verify installation is approved for operation, equipment is lubricated, and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts. Replace filters at Substantial Completion.

1.5 TEMPORARY VENTILATION

A. Ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

1.6 COMMUNICATION SERVICES

A. Telephone Service: Provide, maintain, and pay for telephone service to field office at time of Project mobilization and until completion of Work.

B. Facsimile Service: Provide, maintain, and pay for facsimile service to field office at time of Project mobilization and until completion of Work.

C. Internet Service: Provide, maintain, and pay for broadband Internet service to field office at time of Project mobilization. Provide desktop computer with Microsoft operating system and appropriate office function software, modem, and printer.

1.7 TEMPORARY WATER SERVICE

A. Provide suitable quality water service as needed to maintain specified conditions for construction operations.

1.8 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Existing facility use is not permitted. Provide facilities at time of Project mobilization.

1.9 VEHICULAR ACCESS

A. Construct temporary all-weather access roads from public thoroughfares to serve construction area, of width and load-bearing capacity to accommodate unimpeded traffic for construction purposes.

B. Construct temporary bridges and culverts to span low areas and allow unimpeded drainage.

C. Extend and relocate vehicular access as Work progress requires and provide detours as necessary for unimpeded traffic flow.

D. Locate as indicated on Drawings or as approved by Engineer.

E. Provide unimpeded access for emergency vehicles. Maintain 20’-wide driveways with turning space between and around combustible materials.

F. Provide and maintain access to fire hydrants free of obstructions.

G. Provide means of removing mud from vehicle wheels before entering streets.
1.10 PARKING

A. Arrange for or Provide temporary gravel surface parking areas to accommodate construction personnel.

B. If Site space is not adequate, provide additional off-Site parking.

C. Tracked vehicles are not allowed on paved areas.

D. Permanent Pavements and Parking Facilities:
   1. Avoid traffic loading beyond paving design capacity. Tracked vehicles are not allowed.

E. Maintenance:
   1. Maintain traffic and parking areas in sound condition free of excavated material, construction equipment, products, mud, snow, ice, and the like.
   2. Maintain existing paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original condition.

F. Removal, Repair:
   1. Remove temporary materials and construction at Substantial Completion.
   2. Repair existing facilities damaged by use, to original condition.

G. Mud from Site vehicles: Provide means of removing mud from vehicle wheels before entering streets.

1.11 PROGRESS CLEANING AND WASTE REMOVAL

A. Maintain areas free of waste materials, debris, and rubbish. Maintain Site in clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, before enclosing spaces.

C. Broom and vacuum clean interior areas before starting surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and rubbish from Site periodically and dispose of off-Site.

E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.12 FIRE-PREVENTION FACILITIES

A. Portable Fire Extinguishers: NFPA 10; 10-pound capacity, 4A-60B: C UL rating.
   1. Provide minimum of one fire extinguisher in every construction trailer and storage shed.

1.13 SECURITY

A. Security Program:
   1. Protect Work from theft, vandalism, and unauthorized entry.
   2. Initiate program at Project mobilization.
   3. Maintain program throughout construction period until Engineer.

1.14 WATER CONTROL

A. Grade Site to drain. Maintain excavations free of water. Provide, operate, and maintain necessary pumping equipment.
B. Protect Site from puddles or running water. Provide water barriers as required to protect Site from soil erosion.

1.15 DUST CONTROL

A. Execute Work by methods that minimize raising dust from construction operations.

B. Provide positive means to prevent airborne dust from dispersing into atmosphere.

1.16 EROSION AND SEDIMENT CONTROL

A. Plan and execute construction by methods to control surface drainage from cuts and fills from borrow and waste disposal areas. Prevent erosion and sedimentation.

B. Minimize surface area of bare soil exposed at one time.

C. Provide temporary measures including berms, dikes, drains, and other devices to prevent water flow.

D. Construct fill and waste areas by selective placement to avoid erosive surface silts and clays.

E. Periodically inspect earthwork to detect evidence of erosion and sedimentation. Promptly apply corrective measures.

F. Comply with sediment and erosion control plan if indicated on Drawings.

1.17 NOISE CONTROL

A. Provide methods, means, and facilities to minimize noise produced by construction operations.

1.18 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, and materials before Substantial Completion inspection.

B. Clean and repair damage caused by installation or use of temporary Work.

C. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION
PART 1 GENERAL

1.01 DESCRIPTION

This Section describes procedures for traffic regulation during construction of the Project.

1.02 SUBMITTALS

A. Submit traffic control plan in accordance with the Supplemental General Conditions and UDOT State Specifications. The traffic control concept shown on the plans is for bidding purposes and is intended to serve as a guideline only. The Contractor shall be responsible for the preparation and adequacy of any traffic control plan utilized, including this suggested plan, and shall submit the final traffic control plan (prepared, signed and sealed by a Utah licensed professional engineer) in drawing form to the Engineer.

B. Submit to the Engineer a detailed signing and traffic detouring plan in drawing form for each phase for approval. Post detour routes to provide clear guidance to traffic as approved by the Engineer.

1.03 GENERAL

A. Control traffic at those locations indicated and in conformance with the Plans and as approved by the Engineer.

B. Furnish, install, construct, maintain, and remove detours, road closures, lights, temporary signals, signs, barricades, K-rail, fences, flares, miscellaneous traffic devices, flagmen, drainage facilities, paving, and such other items and services as are necessary to adequately safeguard the public from hazard and inconvenience. All such work shall comply with the ordinances, directives, and regulations of authorities with jurisdiction over the public roads in which the construction takes place and over which detoured traffic is routed by the Contractor.

C. After devices have been installed, maintain and keep them in good repair and working order until no longer required. Replace such devices that are lost or damaged, to such an extent as to require replacement, regardless of the cause of such loss or damage.

D. Prior to the start of construction operations, notify the Engineer and Bluffdale City police and fire departments in whose jurisdiction the project lies, giving the expected starting date, completion date, and the name and telephone number of a responsible person who may be contacted at any hour in the event of a condition requiring immediate correction.

1.04 TRAFFIC CONTROL DEVICES AND SIGNS

A. Construction signing, striping, barricades, and other traffic control devices used for handling traffic and public convenience shall conform to the latest edition of the Federal Highway Administration "Manual on Uniform Traffic Control Devices for Streets and Highways" (MUTCD).
B. Signs shall be reflectorized when they are used during hours of darkness. Provide cones, pylons, barricades, or posts used in the diversion of traffic with flashers or other illumination if in place during hours of darkness.

C. Maintain a 24-hour emergency service to remove, install, relocate, and maintain warning devices and furnish to the authority having jurisdiction names and telephone numbers of three persons responsible for this emergency service. In the event these persons do not promptly respond or the authority having jurisdiction deems it necessary to call out other forces to accomplish emergency service, the Contractor will be held responsible for the cost of such emergency service.

D. During the duration of a detour, cover all signs not in accordance with the traffic control plan. Relocate existing signs to provide visibility from all relocated traffic lanes.

E. Temporary traffic striping, where used, shall be removable pavement marking tape. Pavement markings shall be white or yellow, weather and traffic resistant reflective film on conformable backing and pre-coated with a pressure-sensitive adhesive that does not require an activation process.

F. Temporary pavement markings shall conform to the following minimum reflective values as specified. Express reflective values as candlepower per foot candle per square foot measured on a 1 foot by 2 foot (0.3 m by 0.6 m) panel at 86 degrees incidence.

<table>
<thead>
<tr>
<th>Divergence Angle</th>
<th>White</th>
<th>Yellow</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2°</td>
<td>0.20</td>
<td>0.18</td>
</tr>
<tr>
<td>0.5°</td>
<td>0.18</td>
<td>0.16</td>
</tr>
</tbody>
</table>

G. Supply striping tape in rolls ready for application. Use pavement message tape 20 to 30 mils (0.5 to 0.7 mm) thick, that does not shrink or release prematurely, and that has an easily removable liner.

H. At the end of each workday, place temporary pavement markers on any roadway surfaces open to traffic. Apply pavement markers to a clean and dry surface during daylight hours. During winter shut-down, place permanent paint striping and pavement messages.

I. Press the tape into the surface until it adheres to the pavement surface.

1.05 VEHICULAR TRAFFIC CONTROL

Reduce speed limit through the construction zone to 25 mph (40 km/hr) and post accordingly.

Traffic lane transitions from permanent lanes to construction zone patterns shall be transitioned in accordance with the requirements for the normal posted speed limit and as shown on the plans.

Where traffic is directed around or adjacent to the construction area, the contractor shall provide, install, maintain, and remove delineators, barricades, lights, signs, and other devices required for the control of traffic as required by UDOT traffic regulations and said "Manual on Uniform Traffic Control Devices". The Engineer shall have the right to relocate or direct the Contractor to relocate traffic control devices.

All roadways and sidewalks shall be returned to unrestricted vehicle and pedestrian usage when construction is not underway. Truck operations in and out of construction and staging areas shall be controlled by flagmen at all times.
A. The maximum delay to the public due to Contractor construction activities is four hours.

B. Construction in Intersections: The Contractor shall maintain one lane of traffic through the construction area at all times, or single blocks shall be closed at a time if suitable detours can be made. Access to residences shall be made at the conclusion of the day’s work.

1.06 ACCESS TO ADJACENT PROPERTIES

A. General: Maintain reasonable access to all adjacent properties at all times during construction. Prior to restricting normal access from public streets to adjacent properties, notify each property owner or responsible person, informing him of the nature of the access restriction, the approximate duration of the restriction, and the best alternate access route for that particular property.

1.07 CONSTRUCTION PARKING CONTROL

A. Control vehicular parking. Do not interfere with public traffic or parking, access by emergency vehicles, Owner’s operations, or construction operations.

B. Monitor parking of private vehicles.

1. Maintain free vehicular access to and through parking areas.

2. Prohibit parking on or adjacent to access roads, or in non-designated areas.

3. Maintain fire and emergency vehicle access.

END OF SECTION
SECTION 016000
MATERIAL AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Products.
B. Transportation and handling.
C. Storage and protection.
D. Product options.
E. Substitutions.

1.02 RELATED SECTIONS

A. GENERAL CONDITIONS - Section 7 – Substitutions
B. SECTION 012500 - Substitution Procedures

1.03 PRODUCTS

A. Provide interchangeable components of the same manufacture for components being replaced.

1.04 TRANSPORTATION AND HANDLING

A. Transport and handle Products in accordance with manufacturer's instructions.
B. Promptly inspect shipments to ensure that Products comply with requirements, quantities are correct, and Products are undamaged.
C. Provide equipment and personnel to handle Products by methods to prevent soiling, disfigurement, or damage.

1.05 STORAGE AND PROTECTION

A. Store and protect Products in accordance with manufacturers' instructions.
B. Store with seals and labels intact and legible.
C. Store sensitive Products in weather tight, climate controlled, enclosures in an environment favorable to Product.
D. For exterior storage of fabricated Products, place on sloped supports above ground.
E. Cover Products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of Products.

F. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

G. Provide equipment and personnel to store Products by methods to prevent soiling, disfigurement, or damage.

H. Arrange storage of Products to permit access for inspection. Periodically inspect to verify Products are undamaged and are maintained in acceptable condition.

1.06 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Any Product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Products of manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named in accordance with the following article.

1.07 SUBSTITUTIONS

A. Instructions to Bidders specify time restrictions for submitting requests for Substitutions during the bidding period to requirements specified in this section.

B. Substitutions may be considered when a Product becomes unavailable through no fault of the Contractor.

C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.

D. A request constitutes a representation that the Bidder or Contractor:

1. Has investigated proposed Product and determined that it meets or exceeds the quality level of the specified Product.

2. Will provide the same warranty for the Substitution as for the specified Product.

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.

4. Waives claims for additional costs or time extension which may subsequently become apparent.

5. Will reimburse Owner and Engineer for review or redesign services associated with re-approval by authorities.
E. 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.

F. Substitution Submittal Procedure:

1. Submit a pdf of request for Substitution for consideration. Limit each request to one proposed Substitution.

2. Submit shop drawings, product data, and certified test results attesting to the proposed Product equivalence. Burden of proof is on proposer.

3. The Engineer will notify Contractor in writing of decision to accept or reject request.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION
SECTION 017000
EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES
   A. Field engineering.
   B. Closeout procedures.
   C. Project record documents.
   D. Examination.
   E. Final cleaning.

1.2 FIELD ENGINEERING
   A. Owner will locate and Contractor shall protect survey control and reference points. Promptly notify
      Engineer of discrepancies discovered.
   B. Control datum for survey is indicated on Drawings.
   C. Verify setbacks and easements; confirm Drawing dimensions and elevations.
   D. Protect survey control points prior to starting Site Work; preserve permanent reference points during
      construction.
   E. Promptly report to Engineer loss or destruction of reference point or relocation required because of changes
      in grades or other reasons.
   F. Replace dislocated survey control points based on original survey control. Make no changes without prior
      written notice to Engineer.

1.3 CLOSEOUT PROCEDURES
   A. Prerequisites to Substantial Completion: Complete following items before requesting Certification of
      Substantial Completion, either for entire Work or for portions of Work:
      1. Submit maintenance manuals, Project record documents, and other similar final record data in
         compliance with this Section.
      2. Complete facility startup, testing, adjusting, balancing of systems and equipment, demonstrations, and
         instructions to Owner's operating and maintenance personnel as specified in compliance with this
         Section.
      3. Conduct inspection to establish basis for request that Work is substantially complete. Create
         comprehensive list (initial punch list) indicating items to be completed or corrected, value of
         incomplete or nonconforming Work, reason for being incomplete, and date of anticipated completion
         for each item. Include copy of list with request for Certificate of Substantial Completion.
4. Obtain and submit releases enabling Owner's full, unrestricted use of Project and access to services and utilities. Include certificate of occupancy, operating certificates, and similar releases from authorities having jurisdiction and utility companies.

5. Deliver tools, spare parts, extra stocks of material, and similar physical items to Owner.

6. Make final change-over of locks and transmit keys directly to Owner. Advise Owner's personnel of change-over in security provisions.

7. Discontinue or change over and remove temporary facilities and services from Project Site, along with construction tools, mockups, and similar elements.

8. Perform final cleaning according to this Section.

B. Substantial Completion Inspection:

1. When Contractor considers Work to be substantially complete, submit to Engineer:
   a. Written certificate that Work, or designated portion, is substantially complete.
   b. List of items to be completed or corrected (initial punch list).

2. Within seven days after receipt of request for Substantial Completion, Engineer will make inspection to determine whether Work or designated portion is substantially complete.

3. Should Engineer determine that Work is not substantially complete:
   a. Engineer will promptly notify Contractor stating reasons in writing.
   b. Contractor shall remedy deficiencies in Work and send second written request for Substantial Completion to Engineer.
   c. Redo and Inspection of Deficient Work: Repeated until Work passes Engineer's inspection.

4. When Engineer finds that Work is substantially complete, Engineer will:
   a. Prepare Certificate of Substantial Completion, accompanied by Contractor's list of items to be completed or corrected as verified and amended by Engineer and Owner final punch list.
   b. Submit Certificate to Owner and Contractor for their written acceptance of responsibilities assigned to them in Certificate.

5. After Work is substantially complete, Contractor shall:
   a. Allow Owner occupancy of Project under provisions stated in Certificate of Substantial Completion.
   b. Complete Work listed for completion or correction within time period stipulated.

C. Prerequisites for Final Completion: Complete following items before requesting final acceptance and final payment.

1. When Contractor considers Work to be complete, submit written certification that:
   a. Contract Documents have been reviewed.
   b. Work has been examined for compliance with Contract Documents.
   c. Work has been completed according to Contract Documents.
   d. Work is completed and ready for final inspection.

2. Submittals: Submit following:
   a. Final punch list indicating all items have been completed or corrected.
   b. Final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
   c. Specified warranties, workmanship/maintenance bonds, maintenance agreements, and other similar documents.
   d. Accounting statement for final changes to Contract Sum.

3. Perform final cleaning for Contractor-soiled areas according to this Section.

D. Final Completion Inspection:

1. Within seven days after receipt of request for final inspection, Engineer will make inspection to determine whether Work or designated portion is complete.

2. Should Engineer consider Work to be incomplete or defective:
1. Engineer will promptly notify Contractor in writing, listing incomplete or defective Work.

b. Contractor shall remedy stated deficiencies and send second written request to Engineer that Work is complete.

c. Engineer will reinspect Work.

d. Redo and Inspection of Deficient Work: Repeated until Work passes Engineer inspection.

1.4 PROJECT RECORD DOCUMENTS

A. Maintain on Site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other modifications to the Contract.
   5. Reviewed Shop Drawings, product data, and Samples.
   6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress, not less than weekly.

E. Specifications: Legibly mark and record, at each product Section, description of actual products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates used.
   3. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction as follows:
   1. Include Contract modifications such as Addenda, supplementary instructions, change directives, field orders, minor changes in the Work, and change orders.
   2. Include locations of concealed elements of the Work.
   3. Identify depth of buried utility lines and provide dimensions showing distances from permanent facility components that are parallel to utilities.
   4. Dimension ends, corners, and junctions of buried utilities to permanent facility components using triangulation.
   5. Identify and locate existing buried or concealed items encountered during Project.
   7. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   8. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
   10. Details not on original Drawings.

G. Submit marked-up paper copy documents to Engineer before Substantial Completion.

H. Submit PDF electronic files of marked-up documents to Engineer before Substantial Completion.
PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.1 EXAMINATION

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

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

C. Examine and verify specific conditions described in individual Specification Sections.

D. Verify that utility services are available with correct characteristics and in correct locations.

3.2 FINAL CLEANING

A. Execute final cleaning prior to final Project assessment.

B. Remove waste and surplus materials, rubbish, and construction facilities from Site.

END OF SECTION
SECTION 024113
SITE DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Remove site structural and site utility and dispose of them off site.
B. Salvage

1.02 REFERENCES
A. APWA 02 41 13: Selective Site Demolition
B. APWA 02 41 19: Selective Building Demolition
C. APWA 02 41 14: Pavement Removal
D. UDOT 2012 Standard Specifications for Road and Bridge Construction: Section 02221 Remove Structure and Obstruction.

1.03 DEFINITIONS
A. Remove: Remove and legally dispose of items except those indicated to be reinstalled, salvaged, or to remain OWNER’s property unless indicated otherwise by ENGINEER.
B. Remove and Salvage: Items indicated to be removed and salvaged remain OWNER’s property. Remove, clean, and pack or crate items to protect against damage. Identify contents of containers and deliver to OWNER.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 PREPARATION
A. Review all work procedures with ENGINEER and with owners of any utility in the work zone.
B. Locate and preserve all utilities which are to remain in service.
C. Obtain all necessary permits for working in Railroad right-of-way.
D. Obtain all necessary permits for asbestos removal.

3.02 PROTECTION
A. Protect in place all utilities not called out for removal.
B. Protect structures to be removed and their contents from vandalism and theft.

C. Protect trees that are not called out for removal.

D. Protect all surfaces such as asphalt pavement or concrete flatwork not scheduled for removal.

E. Repair any damage to owner’s satisfaction at no additional cost to OWNER.

3.03 STRUCTURE DEMOLITION

A. Survey condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during demolition.

B. Owner assumes no responsibility for actual condition of building to be demolished.

C. Remove asbestos in accordance with all current laws and regulations.

D. Comply with laws and regulations before, during, and after demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

E. Storage or sale of removed items or materials on site will not be permitted.

F. Remove structures and incidentals such as foundations, fences, outbuildings, abandoned utilities, etc.

G. Remove foundation walls completely below finished grade or natural ground level.

H. Remove floor slab or break it into pieces no larger than three (3) feet square.

I. Backfill and compact all depressions left by building removals to finished grade.
3.04 PIPELINE DEMOLITION

A. General

1. Remove asbestos in accordance with all current laws and regulations.

2. Do not damage pipe or structures that are to remain in service or are to be salvaged for OWNER.

3. Pipe shall be completely removed to a bury depth of six (6) feet below grade.

4. Backfill and compact all depressions to finished grade.

B. Gravity Pipe Demolition

1. Plug abandoned pipe with a permanent, water tight concrete plug extending into the pipe at least two (2) feet.

2. Seal openings in walls or remaining manholes, catch basins, or structures with water-tight plugs.

3. For service line demolition or abandonment, disconnect the line from the mainline and place water tight cap on mainline.

C. Pressure Pipe Demolition

1. Coordinate work including any shutdowns with utility OWNER.

2. Plug abandoned pipe with a permanent water-tight plug.

3. Cap and restrain the active pipe with a blind flange or equivalent type of plug.

4. For service line demolition or abandonment, disconnect the line from the mainline and shut off corporation stop.

3.05 BURIED TANKS

A. Any buried tanks shall be completely removed and disposed of according to current State and Federal regulations.

B. Empty and dispose of tank contents in accordance with current laws and regulations.

C. Break down and remove tank and appurtenances completely below the subgrade surface or finished ground.

D. Break floor into pieces not over three (3) feet squared.

E. Backfill and compact all depressions to finished grade.

3.06 REMOVE ASPHALT CONCRETE PAVEMENT

A. Saw cut along edge of any pavement not called out for removal.

B. Remove and dispose of asphalt as shown in plans.
3.07 REMOVE CONCRETE FLATWORK
A. Saw cut along edge of any concrete flatwork not called out for removal.
B. Remove and dispose of concrete flatwork as shown in plans.

3.08 REMOVE FENCE
A. Remove and dispose of fence, posts, and foundations to at least two (2) feet below finished grade.
B. Backfill and compact all depressions to finished grade.

3.09 TREE REMOVAL
A. Coordinate with ENGINEER and OWNER before any tree removal.
B. Remove all trees with a circumference larger than 20 inches measured at a point 2 feet above existing grade.
   1. A tree consists of stump, root, trunk, branches and foliage.
   2. Multiple leaders rising from a common root will not be counted separately.
   3. Remove the root system to at least two (2) feet below finished ground and a two (2) foot radius around the stump.
   4. When there is no bid item for tree removal it is considered incidental to other work.
C. Trees removed with a circumference 20 inches or less measured at 2 feet above existing ground are considered incidental to other items of work.
D. Backfill and compact all depressions to finished grade.

3.10 REMOVE RAILROAD TRACK
A. Obtain all necessary permits while working in railroad right-of-way.
B. Remove all rails, ties, paving, track encasement, and other appurtenances.
C. Remove ballast where required. Coordinate with ENGINEER and OWNER. Grade ballast that isn’t removed as required.
D. Backfill and compact all depressions to finished grade.

3.11 MISCELLANEOUS DEMOLITION
A. Remove miscellaneous structures and obstructions or cover them with backfill if the result meets the following requirements:
   1. Backfill is stable
   2. Burial doesn’t interfere with construction
   3. Permission to do so is obtained from the ENGINEER.
4. No remaining portion is within five (5) feet of the final ground surface.

3.12 SALVAGE

A. Salvage designated equipment and materials for OWNER.

B. All other material becomes the property of CONTRACTOR unless such materials are not owned by owner.

END OF SECTION
SECTION 031100
CONCRETE FORMWORK

PART

1.01 SECTION INCLUDES

1.02 RELATED SECTIONS
A. Section 032000 - Concrete Reinforcement.
B. Section 033000 - Concrete Work
C. Section 033040 - Portland Cement Concrete.

1.03 REFERENCES
A. ACI 301 - Structural Concrete for Buildings.
B. ACI 318 - Building Code Requirements for Reinforced Concrete.
C. ACI 347 - Recommended Practice For Concrete Formwork.
D. PS 1 - Construction and Industrial Plywood.

1.04 DESIGN REQUIREMENTS
A. Design, engineer and construct formwork, shoring and bracing to conform to design and code requirements; resultant concrete to conform to required shape, line and dimension.

1.05 QUALITY ASSURANCE
A. Perform Work in accordance with ACI 301 standards.

1.06 REGULATORY REQUIREMENTS
A. Conform to applicable code for design, fabrication, erection and removal of formwork.
PART 2 PRODUCTS

2.01 WOOD FORM MATERIALS

A. Form Materials: At the discretion of the Contractor.

2.02 PREFABRICATED FORMS

A. Preformed Steel Forms: Minimum 16 gage matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

B. Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished concrete surfaces.

C. Void Forms: Moisture resistant treated paper faces, biodegradable, structurally sufficient to support weight of wet concrete mix until initial set; 2 inches thick.

2.03 FORMWORK ACCESSORIES

A. Form Ties: Snap-off type, galvanized metal adjustable length, with waterproofing washer, free of defects that could leave holes larger than 1 inch in concrete surface.

B. Form Release Agent: Colorless mineral oil which will not stain concrete, or absorb moisture.

C. Corners: Chamfered, 2 inch size; maximum possible lengths. Chamfer all exposed corners

D. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

E. Waterstops: Polyvinyl chloride, minimum 2,000 psi tensile strength, minimum 50 degrees F (46 degrees C) to plus 175 degrees F working temperature range, 1 inch wide, maximum possible lengths, ribbed profile, preformed corner sections, heat welded jointing.

2.04 WATERSTOP

A. Manufacturer: Greenstreak Plastic Products, Model Ribbed with Centerbulb.

B. Waterstop shall be installed in concrete joints where indicated on the Plans and on the Typical Details. Waterstop shall be polyvinyl chloride.

C. All vertical joints in waterbearing structures shall have waterstops, whether indicated on the Plans or not.

D. All waterstops shall be continuous.

E. Waterstops in the walls shall be carried into lower slabs and shall join the waterstops in the slabs with appropriate types of fittings.
F. Waterstops: Polyvinyl Chloride:

<table>
<thead>
<tr>
<th>Property</th>
<th>Test Method</th>
<th>Recommended Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Absorption</td>
<td>ASTM D 570</td>
<td>5% max</td>
</tr>
<tr>
<td>Tear Resistance</td>
<td>ASTM D 624</td>
<td>285 lbf/in</td>
</tr>
<tr>
<td>Ultimate Elongation</td>
<td>ASTM D 638</td>
<td>360%</td>
</tr>
<tr>
<td>Tensile Strength</td>
<td>ASTM D 638</td>
<td>2,000 psi min</td>
</tr>
<tr>
<td>Low Temperature Brittleness</td>
<td>ASTM D 746</td>
<td>No Failure @ -35°F/-37°C</td>
</tr>
<tr>
<td>Stiffness in Flexure</td>
<td>ASTM D 747</td>
<td>600 psi min</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>ASTM D 792</td>
<td>1.4 max</td>
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<tr>
<td>Ozone Resistance</td>
<td>ASTM D 1149</td>
<td>No failure</td>
</tr>
<tr>
<td>Volatile Loss</td>
<td>ASTM D 1203</td>
<td>0.50% max</td>
</tr>
<tr>
<td>Hardness, Shore A/15</td>
<td>ASTM D 2240</td>
<td>65 to 80</td>
</tr>
<tr>
<td>Tensile Strength After Accelerated Elongation</td>
<td>CRD-C 572</td>
<td>1,600 psi min</td>
</tr>
<tr>
<td>Elongation After Accelerated Extraction</td>
<td>CRD-C 572</td>
<td>300% min</td>
</tr>
<tr>
<td>Effect on Alkali After 7 Days</td>
<td>CRD-C 572</td>
<td>-0.1% to 0.25%</td>
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</tbody>
</table>

2.05 NEOPRENE BEARING PAD

A. Neoprene pads shall be of dimensions and hardness shown on the drawings and shall be made by approved manufacturer.

B. The material for 40 durometer neoprene pads shall conform to ASTM D-200 M2BC414A14C12F17 and the material for the 30 durometer neoprene pads shall conform to ASTM D-200 M2BC10A14C12F17.

C. Unless otherwise specified on the drawings, neoprene pads shall be 40 durometer.

2.06 CLOSED CELL NEOPRENE PAD

A. Closed cell neoprene pads, shall be used as a filler material in the flexible joints between the wall and wall-footing and between the wall and roof connection in the areas not taken up by the solid neoprene bearing pads and waterstops.

B. The material shall be medium grade closed cell neoprene conforming to 2A3 of ASTM D 1056-85.

C. Rubatex R431N or R423N, or Cypress Sponge 431N or 423N, or approved equal.
2.07 SOFT MASTIC

A. Soft mastic shall be installed in all voids and cavities around the bearing pads, waterstop and seismic cable sleeves. Such material shall be installed with a consistency that will not adversely affect the quality of pvc and neoprene materials.

B. Sikaflex 1A, or Select Seal U-230, or approved equal.

2.08 INSTALLATION OF BEARING AND FILLER PADS

A. Bearing and filler pads shall be installed as indicated on the drawings.

B. Bearing and filler pads shall be glued to the concrete with an approved rubber cement material to prevent uplift of the pads during concrete pouring. In addition, all pads shall be held down with approved plastic shim plates placed under reinforcing steel.

C. Nailing down pads will not be permitted.

D. All voids and cavities between bearing and filler pads, waterstop and seismic cable sleeves shall be filled with soft mastic.

E. Contractor’s workmanship shall be such that no cement grout or concrete seepage will occur through the bearing and filler pad area resulting in a restraint of radial wall movements.

F. A continuous neoprene pad and one or more filler pads are required between the top of the wall and the underside of the roof. Any void area between such pads shall be caulked and sealed to prevent any cement from the roof pour to come in contact with the wall top.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.02 EARTH FORMS

A. Earth forms are not permitted.

3.03 ERECTION - FORMWORK

A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.

B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.

C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

D. Align joints and make watertight. Keep form joints to a minimum.
E. Obtain approval before framing openings in structural members which are not indicated on Drawings.

F. Provide chamfer strips on external corners.

G. Install void forms in accordance with manufacturer's recommendations. Protect forms from moisture or crushing.

H. Coordinate this section with other sections of work which require attachment of components to formwork.

I. If formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement before proceeding, request instructions from Engineer.

3.04 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings which are effected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.05 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for items to be embedded in passing through concrete work.

B. Locate and set in place items which will be cast directly into concrete.

C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.

D. Install accessories in accordance with manufacturer's instructions, straight, level, and plumb. Ensure items are not disturbed during concrete placement.

E. Install waterstops in accordance with manufacturer's instructions, continuous without displacing reinforcement.

F. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.

G. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.06 FORM CLEANING

A. Clean forms as erection proceeds, to remove foreign matter within forms.

B. Clean formed cavities of debris prior to placing concrete.
C. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.

D. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.07 FORMWORK TOLERANCES
A. Construct formwork to maintain tolerances required by ACI 301.

3.08 FIELD QUALITY CONTROL
A. Section 014000 - Quality Requirements: Field inspection and testing.
B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties, and items are secure.
C. Do not reuse wood formwork more than 2 times for concrete surfaces to be exposed to view. Do not patch formwork.

3.09 FORM REMOVAL
A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads (minimum of seven days).
B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.
C. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.

END OF SECTION
SECTION 032000
CONCRETE REINFORCEMENT

PART

1.01 SECTION INCLUDES

1.02 RELATED SECTIONS

C. Section 033000 - Concrete Work

1.03 REFERENCES

G. AASHTO M 55: Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.

1.04 SUBMITTALS FOR REVIEW

and cutting schedules, and supporting and spacing devices.

1.05 QUALITY ASSURANCE

PART

2.01 REINFORCEMENT

indicated, unfinished steel shall be clean and free from rust.
D. Epoxy Coating: When epoxy coating of reinforcing is required, the coating materials and process, the fabrication, handling, and the repair of any damaged coating material that occurs during fabrication and handling shall conform to the requirements of AASHTO M 284 (ASTM D 3963).

E. Deformed Bar Anchors: Deformed bar anchors, which are welded to plates and structural shapes, shall be made from cold drawn wire conforming to requirement ASTM A496. Tensile requirement of deformed bar anchors, as determined by test of the finished anchor and shall conform to the following:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum tensile</td>
<td>80,000 psi</td>
</tr>
<tr>
<td>Minimum yield</td>
<td>70,000 psi</td>
</tr>
</tbody>
</table>

(Yield strength is determined at an extension of 0.005 inch per inch of specimen length.)

2.02 ACCESSORIES

A. Tie Wire: Minimum 16 gage annealed type.

B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions. Bar supports shall be located in accordance with CRSI Manual of Standard Practice and placed in accordance with CRSI 65. Concrete block supports shall be provided for footings and slabs or grade. Standard steel supports shall be provided for other work.

2.03 FABRICATION

A. Fabricate concrete reinforcing in accordance with ACI 318.

B. Locate reinforcing splice not indicated on drawing at points of minimum stress. Indicate locations of splices on shop drawings.

PART 3 EXECUTION

3.01 GENERAL

A. As provided in the General Conditions, the Owner is defining the quality of concrete reinforcement by specifying in this part some of the means, methods, techniques, sequences and procedures for installation of concrete reinforcement. The Contractor, without relinquishing authority and responsibility for supervision and direction of the work, agrees to follow the specified means, methods, techniques, sequences and procedures.

3.02 FABRICATION

A. Reinforcing steel shall not be bent or straightened in a manner which will injure the material. Bars with kinks or with bends not shown shall not be used. Bars shall not be welded at the bend. Tack welding of cross bars is not acceptable.
3.03 PLACEMENT
A. Place, support and secure reinforcement against displacement. Do not deviate from required position.
B. Do not displace or damage vapor barrier.
C. Accommodate placement of formed openings.
D. Maintain the distance from vertical forms and between layers of reinforcement by means of prefabricated chairs, ties, hangers, or other approved devices. Placing and fastening of reinforcement in each section of the Work must be approved by Engineer before concrete is placed.
E. Unless otherwise indicated on the Plans, reinforcement shall be placed so as to provide the thickness of protective concrete covering as indicated on the Typical Details. If not indicated on the Plans or Typical Detail protective covering shall be in accordance with ACI 318.

3.04 PLACING EMBEDDED ITEMS
A. Place all sleeves, inserts, anchors and embedded items prior to concrete placement. Fill voids in embedded items temporarily with readily removable material to prevent entry of concrete.
B. Give all trades whose work is related to the concrete section ample notice and opportunity to introduce and/or furnish embedded items before concrete placement.

3.05 SPlicing
A. Furnish all reinforcement in the full lengths indicated unless otherwise permitted. Splicing of bars, except where indicated is not permitted without written approval from Engineer. Stagger splices where possible.
B. Unless indicated otherwise, overlap reinforcing bars a minimum of 30 diameters to make the splice. In lapped splices, placed the bars and wire in such a manner as to maintain the minimum distance for clear spacing to the surface of the concrete.
C. Do not use lap splices on bars greater in diameter than No. 11.
D. Weld reinforcing steel only if indicated or if authorization is made by Engineer in writing. Weld in conformance to AWS D1.4.
E. Do not bend reinforcement after embedding in hardened concrete, unless permitted by Engineer.
F. Do not permit reinforcement or other embedded metal items bonded to the concrete to extend continuously through any expansion joint, except dowels in floors bonded on only one side of joints.

3.06 CLEANING
A. Reinforcing steel shall be cleaned of mill rust scale, dried concrete, or other coatings that may reduce bond. Reinforcement reduced in section is not acceptable. When concrete placement is delayed, reinforcement shall be cleaned by sandblasting.

END OF SECTION
SECTION 033000
CONCRETE WORK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Cast-in-place concrete placement operations for slabs on grade, slabs on fill, structural building frame, and other concrete components.

1.02 REFERENCES

A. AASHTO M-182: Standard Specification for Burlap Cloth Made from Jute or Kenaf.
B. ACI 301: Specifications for Structural Concrete for Buildings.
C. ACI 305: Hot Weather Concreting.
D. ACI 306: Cold Weather Concreting.
E. ACI 309: Standard Practice for Consolidation of Concrete.
F. ACI 315: Details and Detailing of Concrete Reinforcement.

1.03 RELATED WORK

A. Manufacture of Portland cement concrete and its delivery to site, in accordance with Section 033040.

1.04 SUBMITTALS

A. Record of Placed Concrete: Record date, location of pour, quantity, air temperature, and test samples taken.
B. Product name, type, and chemical analysis of the following as applicable:
   1. Curing compound.
   2. Sealing compound.
   3. Chemical hardener.
1.05 QUALITY ASSURANCE

A. Rejection: Concrete work which fails to meet one or more of the following requirements, and which cannot be brought into compliance shall be rejected. Engineer shall determine appropriate modifications or payment adjustments to be made.

1. Appearance: Concrete exposed to view with defects which adversely affect appearance of specified finish.

2. Strength: Strength of concrete fails to comply with any of the following requirements.
   a. Low compressive or flexural strength.
   b. Reinforcing steel size, quantity, strength, position, damage, or arrangement at variance with requirements.
   c. Concrete which differs from required dimensions or location in such a manner as to reduce its strength or load carrying capacity.
   d. Inadequate protection of concrete from extremes of temperature during the early stages of hardening and strength development.
   e. Mechanical injury, construction fires, accidents, or premature removal of formwork likely to result in deficient strength development.
   f. Workmanship likely to result in deficient strength.

3. Slab Tolerance: Field quality control as specified herein.

1.06 WARRANTY

A. Repair or replace defective or damaged work at no additional cost to Owner.

PART 2 PRODUCTS

2.01 ACCESSORIES

A. Bonding Compound: Polyvinyl acetate or acrylic base, rewettable type.

B. Vapor Retarder: 10 mil thick clear polyethylene sheet. Type recommended for below grade application.

C. Forms: In accordance with Section 031100 and ACI 315.

D. Reinforcement: In accordance with section 032000.

E. Covering: Waterproof paper, polyethylene sheet or burlap cloth complying with AASHTO M 182, Class two.

F. Waterstop: In accordance with section 031100.

2.02 CONCRETE SURFACE CURING COMPOUND

A. Liquid membrane, in accordance with AASHTO M-148.

B. Type of Compound: Engineer to select.

1. Type 1, clear or translucent without dye.
2. Type 1-D, clear or translucent with red fugitive dye.
3. Type 2, white pigmented.

C. Class of Vehicle: Class A, no restrictions.

D. Performance Criteria of Compound: Compatible with sealing compound, if sealing compound is to be applied over concrete curing compound.

2.03 EPOXY INJECTION SYSTEM

A. Liquid membrane, in accordance with AASHTO M-148

B. Type of Compound: Engineer to select.
   1. Type 1, clear or translucent without dye.
   2. Type 1-D, clear or translucent with red fugitive dye.
   3. Type 2, white pigmented

PART 3 EXECUTION

3.01 CONCRETE PLACEMENT

A. Deposit concrete as close as possible to its final position, without allowing it to flow laterally in the form any considerable distance. Do not use vibrators to flow concrete laterally.

B. Limit placement duration to 45 minutes.

C. When placing concrete with a concrete pump, use a pump that produces a continuous stream of concrete without air pockets. Do not add water to the concrete in the pump hopper.

D. Use high frequency internal vibrators to compact all concrete. Supply enough vibrators (two minimum) to compact concrete within 15 minutes after it is deposited in forms. Do not allow vibrators to penetrate layers of concrete that have taken an initial set.

E. Do not allow the free fall of concrete to exceed 5-feet without the use of a tremmie or metal spout.

3.02 WATERTIGHTNESS OF CONCRETE WORK

A. Provide concrete work and grout of homogeneous structure, which when hardened will have the required strength, watertightness, and resistance to weathering.

B. Construction, contraction, and expansion joints have been positioned in structures, and curing methods specified, for the purpose of reducing the number and size of these expected cracks, due to the normal expansion and contraction expected from the specified concrete mixes. Class A concrete shall be watertight. Cracks which develop in walls or slabs shall be repaired. Cracks which show any signs of leakage shall be repaired until all leakage is stopped.

C. Visible cracks, other than hairline cracks and crazing, in the following areas shall be pressure grouted with low viscosity epoxy as specified herein as Epoxy Injection System for floors and walls of water bearing structures.
D. Walls or slabs, as above, that leak or sweat because of porosity or cracks too small for successful pressure grouting, shall be sealed on the water or weather side by coatings of a surface sealant system, as specified elsewhere herein.

E. Grouting or sealing as specified above shall be continued until the structure is watertight and shall remain watertight.

3.03 PREPARATION

A. All exposed corners shall be chamfered (3/4" x 3/4").

B. Verify that anchors, seats, plates, reinforcement, and other items to be cast into concrete are accurately placed, held securely, and will not impede placing concrete.

C. Do not allow construction loads to exceed member capacity.

D. Prepare previously placed concrete by cleaning with steel brush and applying bonding compound. Apply bonding compound in accordance with manufacturer’s instructions.

E. Do not disturb reinforcement, inserts, embedded parts, and formed joints.

F. Do not break or interrupt successive pours such that cold joints occur.

G. Honeycomb or embedded debris in concrete is not acceptable.

3.04 JOINTS

A. As far as practicable the concrete work shall be constructed as a monolith. The locations of contraction, construction, and other joints are indicated on the Plans or specified herein. Where not specified or indicated otherwise, all slabs and walls shall have construction joints at intervals not greater than 30 feet. In order to preserve the strength and watertightness of the structures, no other joints shall be made except as the Engineer may authorize.

B. At construction joints, the concrete in place shall be thoroughly cleaned of laitance, grease, oil, mud, dirt, curing compounds, mortar droppings, or other objectionable matter by means of a brush, hammer or heavy sandblasting, after which the surfaces shall be washed just prior to the succeeding concrete placement.

C. Immediately prior to resuming concrete placing operations, a bed of grout not less than 1 inch in thickness nor more than 1 inch in thickness shall be thoroughly spread over the horizontal joint surfaces.

D. Keyways in joints shall be provided as indicated on the Plans. Material for keyways shall be steel, plastic or lumber treated with form release coating, applied in accordance with the manufacturer’s published instructions.

E. Construction joints shall be washed free of sawdust, chips, and other debris after forms are built and immediately before the concrete placement. Should formwork confine sawdust, chips, or other loose matter in such a manner that it is impossible to remove them by flushing with water, a vacuum cleaner shall be used for their removal, after which the cleaned surfaces shall be flushed with water. A cleanout hole shall be provided at the base of each wall and column for inspection and cleaning.
F. In any case where it is necessary to repair concrete by bonding mortar or new concrete to concrete which has reached its initial set, the surface of the set concrete shall first be coated with epoxy bonding agent Concrete No. 1001 LPL as manufactured by Adhesive Engineering; Sikadur HiMod as manufactured by Sika Chemical Corporation; or equal. This material shall be applied in accordance with the manufacturer’s published instructions.

G. Expansion, contraction, and construction joints shall be constructed where and as indicated on the Plans. Waterstops, expansion joint material, synthetic rubber sealing compound, and other similar materials, shall be as specified elsewhere herein.

H. The Contractor shall schedule the placing of concrete in such a manner as to complete any single placing operation to a construction, contraction, or expansion joint. Special care shall be taken to insure that concrete is well consolidated against waterstops and that waterstops are secured in the proper position.

3.05 CAULKING

A. All caulking where indicated on the Plans or as specified, except for masonry construction and where specified otherwise, shall be done with synthetic rubber sealing compound.

B. Concrete must be thoroughly cured prior to caulking. All surfaces to be caulked shall be dry, clean, and free of dirt, grease, curing compounds, and other residue which might interfere with adhesion of the caulking compound. Concrete surfaces shall be cleaned and primed in strict accordance with the manufacturer’s recommendations prior to caulking. Sponge rubber filler materials may be used as backing for caulking, if acceptable to the Engineer. Filler material, when used, shall be compressible and untreated.

C. Caulking shall be applied with a pneumatic caulking gun. Nozzles of the proper shape and size shall be used for the application intended. A continuous bond shall be maintained between the caulking and the sides of the joint to eliminate gaps, bubbles, or voids and to fill the joint in a continuous operation without layering of the compound. All joints and seams shall be caulked by experienced applicators in a neat workmanlike manner.

D. No caulking shall be applied when the temperature exceed 120 degrees F to avoid sponging or bubbling of compound. To hasten curing of the compound when used on wide joints subject to movement, the Contractor shall apply heat with infra-red lamps or other convenient means.

E. Excess caulking shall be removed by soaking and scrubbing before caulking has cured with Chem Seal CS9900; equivalent product of Products Research and Chemical Corporation; or equal. Excess cured material shall be removed by sanding with No. 80 grit paper.

3.06 CONSOLIDATION

A. In accordance with ACI 309.

B. Keep spare vibrator available during concrete placement operations.

3.07 FINISHING

A. Do not add water or retemper concrete unless Engineer’s approval is secured.
B. Slab Finishing Tolerance:

1. Class A finish: 1 in 1000.
2. Class B finish: 1 in 500.
3. Class C finish: 1 in 150.

C. Finishes: In accordance with Section 033500. When type of finish is not indicated, use following finishes as applicable:

1. Sidewalks, garage floors, and ramps: Broom or belt finish.
2. Exterior concrete pavement: Broom or belt finish.
3. Exterior platforms, steps, and landings, exterior and interior pedestrian ramps, not covered by other finish materials: Nonslip finish.
4. Surfaces intended to receive bonded applied cementitious applications: Scratched finish.
5. Surfaces intended to receive roofing, except future floors, waterproofing membranes, and roof surfaces which are future floors or sand bed terrazzo: Floated finish.
6. Floors and roof surfaces which are floors intended as walking surfaces or to receive floor coverings: Troweled finish.
7. Unpainted concrete surfaces not exposed to public view: Smooth as-cast form finish.
8. Unpainted concrete surfaces exposed to public view: Rubbed finish.
9. Concrete surfaces to receive paint or plaster: Grout cleaned finish.

D. Chemical Hardener: After completion of curing, apply chemical hardener in accordance with manufacturer’s instructions to all interior floor slabs which are exposed in finished work and elsewhere as indicated. After final coat of chemical hardener solution is applied and dried, remove surplus hardener by scrubbing and mopping with water. Do not place liquid floor hardener on floor areas scheduled to receive synthetic matrice terrazzo, or setting beds for tile, terrazzo, vinyl flooring, or like items.

3.08 CURING

A. Curing: In accordance with Section 033900.

B. General: Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete. Cure concrete by applying curing and sealing compound, by moisture curing, by moisture-retaining cover curing, or by combinations thereof.

C. Curing Compounds:

1. Apply curing compound to concrete slabs within 2 hours of completing final finishing operations. Apply uniformly in continuous operation. Recoat areas subjected to heavy
rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period. Should side forms be removed before expiration of 7 days from start of curing, coat exposed surfaces with curing compound.

2. Do not use membrane curing compounds on surfaces which are to be covered with coating material applied directly to concrete, liquid floor hardener, waterproofing, damproofing, membrane roofing, flooring (such as ceramic or quarry tile, glue-down carpet), painting, and other coatings and finish materials, unless otherwise acceptable to Engineer.

D. Moisture Curing: Provide either of the following methods.

1. Keep concrete surface continuously wet by covering with water or continuous water-fog spray.

2. Cover concrete surface with absorptive cover, thoroughly saturated with water and kept continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.

3.09 SEALING

A. Surface Preparation: If necessary to remove curing compound, sandblast concrete surface. Clean surface free of dirt, oil, grease and other contaminants. If necessary use proprietary cleaning compounds (not raw acids) followed by thorough water rinsing. Use high pressure water equipment providing 1,200-2,000 psi to remove detergent residues. Do not attempt application when condensation is present.

B. Application: Spray with low pressure (20 psi) airless spray equipment. Saturate the surface to the point of rejection. On vertical surfaces apply 2 coats.

C. Coverage Rates: In accordance with manufacturer’s recommendation.

D. Paint Adhesion: Always test to verify compatibility between sealant and other proposed surface treatments.

E. Warning: Remove inadvertent splashes before the solution has dried on the surface. If sealant is a hazardous material, allow use only by professional applicator.

3.10 METHOD OF INJECTION OF EPOXY

A. Adequate surface seal shall be applied to the crack or joint to prevent escape of the epoxy. Entry points shall be established at a distance along the seal not less than the thickness of the cracked member.

B. A 100 percent solid epoxy adhesive as specified shall be forced into the crack at the first port with sufficient pressure to advance the epoxy to the adjacent port. The original port shall be sealed and entry shifted to the port at which the epoxy appears. This manner of port-to-port injection shall be continued until each joint has been injected for its entire length.

C. Before processing, the space in the vicinity of a crack location receiving epoxy shall have been swept and left in generally clean condition. All joints receiving epoxy under this section shall be cleaned free from dirt, laitance, and other loose matter.
D. Pump unit used for injection shall be a positive displacement type with interlock to provide an inline mixing and metering system for the two-component epoxy. The pressure hoses and injection nozzle shall be of such a design as to allow proper mixing of the two components of epoxy. The presence of a standby injection unit may be required.

E. For small amounts, or where excessive grout pressure developed by a pump unit might further damage the structure, premixed material and a hand caulking gun may be used if acceptable to the Engineer.

F. Seal all ports, including adjacent locations where epoxy seepage occurs, as necessary to prevent drips or run out. Any condition other than normal shall be reported to the Engineer. Solvents may not be used to thin the epoxy system introduced into the cracks or joints. All work under this Specification shall be performed and conducted in a neat orderly manner.

3.11.1 DAMPPROOFING

A. Surfaces to be dampproofed shall be cured, dry and free of all frost, loose material and dirt.

B. The surface which is to be protected by dampproofing shall be thoroughly cleaned before the primer is applied. The surface shall then be brush or spray painted with two coats of asphalt for primer treatment at a rate of 1/8 gallon per square yard for each coat. After the primed surface has dried one application of asphalt dampproofing material shall be applied by brush, at a rate of 1/10 gallon per square yard.

C. Care shall be taken to prevent discoloration of other parts of the structure not to be dampproofed, by the dripping or spreading of asphalt.

3.12 TESTS

A. Arrange for and perform all testing required for qualification of proposed materials and the establishment of mix designs, in determining strengths for early form removal, for cylinder tests after the addition of water, and other needs of Contractor.

B. Two slump tests, one before and one after the addition of super-plasticizer.

C. Five (5) standard 4-inch cylinder samples of concrete from trucks receiving water after addition of water.

3.13 DEFECTIVE CONCRETE

A. Modify or replace concrete not conforming to required levels, lines, details, and elevations.

B. Structural analysis and additional testing may be required at no additional cost to Owner when the strength of a structure is considered potentially deficient.

C. Patch imperfection. Refer to Section 033500 requirements.

3.14 PROTECTION AND REPAIRS

A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

C. Random Cracks in Pavement Slabs on Grade: When cracks occur within 2 feet of expansion of construction joints, remove and repair, otherwise grout with approved epoxy grout. Use saw cuts and dowels in all cut planes.

3.15 PLACING CONCRETE IN COLD WEATHER

A. No concrete shall be placed where the air temperature is lower than 40 degrees Fahrenheit, at a location where the concrete cannot be covered or protected from the surrounding air.

B. When concrete is placed below a temperature of 35 degrees Fahrenheit the ingredients of the concrete shall be heated so that the temperature of the mixture shall not be less than 50 degrees or more than 100 degrees Fahrenheit.

C. Before mixing, the heated aggregates shall not exceed 175 degrees Fahrenheit.

D. Cement shall not be added while the temperature of the mixed aggregates and water is greater than 100 degrees Fahrenheit.

E. When there is likelihood of freezing during the curing period, the concrete shall be protected by means of an insulated covering to prevent freezing of the concrete for a period of not less than 7 days after placing.

F. Equipment for protecting concrete from freezing shall be available at the job site prior to placing concrete. Particular care shall be exercised to protect edges and exposed corners from freezing.

G. In the event heating is employed, care shall be taken to insure that no part of the concrete becomes dried out or is heated to temperatures above 100 degrees Fahrenheit.

H. The housing, covering, or other protection used shall remain in place and intact at least 24 hours after the artificial heating is discontinued.

I. For a period of five days the concrete shall be kept above 40 degrees F and below 100 degrees F.

3.16 CLEANING AND WATERPROOFING

A. After construction is completed, the interior of the tank shall be completely hosed out and cleaned of all dirt and loose material.

B. Floor, wall, footing, column, and roof cracks, which may have developed from drying shrinkage, shall not be taped or chipped out and caulked. All cracks shall be pumped and sealed with a two-part water insensitive grout.

3.17 TESTING AND REPAIR LEAKS

A. TESTING

1. After filling the tank, the water level shall be held at the overflow for a period of 72 hours.
2. The tank and the drain lines from the ring drain shall then be examined for evidence of leaks.
3. All visible leaks and damp spots repaired to the satisfaction of the Engineer at the expense of the Contractor.
4. Damp spots are defined as spots where moisture can be picked up on dry land.
5. Any areas that, in the opinion of the Engineer, are exposed to contamination during the repair work shall be re-chlorinated to the Engineer’s satisfaction.

B. LEAK DETECTION METHODS

1. Leaks in floor construction joints may be detected with the aid of a diver.
2. Mud or cement deposits on the floor, when stirred up, would flow to the leak and may so indicate where the leaks are.
3. Honeycomb and cracks around waterstops may be detected through tapping with a hammer along the joint.
4. Any of these procedures may be insisted upon by the Engineer when cement seeding has not stopped the leaks.
5. Leakage through joints, which may have resulted from bent over waterstops or honeycomb under or around waterstops may require the removal of concrete around the waterstops in suspected areas.
6. Chipped out concrete areas shall be properly drypacked with a mix of 1 cement to 2 coarse sand, after coating the existing concrete surface with an approved grout.

C. ACCEPTANCE

1. The acceptable drop in water level of covered water tanks shall not exceed 1/10 inch per 24 hours after the tank has been filled. There shall be no visible running leaks or water puddles. Small damp spots may be accepted, at the discretion of the Engineer, during the first few months of operation; however, if they have not healed, the Engineer may order the immediate repair of such areas. Any cracks, voids, honeycomb, or cold joints showing or causing running leaks of water shall be group pumped by qualified operators until such cracks and voids have been completely sealed. If requested by the Contractor to stop floor leakage and if allowed by the Owner, the floor may be covered with a minimum of two inches of water and pure cement shall then be spread evenly over the entire floor area at the rate of one sack of cement to every 1000 square feet of floor area. The floor shall not be allowed to dry after the application of cement. If the tank has been cement seeded and if the tank is drained during the warranty period, Contractor shall be given fourteen (14) days advance notice and Contractor shall promptly remove all cement residue from the tank floor and clean the tank to the Owner’s satisfaction. The Owner shall pay for the subsequent tank disinfection and chlorination.
2. The tank shall not be backfilled until and unless the Engineer has accepted the leakage tests.
3. This section shall be applicable during the entire specified warranty period of the tank.

3.18.1 DISINFECTING THE FILLING

A. Water containing 200 ppm of chlorine shall be sprayed on all walls, columns and underside of roof areas.

B. The solution from the wash down shall be allowed to stand for no more than 24 hours prior to filling the tank.

C. The chlorine shall be monitored and adjusted while filling, so that when the reservoir is full the resulting chlorine solution is approximately 2 ppm.

D. The disinfection shall be accepted if samples taken for the final bacteriological test conform to AWWA Standard C-652 and are found to be satisfactory.

E. The tank should only be filled during normal working hours, at the end of each day the reservoir and ring drain should be checked for any kind of visible leakage. If only damp spots and small puddles of water are noted, the filling can continue. If major leaks are noted, they should be thoroughly investigated prior to continuing to fill the tank.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES

A. Portland cement concrete material requirements.

B. Mix design requirements.

1.02 REFERENCES

A. AASHTO T 26: Standard Method of Test for Quality of Water to be Used in Concrete.


C. ACI 211.2: Standard Practice for Selecting Proportions for Structural Lightweight Concrete.

D. ACI 211.3: Standard Practice for Selecting Proportions for No-Slump Concrete.

E. ACI 214: Recommended Practice for Evaluation of Strength Test Results of Concrete.

F. ACI 306: Cold Weather Concreting.


H. ASTM C 88: Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.


1.03 DEFINITIONS

A. Average Strength ($f_{\text{cr}}$): The required average strength for 30 consecutive strength tests which statistically assures no more than the permissible proportions of tests will fall below specified strength.

B. Specified Strength ($f'_{c}$): The indicated strength.

1.04 SUBMITTALS

A. Mix Design: Submit each proposed mix design 14 days prior to use in the Work. Indicate whether mixes have been designed for pumping. Include in the report of the following information.

1. Water-cement ratio.

2. Proportion of materials in the mix.

3. Source and type of cement.

4. Analysis of water to be used.

5. Type name of admixtures applied. Indicate when accelerating or retarding admixtures are to be used.

6. Slump, air content and temperature of samples.

7. Unit weight of fresh and dry light weight concrete.

B. Pre-Approved Mix Design Data: If supplier has on record, and Owner approved mix design, submit name and address of supplier for each mix design 1 day prior to using concrete mix.

1.05 QUALITY ASSURANCE

A. Use the same source and type of cement, air-entraining agent, water reducing agent, other admixtures, and aggregate.

B. In proportioning material for mixing, use scales certified by the State of Utah. Do not use volume measurement except for water and liquid admixtures.

C. Do not change the quantity of cement per cubic yard.

D. Use of admixtures will not relax hot or cold weather placement requirements.

E. Ready-mixed concrete, in accordance with Alternate No. 3 of ASTM C 94 and requirements in this Section.

F. Testing Concrete: In accordance with ASTM C39.

1.06 PRODUCT STORAGE AND HANDLING

A. Store bagged and bulk cement in weatherproof enclosures to exclude moisture and contaminants.
B. Stockpile aggregate to avoid segregation and prevent contamination.

C. Avoid contamination, evaporation, or damage to admixtures. Protect liquid admixtures from freezing and temperature changes.

PART 2 PRODUCTS

2.01 CEMENT

A. Type II (moderate), in accordance with ASTM C 150. Type I may be used in above grade structure if approved by Engineer.

B. Do not use air entraining cement.

2.02 WATER

A. Clean, non-staining and not detrimental. Comply with AASHTO T 26.

2.03 AGGREGATES - GENERAL

A. Gravel, crushed slag, crushed stone, or other inert materials, composed of hard, strong, durable particles free of injurious coatings.

B. The materials passing the No. 200 sieve shall not exceed 1.75 percent by weight in the combined coarse and fine aggregate.

2.04 COARSE AGGREGATE

A. Sieve Analysis: Graded in accordance with ASTM C 33, as follows:

<table>
<thead>
<tr>
<th>COURSE AGGREGATE</th>
<th>Percent Passing (By Weight)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIEVE SIZES</td>
<td>1&quot; Aggregate</td>
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<tr>
<td>Min</td>
<td>Max</td>
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<td>---</td>
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</tr>
<tr>
<td>1-1/2&quot;</td>
<td>100</td>
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<tr>
<td>1&quot;</td>
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<tr>
<td>3/4&quot;</td>
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<td>&quot;&quot;</td>
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</table>

These limitations may be changed if, in the judgment of the Engineer, workability and methods of consolidation are such that concrete can be placed without honeycomb or voids and the maximum aggregate size does not exceed the following requirements.

1. 1/5 of narrowest dimension between forms.
2. 1/3 of depth of slabs.
3. 3/4 of minimum clear spacing between reinforcing bars.

B. Deleterious Substances: Maximum percentage by weight.
1. Soft Fragments: 2.0 percent.
2. Coal and Lignite: 0.3 percent.
3. Clay Lumps: 0.3 percent.
4. Other Deleterious Substances: 2.0 percent.

2.05 FINE AGGREGATE

A. Sieve Analysis: Graded in accordance with ASTM C 33, as follows.

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Passing (by weight)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

B. Deleterious Substances: Maximum percentage by weight.
1. Coal and Lignite: 0.3 percent.
2. Clay Lumps: 0.5 percent.
3. Other Deleterious Substances: 2.0 percent.

2.06 SOUNDNESS AND REACTIVITY OF AGGREGATE

A. Determine suitability of fine and coarse aggregate sources for soundness in accordance with ASTM C 88. Weight loss; not exceeding 16 percent by weight when subject to 5 cycles of sodium sulphate.

B. Determine alkali-silica reactivity in accordance with ASTM C 289. Do not use aggregates determined either potentially or actually deleterious.
2.07 ADMIXTURES

A. Air Entrainment: pH 2.0 maximum type in accordance with ASTM C 260.

   1. Type A: Water reducing.
   2. Type B: Retarding.
   3. Type C: Accelerating.
   4. Type D: Water reducing and water retarding.
   5. Type E: Water reducing and accelerating.
   6. Type F: High range water reducing (super plasticizer). *
   7. Type G: High range water reducing and retarding. *

*The relative durability factor of water reducing admixtures shall not be less than 90 and the chlorides content (as C1-) shall not exceed 1 percent by weight of the admixtures.

C. Calcium Chloride: None allowed.

D. Pozzolan: Pozzolan conforming to the requirements of ASTM C 618, Class F, is allowed as Portland cement replacing agent under the following conditions:
   1. Do not replace more than 15 percent of the Portland Cement.
   2. The ratio of replacement by weight of Pozzolan to cement shall be 1.25 to 1.0.
   3. The minimum cement content shall be used in the design formulas before replacement is made.
   4. Loss if ignition of Pozzolan is less than 3 percent and the water requirement shall not exceed 100 percent.
   5. All other requirements of this section still apply.
   6. Mix designs including trial batches are required for each aggregate source and for each concrete class.

E. Fly Ash: Maximum 15% Fly Ash will be allowed.

F. Fiber Mesh: A.G. 0.90, Tensile Strength 70-11 ksi, Lengths of 0.5", 0.75, 1.5", & 2.0".

2.08 ENTRAINING AGENT

A. An entraining agent shall be used in all concrete exposed to weather. The agent shall conform to AASHTO designation M-154.
2.09 ACI MIX DESIGN

A. The amount by which the average strength of a concrete mix exceeds the specified strength shall be based upon no more than 1 in 100 random individual strength tests falling below the specific strength.

B. Proportion the materials in accordance with ACI 211.1, 211.2 or 211.3 as applicable to produce concrete having the following properties or limitations:

<table>
<thead>
<tr>
<th>CONCRETE MIX PROPERTIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class</td>
</tr>
<tr>
<td>Properties</td>
</tr>
<tr>
<td>Specified Compressive Strength $f'_c$ at 28 days, psi</td>
</tr>
<tr>
<td>Compressive Strength at 7 days, psi (a)</td>
</tr>
<tr>
<td>Cement content (94 lb. Sacks of cement per cubic yard of concrete)</td>
</tr>
<tr>
<td>Fiber Mesh</td>
</tr>
<tr>
<td>Superplasticizer</td>
</tr>
<tr>
<td>Water</td>
</tr>
<tr>
<td>Crushed Rock</td>
</tr>
<tr>
<td>Sand</td>
</tr>
<tr>
<td>Entrained air content, (% by volume)</td>
</tr>
<tr>
<td>Slump Range, in. (b)</td>
</tr>
</tbody>
</table>

(a) Used for monitoring purposes only.
(b) Not more than 8" after adding high range water reducer admixture (superplasticizer) to verified 2" to 3" slump concrete.

C. The use for each class of concrete is as follows:

1. Class A (5000 psi): Concrete Tank
2. Class B (4000 psi): All other reinforced structural concrete

3. Class C (3000 psi): Sidewalks, curb and gutter, cross gutters, pavements and unreinforced footings and foundations.


5. All other concrete, unless specified or otherwise indicated on the Drawing use Class B concrete.

D. Water

1. Sufficient water shall be added to produce concrete with the minimum practicable slump.

2.09 HAND MIXING

A. Do not hand mix batches exceeding 0.5 cubic yards.

B. Hand mix only on watertight platform. Mix cement and aggregate prior to adding water.

C. Ensure all stones are thoroughly covered with mortar and mixture is of uniform color and consistency.

2.10 HEATING, WATER, AND AGGREGATE

A. Do not allow products of fuel combustion to contact the aggregate.

B. Heat aggregate and mixing water to 150 degrees F. maximum. Heat aggregates uniformly.

C. Maintain mixed concrete temperature at time of placement between 60 and 90 degrees F.

D. Do not mix cement with water or with mixtures of water and aggregate greater than 90 degrees F.

PART 3 EXECUTION

3.01 DELIVERY

A. Slump: Do not transport concrete to the work location if concrete is greater than permissible slump.

B. Discharge: After the introduction of mixing water to the cement and aggregates at the batch plant, discharge concrete from truck mixer withing the following air temperatures and time periods.

1. Less than 80 degrees F.: 1-1/2 hours.

2. 80-90 degrees F.: 75 minutes.

3. 90+ degrees F.: 1 hour maximum.
3.02 RE-TEMPERING

A. Adding Water: When concrete arrives at site with slump below specified, water may be added if neither the maximum approved water/cement ratio nor the maximum slump is exceeded provided that:

1. The approved mix design has allowed for on-site addition of water.
2. The amount of water added at the site is accurately measured to ±1 gallon of the desired added amount.
3. That water additions is followed by 3 minutes of mixing at mixing speed prior to discharge.
4. That additional standard cylinder samples are taken from all trucks receiving water after addition of water at no additional cost to Owner.
5. That the person authorized to add water is mutually approved of in writing by Engineer, Contractor, and ready-mix vendor.

B. Super-plasticizers: Premix and add high range water reducers (super-plasticizers) in accordance with manufacturer’s instructions. Add super-plasticizers at site using truck-mounted power injection equipment capable of rapidly and uniformly distributing the admixture to the concrete. Mix for a minimum of 3 minutes prior to discharge.

C. Re-tempering after delivery time with super-plasticizer is prohibited.

END OF SECTION
SECTION 033900
CONCRETE CURING

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Initial and final curing of horizontal and vertical concrete surfaces.

1.02 RELATED SECTIONS
A. Section 033040 – Portland Cement Concrete.

1.03 REFERENCES
A. ACI 301 - Structural Concrete for Buildings.
B. ACI 302 - Recommended Practice for Concrete Floor and Slab Construction.
C. ACI 308 - Standard Practice for Curing Concrete.
D. ASTM C171 - Sheet Materials for Curing Concrete.
E. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.
F. ASTM D2103 - Polyethylene Film and Sheeting.

PART 2 PRODUCTS

2.01 MATERIALS
A. Membrane Curing Compound Type 1:  ASTM C309 Type 1 acrylic type, clear without fugitive dye.
B. Water:  Potable, not detrimental to concrete.

PART 3 EXECUTION

3.01 EXAMINATION
A. Verify substrate conditions under provisions of Section 013000.
B. Verify that substrate surfaces are ready to be cured.

3.02 EXECUTION - HORIZONTAL SURFACES
A. Cure floor surfaces in accordance with ACI 308.
B. Ponding:  Maintain 100 percent coverage of water over floor slab areas, continuously for 4 days.
C. Membrane Curing Compound: Apply compound in accordance with manufacturer's instructions in one coat.

3.03 EXECUTION - VERTICAL SURFACES

A. Cure surfaces in accordance with ACI 308.

B. Spraying: Spray water over surfaces and maintain wet for 7 days.

C. Membrane Curing Compound: Apply compound in accordance with manufacturer's instructions in one coat.

3.04 PROTECTION OF FINISHED WORK

A. Protect finished Work under provisions of Section 015000.

B. Do not permit traffic over unprotected floor surface.

END OF SECTION
SECTION 050523

BOLTS, WASHERS, DRILLED ANCHORS, AND EYEBOLTS

PART 1 GENERAL

1.01 DESCRIPTION

This section describes materials and installation of anchor bolts, connecting bolts, washers, drilled anchors, eyebolts, and stainless-steel fasteners.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. General Concrete Construction: DIVISION 3
B. Miscellaneous Structural Steel and Aluminum: 051210.

1.03 DESIGN CRITERIA

Structural Connections: AISC Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings (ninth edition), except delete the second paragraph of Section A7.1, the last sentence of the first paragraph of Section M5, the last sentence of Section M5.2, and Chapter N in its entirety.

1.04 SUBMITTALS

A. Submit shop drawings in accordance with the General Conditions.
B. Submit manufacturer's catalog data for bolts, washers, and concrete anchors. Show dimensions and reference materials of construction by ASTM designation and grade.

PART 2 MATERIALS

2.01 ANCHOR BOLTS

Steel anchor bolts shall conform to ASTM A 307, Grade A.

2.02 CONNECTION BOLTS

A. Steel connection bolts shall conform to ASTM A 325, Type 3. Connection type shall be N per the AISC handbook.
B. Provide galvanized bolts where shown in drawings. Galvanizing shall be by the hot-dipped process.

2.03 STAINLESS-STEEL BOLTS

Stainless-steel bolts shall be ASTM A 193, Grade B8M, or ASTM F 593, Type 316. Nuts shall be ASTM A 194, Grade 8M, or ASTM F 594, Type 316. Use ASTM A 194 nuts with ASTM A 193 bolts; use ASTM F 594 nuts with ASTM F 593 bolts. Provide washer for each nut and bolthead. Washers shall be of the same material as the nuts.
2.04 BEVELED WASHERS

Washers for American Standard beams and channels shall be square or rectangular, tapered in thickness, smooth, hot-dipped galvanized, and conforming to ASTM F 436.

2.05 DRILLED ANCHORS

Unless otherwise indicated in the drawings, drilled anchors shall be Type 316 stainless-steel zinc-plated steel hot-dipped galvanized steel wedge anchors as manufactured by ITW Ramset/Redhead, Hilti, or equal.

2.06 EMBEDDED EYEBOLTS

Eyebolts shall be of the welded-eye type, Type 316 stainless steel.

PART 3 EXECUTION

3.01 STORAGE OF MATERIALS

Store material, either plain or fabricated, above ground on platforms, skids, or other supports. Keep material free from dirt, grease, and other foreign matter and protect from corrosion.

3.02 GALVANIZING

Zinc coating for bolts, anchor bolts, and threaded parts shall be in accordance with ASTM A 153.

3.03 INSTALLING CONNECTION BOLTS

A. Use steel bolts to connect structural steel members. Use stainless-steel bolts to connect structural aluminum members.

B. Install ASTM A 325 bolts per the AISC "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

C. Bolt holes in structural members shall be 1/16 inch (1.6 mm) in diameter larger than bolt size. Measure cast-in-place bolt locations in the field before drilling companion holes in structural steel beam or assembly.

D. Drive bolts accurately into the holes without damaging the thread. Protect boltheads from damage during driving. Boltheads and nuts shall rest squarely against the metal. Where bolts are to be used on beveled surfaces having slopes greater than 1 in 20 with a plane normal to the bolt axis, provide beveled washers to give full bearing to the head or nut. Where self-locking nuts are not furnished, bolt threads shall be upset to prevent the nuts from backing off.

E. Bolts shall be of the length that will extend entirely through but not more than 1/4 inch (6.4 mm) beyond the nuts. Draw boltheads and nuts tight against the work. Tap boltheads with a hammer while the nut is being tightened. After final tightening, lock the nuts.

3.04 INSTALLING ANCHOR BOLTS

A. Preset bolts and anchors by the use of templates.

B. After anchor bolts have been embedded, protect their threads by applying grease and by having the nuts screwed on until the time of installation of the equipment or metalwork.

END OF SECTION
SECTION 051210

MISCELLANEOUS STRUCTURAL STEEL AND ALUMINUM

PART 1 GENERAL

1.01 DESCRIPTION
   A. This section describes materials, fabrication, and installation of structural steel, structural aluminum, stainless-steel plate and members, steel tubing, aluminum tubing, and aluminum sheet.

1.02 RELATED WORK SPECIFIED ELSEWHERE
   A. Structural Steel 051200.

1.03 DESIGN CRITERIA
   A. Structural Connections and Framing: AISC Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings (ninth edition), except delete the second paragraph of Section A7.1, the last sentence of the first paragraph of Section M5, the last sentence of Section M5.2, and Chapter N in its entirety.

1.04 SUBMITTALS
   A. Submit shop drawings in accordance with Section 013300: Submittal Procedures.
   B. Submit placing or erection drawings which indicate locations of fabricated items. Reproductions of contract documents will not be accepted for this purpose.

PART 2 MATERIALS

2.01 STRUCTURAL STEEL
   A. Material for all-purpose bolted or welded construction shall conform to ASTM A 36.
   Steel pipe shall conform to ASTM A53.

2.02 STRUCTURAL STEEL TUBING
   A. Conform to ASTM A 500, Grade A 501.

2.03 STAINLESS-STEEL PLATE AND MEMBERS
   A. Except where otherwise specified, stainless-steel plate and members shall be Type 316, ASTM A 167.

2.04 ALUMINUM SHEET
   A. Aluminum sheet shall conform to ASTM B 209, Alloy 3003, H 14 temper, unless otherwise shown.

2.05 STRUCTURAL ALUMINUM
A. Aluminum structural members shall conform to ASTM B 308, Alloy 6061-T6.

2.06 ALUMINUM TUBING
A. Aluminum tubing shall conform to ASTM B 241, Alloy 6061-T6. Wall thickness shall be Schedule 80, per ANSI H35.2, unless otherwise shown in the drawings.

2.07 WELDING ELECTRODES
A. Welding electrodes for structural steel shall conform to AWS A5.5. Use electrodes in the E-70 series.
B. Welding electrode for aluminum shall be 4043 filler metal.
C. Use Type 347 electrode for stainless steel.

PART 3 EXECUTION
3.01 STORAGE OF MATERIALS
A. Store structural material, either plain or fabricated, above ground on platforms, skids, or other supports. Keep material free from dirt, grease, and other foreign matter and protect from corrosion.

3.02 FABRICATION AND ERECTION
A. Fabricate miscellaneous metal items to straight lines and true curves. Drilling and punching shall not leave burrs or deformations. Continuously weld permanent connections along the entire area of contact. Exposed work shall have a smooth finish with welds ground smooth. Joints shall have a close fit with corner joints coped or mitered and shall be in true alignment. Unless specifically indicated in the drawings, there shall be no bends, twists, or open joints in any finished member nor any projecting edges or corners at intersections. Conceal fastenings wherever possible. Built-up parts shall be free of warp. Exposed ends and edges of metal shall be slightly rounded.
B. Clean the surfaces of metalwork to be in contact with concrete of rust, dirt, grease, and other foreign substances before placing concrete.
C. Set embedded metalwork accurately in position when concrete is placed, and support it rigidly to prevent displacement or undue vibration during or after the placement of concrete. Unless otherwise specified, where metalwork is to be installed in recesses in formed concrete, said recesses shall be made, metalwork installed, and recesses filled with dry-pack mortar in conformance with Section 03000.

3.03 GALVANIZING
A. Zinc coating for steel plates shall be in accordance with ASTM A 153. Structural steel, pipe, and tubing shall be zinc coated in accordance with ASTM A 123.

3.04 WELDING
A. Perform welding on steel by the shielded metal arc welding (SMAW) process. Welding shall conform to the AWS Structural Welding Code D1.1.
B. Perform welding on aluminum by the gas metal arc (MIG) or gas tungsten arc (TIG) process, per
C. Provide a minimum of two passes for metal in excess of 5/16-inch (8 mm) thickness.

D. Produce weld uniform in width and size throughout its length with each layer of weldment smooth; free of slag, cracks, pinholes, and undercuttings; and completely fused to the adjacent weld beads and base metal. Avoid irregular surface, nonuniform bead pattern, and high crown. Form fillet welds of the indicated size of uniform height and fully penetrating. Accomplish repair, chipping, and grinding of welds in manner that will not gouge, groove, or reduce the base metal thickness.

3.05 BOLTING

A. See Section 05050.

3.06 CONTROL OF FLAME CUTTING

A. Do not use a gas-cutting torch in the field for correcting fabrication errors on any member in structural framing. Use a gas-cutting torch only on minor members when the member is not under stress.

3.07 REPAIR OF GALVANIZED SURFACES

A. Repair or replace metal with damaged galvanized surfaces at no additional cost to the Owner. Accomplish repair of galvanized surfaces by use of DRYGALV as manufactured by the American Solder and Flux Company, Cold Galvanizing Repair Compound as manufactured by Rust-Oleum, or equal. Apply in accordance with the manufacturer's instructions.

3.08 CORROSION PROTECTION OF ALUMINUM SURFACES

A. Coat aluminum surfaces to be embedded or which are in contact with concrete or masonry, per Section 099000, System No. 51 before installation. Allow the paint to dry before the aluminum is placed in contact with the concrete.

B. Where aluminum surfaces come in contact with dissimilar metals, keep the dissimilar metallic surfaces from direct contact by use of neoprene gaskets or washers.

3.09 PAINTING AND COATING OF STRUCTURAL STEEL

A. Coat nongalvanized structural steel surfaces per Section 099000. Apply prime coat in the shop prior to shipping to the site. Apply intermediate and finish coats after erection, except surfaces that will be inaccessible for coating after erection or assembly shall be finish coated prior to erection or assembly.

END OF SECTION
SECTION 312323
COMMON FILL

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Common fill material requirements.

1.02 REFERENCES
A. AASHTO M-145: Recommended Practice for the Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes.


1.03 DEFINITIONS
A. Common Fill: Backfill material which is not mechanically graded.

1.04 ACCEPTANCE
A. Acceptance of common fill shall be determined by Engineer and based upon 1 sublot of 500 tons plus any additional sublots for each 500 tons or portion thereof over and above the first 500 tons of each common fill placed in any 1 week.

B. The Engineer reserves the right to select and test backfill on a random basis from any location in the Work, on the site or from the backfill source.

PART 2 PRODUCTS

2.01 GRANULAR BORROW (AASHTO TYPE A-1-a)
A. Bank run material: free of shale, clay, slag, friable material and debris.

B. The material must be within the following limits:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent by Weight Passing Sieve</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 inches</td>
<td>99</td>
</tr>
<tr>
<td>No. 4 (4.75 mm)</td>
<td>30 to 70</td>
</tr>
<tr>
<td>No. 200 (75 micro m)</td>
<td>3 to 15</td>
</tr>
</tbody>
</table>
2.02 NATIVE MATERIAL
   A. Sound, earthen material with 95% passing the 4 inch sieve.
   B. Percent of material by weight passing Number 200 sieve shall not exceed 20% when tested in accordance with AASHTO T-27.

2.03 SAND
   A. Clean, coarse, natural sand.
   B. Nonplastic when tested in accordance with ASTM D 4318.
   C. 100 percent shall pass a 1/8 inch screen.
   D. No more than 20 percent shall pass a number 200 screen.

2.04 SOURCE QUALITY CONTROL
   A. Verify gradation compliance in accordance with AASHTO T-27. Select samples uniformly in time on a random basis.

PART 3 EXECUTION

3.01 INSTALLATION
   A. Excavation and Backfill Operations: In accordance with Section 312333.

END OF SECTION
SECTION 312324
SELECT FILL

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Select fill material requirements.

1.02 REFERENCES

1.03 DEFINITIONS
A. Select Fill: Backfill material which is mechanically graded.

1.04 SUBMITTALS
A. Material analysis of each select fill material to be used.

1.05 ACCEPTANCE
A. Engineer reserves the right to select, reject, and test backfill on a random basis from any location in the Work or from the backfill source.

PART 2 PRODUCTS

2.01 AGGREGATES
A. Clean, hard, tough, durable and sound mineral aggregates that consists of 95% crushed stone, crushed gravel or crushed slag; free of deleterious and organic matter; and complies with the following:

2. Material shall be classified as A-1 material.

B. Aggregates - master grading band limits
1. The following limits are based on fine and course aggregate having approximately the same bulk specific gravities. The limits are wider than necessary for good job control. Sieve gradations are based upon percent of aggregate passing by weight in accordance with AASHTO T-27.
2. **Source quality control**
   a. Verify job-mix grading band material compliance in accordance with AASHTO T-27. Select samples uniformly in time on a random basis.

2.02 **DRAIN ROCK**

A. Consist of hard, durable particles of stone or gravel, screened or crushed to specified size and gradation.

B. Free from vegetable matter, lumps or balls of clay, or other deleterious matter.

C. Crush or waste coarse material and waste fine material as required to meet gradation requirements.

D. Durability Index: Percentage of wear not greater than 40 percent when tested in accordance with AASHTO T-96.

E. Conform to size and grade within the limits as follows when tested in accordance with AASHTO T-27.

<table>
<thead>
<tr>
<th>Sieve Size (Square Openings)</th>
<th>Percent By Weight Passing Sieve</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 inch</td>
<td>100</td>
</tr>
<tr>
<td>1-1/2 inch</td>
<td>95-100</td>
</tr>
<tr>
<td>3/4 inch</td>
<td>50-100</td>
</tr>
<tr>
<td>3/8 inch</td>
<td>15-55</td>
</tr>
<tr>
<td>Number 4</td>
<td>0-25</td>
</tr>
<tr>
<td>Number 8</td>
<td>0-5</td>
</tr>
<tr>
<td>Number 200</td>
<td>0-2</td>
</tr>
</tbody>
</table>
2.03 GRAVEL

A. Consist of hard, durable particles or fragments of stone or gravel, screened or crushed to specified sizes and gradations.

B. Free from vegetable matter, lumps or balls of clay, alkali, adobe, or other deleterious matter.

C. When sampled and tested in accordance with specified test methods, material shall comply with the following requirements:

1. Durability index: Percentage of wear not greater than 40 percent after 500 revolutions when tested in accordance with AASHTO T-96.

2. Plasticity Index: Not greater than 5 when tested in accordance with ASTM D 4318.

3. Liquid limit: Not greater than 25 percent when tested in accordance with ASTM D 4318.

D. Conform to sizes and grade within the limits as follows when tested in accordance with AASHTO T-27 and ASTM C 117:

<table>
<thead>
<tr>
<th>Sieve Size (Square Openings)</th>
<th>Percent By Weight Passing Sieve</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 inch</td>
<td>--</td>
</tr>
<tr>
<td>1-1/2 inch</td>
<td>100</td>
</tr>
<tr>
<td>Number 4</td>
<td>30-70</td>
</tr>
<tr>
<td>Number 8</td>
<td>20-60</td>
</tr>
<tr>
<td>Number 30</td>
<td>10-40</td>
</tr>
<tr>
<td>Number 200</td>
<td>0-12</td>
</tr>
</tbody>
</table>

PART 3 EXECUTION

3.01 INSTALLATION

A. Excavation and Backfill Operations: In accordance with Section 312333.

END OF SECTION
SECTION 312337

SOIL COMPACTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Compaction control of native and imported backfill material.

1.02 REFERENCES

A. AASHTO M 145: Recommended Practice for the Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes.


D. AASHTO T-238: Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

1.03 DEFINITIONS

A. A-1 Soils: AASHTO M 145 describes the nature of these soils.

B. Modified Proctor: The test method used for moisture-density relationship of soils as determined by the ASTM D 1557 test method.

C. Percent Compaction or Percent Density: The ratio of the field dry density to the laboratory maximum dry density expressed as a percentage.

D. Standard Proctor: The test method used for moisture-density relationship of soils as determined by the ASTM D 698 test method.

1.04 SUBMITTALS

A. Compaction test results according to Section 014500.

1.05 WARRANTY

A. Correct deficient conditions. Replace or repair surfacing materials and damaged facilities.

B. The method of construction repair shall be proposed in writing by Contractor for approval by Engineer prior to correcting the failed condition.

C. Failure to detect any defective work or material does not prevent later rejection of the work nor obligate Engineer for final acceptance when such defective work or material is discovered.
PART 2 EXECUTION

2.01 COMPACATION REQUIREMENTS

A. The Contractor shall be responsible to perform and pay for all testing of earth materials. See Section 014500.

B. Moisten or de-water backfill material to obtain optimum moisture for compaction compliance.

C. The material shall be deposited in horizontal layers having a compacted thickness of no more than 12 inches for roadway and 6 inches for trenches.

D. The distribution of materials shall be such that the compacted material will be homogeneous and free from lenses, pockets, or other imperfections.

E. The material shall have the optimum moisture content required for the purpose of compaction and the moisture content shall be uniform throughout the layer, insofar as practicable.

F. Backfill shall be compacted by means of sheepsfoot rollers, pneumatic tire rollers, vibrating rollers, or other mechanical tampers of a size and type approved by the Engineer.

G. If the required relative density is not attained, test sections will be required to determine any adjustments in compacting equipment, thickness of layers, moisture content and compactive effort necessary to attain the specified minimum relative density.

H. Approval of equipment, thickness of layers, moisture content and compactive effort shall not be deemed to relieve the Contractor of the responsibility for attaining the specified minimum relative densities.

I. The Contractor in planning his work shall allow sufficient time to perform the work connected with test sections and to permit the Engineer to make tests for relative densities.

2.02 FIELD QUALITY CONTROL

A. Optimum Soil Density: Unless indicated otherwise.

1. In accordance with AASHTO T-180 Method D test (Modified Proctor).

2.03 COMPACTION UNDER ROADWAYS

A. Fill or embankment material shall be compacted to not less than 95% of maximum dry density as measured by AASHTO T-180.

1. Compaction shall extend one foot beyond edge of pavement or proposed curb line.

2.04 COMPACTION OF OTHER FILLS AND EMBANKMENTS

A. Fill or embankment materials other than those mentioned above shall be compacted to not less than 92% of maximum dry density as measured by AASHTO T-180.

END OF SECTION
SECTION 312333

EXCAVATION AND BACKFILL OPERATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Requirements for trenching and backfilling for underground pipelines.

B. Excavating and backfilling operations adjacent to and under structures including boxes, headwalls, or other structures as required by Engineer.

C. Backfilling and compacting operation for construction and reconstruction of roadways, embankments, streets, parking lots, and other paved surface areas.

D. Excavation permit requirements.

1.02 DEFINITIONS

A. Pipe Zone: That zone in an excavation which supports, surrounds, and extends to 1 foot above the top of the pipe barrel.

B. Bedding: Process of preparing the trench bottom to receive the pipe and the backfilling on each side of the pipe to 12 inches over the top of the pipe.

1.03 SUBMITTALS

A. Material Analysis Reports: In accordance with Sections 312323 or 312324 as applicable.

B. Density Test Reports: In accordance with Section 312327.

C. Depth of backfill lift. This information shall be contingent upon type of equipment used in compaction operation. The Engineer may order lesser thickness if compaction is not achieved.

1.04 STORAGE AND HANDLING

A. Stockpile excavated material in a manner as to cause a minimum of inconvenience to public travel and provide for emergency traffic as necessary.

B. Maintain free access to all existing fire hydrants, water and gas valves, and meters.

C. Maintain clearance for free flow of storm water in all bar ditches, conduits, and natural water courses.

D. Utilize appropriate traffic signs, markers, and procedures in all product storage and handling activities.

E. Promptly remove all other material from site.

1.05 SITE CONDITIONS
A. Unsuitable Weather Limitations: Do not place, spread, or roll any fill material during unsuitable weather conditions. Do not resume operations until moisture content of material is satisfactory.

B. Protection of Graded Areas: Protect graded areas from traffic and erosion. Keep free of trash and debris. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

C. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or unsuitable weather, scarify surface, reshape, and compact to required density prior to further construction.

D. Prior to excavation operations, photograph existing surfaces along which Work may take place in order to determine, after construction is completed, whether any damage of existing improvements occurred prior to construction operations.

E. Grading: In compaction operations, do not vary the surface of finished aggregate base course more than 1/4" above or below grade.

PART 2 PRODUCTS

2.01 WATER

A. Make arrangements for source of water during construction and make arrangements for delivery of water to site. Comply with all local laws and regulations when securing water from water utility company at no additional cost to Owner.

2.02 SOIL MATERIALS

A. Over-excavation Fill: Select Fill: in accordance with Section 312324.

B. Common Fill: in accordance with Section 312323.

C. Select Fill: in accordance with Section 312324.

D. Native Backfill:

1. When approved by Engineer, native backfill material obtained from project excavations may be used as backfill, provided organic material, rubbish, debris, rocks larger than 8 inches, and other objectionable materials are removed.

2. Bituminous pavement obtained from project excavations will not be permitted as backfill except for the following:
   a. May be mixed with road subbase if material meets section 312324 gradation.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify areas to be backfilled are free of debris, snow, ice, or water and ground surfaces are not frozen.

B. Verify foundation of basement walls are braced to support surcharge forces imposed by backfilling operations.
C. Immediately prior to suspension of construction operations for any reason, provide proper and necessary drainage of work area.

3.02 PREPARATION

A. For pipelines, use means necessary to avoid displacement, and injury to, pipe and structures while compacting soil or operating equipment next to pipeline.

B. Movement of construction machinery over a pipeline at any stage is solely at Contractor’s risk.

C. When excavation is required in jurisdictions other than Owner’s, satisfy all conditions of the appropriate agencies.

D. Identify required lines, grades, contours, and benchmarks.

E. Notify all affected utility companies and Blue Stakes prior to commencing excavation operation.

F. Support and protect from damage, until completion of the Work, any existing facilities and structures which exist in, pass through, or pass under the site.

3.03 CONTROL OF GROUNDWATER

A. All trenches shall be kept free from water during excavation, fine grading, pipe laying, jointing, and embedment operations.

B. Where the trench bottom is mucky or otherwise unstable because of the presence of groundwater, and in cases where the static groundwater elevation is above the bottom of any trench or bell holed excavation, such groundwater shall be lowered to the extent necessary to keep the trench free from water and the trench bottom stable when the work within the trench is in progress.

3.04 SHORING

Not included

3.05 GENERAL EXCAVATION OPERATIONS

A. If topsoil is on site, remove and store it for later use on site.

B. Excavate site to required grade for Work. Use all means necessary to control dust on or near Work and on or near all off-site borrow and disposal areas.

C. Notify Engineer of unexpected subsurface conditions.

D. Underpin adjacent structure which may be damaged by excavation work, including service utilities and pipe chases.

E. If unstable material is encountered at the bottom or face of excavation, do not perform extra excavation without Engineer's written approval. Correct unauthorized extra excavations at no cost to Owner.

F. Provide necessary protection to excavation walls as required. If conditions permit, slope excavation side to maintain a safe and clean working area. Remove loose materials.
G. Correct excavation beyond the specified lines and grades by filling the resulting voids with approved compacted fill. If the fill is to become the subgrade for other fill, use material approved by Engineer. Do not proceed until Engineer has approved the material and the proposed method of backfilling for over excavation errors.

3.06 EXCAVATION FOR PIPELINES

A. Trenches shall be excavated to the depths and widths required to accommodate the construction of the pipelines, as follows:

1. Except in ledge rock, cobble rock, stones or water saturated earth, mechanical excavation of trenches shall not extend below an elevation of 4 inches below the bottom of the pipe after placement in its final position.

2. All additional excavation necessary for preparation of the trench bottom shall be made manually.

3. Excavation for trenches in ledge rock, cobble rock, stones, mud or other material unsatisfactory for pipe foundation, shall extend to a depth of at least 4 inches below the bottom of the pipe.

4. A bedding of special material shall be placed and thoroughly compacted with pneumatic tampers in 4-inch lifts to provide a smooth, stable foundation.

5. Special foundation material shall consist of suitable earth material free from roots sod or vegetable matter.

6. Trench bottoms shall be hand shaped as specified in paragraph (2) above.

7. The maximum width of trench, measured at the top of the pipe, shall be as narrow as possible but a minimum of 6 inches on each side of the pipe.

8. Trench plugs and/or filter fabric are required at a minimum of 100 feet or as directed by the Engineer.

B. Grade bottom of trenches to provide uniform bearing surface.

C. In public thoroughfares and regardless of trench depth, safely barricade and limit open trenches to a maximum of 200 lineal feet in the daytime, except in traveled roadways where a maximum of 80 lineal feet of open trench will be allowed.

D. Trench safety is to be maintained during non-hours of operation to protect the public from any potential harm.

3.07 GRAVEL FOUNDATION FOR PIPE

A. Wherever the subgrade material does not afford a sufficiently solid foundation to support the pipe and superimposed load; where water must be drained to maintain a dry bottom for pipe installation and at other locations as previously defined, the subgrade shall be excavated to a minimum of 12 inches and replaced with crushed rock or gravel.

B. Gravel for pipe foundations shall conform Drain Rock in Section 312324.
C. Drain Rock material shall be deposited over the entire trench width in 18-inch maximum layers, each layer shall be compacted by tamping, rolling, or vibrating.

D. The material shall be graded to produce a uniform and continuous support for the installed pipe.

### 3.08 BACKFILLING FOR PIPELINES

A. Backfill shall be carefully placed around and over pipes and shall not be permitted to fall directly on a pipe from such a height, or in such a manner as to cause damage.

B. Bedding requirements are as defined in the Specifications for each specific pipe material.

C. Trench backfilling above the level of the pipe bedding shall normally be accomplished with A-1 Native material. Excavated materials shall be free from rocks larger than 8-inches in diameter.

D. Compaction Requirements

   1. In all areas the in-place density shall be a minimum of 95% of the maximum dry density as determined by the same laboratory method

E. Clay cut off dikes shall be constructed as required by Engineer.

### 3.09 INSTALLING IMPERVIOUS BARRIERS

A. Construct impervious barriers in the pipe and trench zones, as shown in the plans and at 100-foot intervals on slopes exceeding 30% (16.7 degrees) and within 50 feet of vertical points of inflection on slopes exceeding 30%.

B. Construct concrete barriers such that the bottom of the collar extends at least 12 inches into the pipe base, at least 12 inches into each side of the walls of the trench, and at least 12 inches above the top of the pipe zone.

### 3.10 STRUCTURAL EXCAVATION

A. Provide all required shoring, cribs, cofferdams, and caissons including all pumping, bailing, draining, sheathing, bracing, and related items.

B. If conditions permit, slope excavation sides as excavation progress to maintain a safe and clean working area as required by OSHA.

C. Support excavation. Do not interfere with the bearing of adjacent foundations, pipelines, etc.

D. All unauthorized excavation below the specified structure subgrade shall be replaced with concrete, monolithic with that of the slab above or with coarse gravel thoroughly compacted into place.

E. Subgrade soil for all concrete structures shall be firm, dense, thoroughly compacted, and consolidated.

F. Subgrade soil shall be free from mud and muck; and shall be sufficiently stable to remain firm and intact under the feet of the workmen engaged in subgrade surfacing, laying reinforcing steel, and depositing concrete.
G. Coarse gravel or crushed stone may be used for subsoil reinforcement if results satisfactory to the Engineer can be obtained thereby.

1. Material shall be applied in lifts of 6” or less.

2. Each lift shall be embedded in the subsoil by thorough tamping.

3. All excess soil shall be removed to compensate for the displacement of the gravel or crushed stone and the finished elevation of any subsoil reinforced in this manner shall not be above the specified subgrade.

3.11 BACKFILLING FOR STRUCTURES

A. Do not fill adjacent to structures until approval is obtained from Engineer.

B. All forms shall be removed and the excavation shall be cleaned of all trash and debris.

C. Backfill areas to contours and elevations indicated. Do not use frozen materials.

D. Do not use compaction equipment adjacent to walls or retaining walls that may cause wall to become over stressed or moved from final alignment.

E. Place select fill a minimum of 3 feet around the outside of structures.

F. Place and compact select fill materials in continuous lifts not exceeding 12” loose depth.

G. Place and compact common fill material in continuous lifts not exceeding 8” loose depth.

H. Do not disturb or damage foundation perimeter drainage, foundation, dampproofing, foundation waterproofing and protective cover, or utilities in trenches.

I. Backfill against foundation walls simultaneously on each side. Do not backfill against walls until concrete has obtained 7 day strength.

J. Make smooth changes in grade. Blend slopes into level areas.

K. Remove surplus backfill materials from site.

L. Leave stockpile areas completely free of excess fill materials.

M. Slope grade away from structure at a minimum of 3” in 10 feet unless otherwise indicated.

N. Compaction: Each layer of material shall be compacted by hand or machine tampers or by other suitable equipment to a density equal to 95% of maximum dry density as measured by AASHTO T-99.

O. Restore any damaged structure to its original strength and condition and re-backfill to specifications.

3.12 ROADWAY EXCAVATIONS

A. In advance of setting line and grade stakes, clean subgrade area of brush, weeds, vegetation, grass, and debris. Drain all depressions or ruts which contain water.
B. A soils classification, as determined by AASHTO T-27, shall be made on the proposed subgrade, and the following shall be required based on that classification:

<table>
<thead>
<tr>
<th>Soil Classification</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-1, A-2, or A-3</td>
<td>The subgrade shall be scarified to a depth of 8&quot; and the loosened material shall be moistened and compacted to the equivalent of 95% of maximum dry density as measured by AASHTO T-99.</td>
</tr>
<tr>
<td>A-4 or A-5</td>
<td>The subgrade shall be over-excavated a minimum of 8&quot; subgrade scarified and compacted, replaced with A-1 granular material, and be moistened and compacted as above.</td>
</tr>
<tr>
<td>A-6 or A-7</td>
<td>The subgrade shall be over-excavated a minimum of 12&quot; subgrade scarified and compacted, replaced with A-1 granular material, and be moistened and compacted as above.</td>
</tr>
</tbody>
</table>

C. No organic material, soft clay, spongy material, or other deleterious material will be permitted in the scarified or imported subgrade layer.

D. Rough subgrades shall be shaped and graded to within a tolerance of 0.15 feet of design grade and drainage shall be maintained at all times.

E. Moisture content of the subgrade layer shall be maintained at not less than 95% or more than 105% of optimum moisture content, during the compaction process. The entire roadbed, to one foot in back of curb, must be compacted to the specified density to a minimum depth of 8 inches.

F. If removal of boulders, rubble, or existing improvements, found within the excavated area results in a lower excavation elevation than indicated, backfill over excavation in a manner approved by the Engineer.

G. Remove all deposits susceptible to frost heave.

B. Excavations through or under streets, sidewalks, street shoulders, driveways, etc. shall comply with the following requirements:

1. The trench shall be filled with select fill as per Section 312324.

2. The trench shall be filled to the existing surface level.

3. Within 10 days of the fill, sufficient fill material shall be removed and replaced with material comparable to the adjacent surface material shall meet the requirements of Section 312324 of these specifications.

4. The Engineer shall inspect all work.

3.13 SUBGRADE PREPARATION

A. Compact subgrade surfaces to density specified for overlying backfills. Refer to Section 312327.
B. If areas of subgrade not readily capable of in-situ compaction, secure Engineer’s authorization for extra excavation and backfill.
C. Maintain minimum overburden cover of 2 feet over pipelines or conduits during subgrade preparation.

3.14 BACKFILLING FOR PAVEMENT
A. Before beginning backfilling operations obtain Engineer's approval of excavation operation.
B. Do not damage subsurface structures or service lines.
C. Process backfill and avoid segregation. Keep base course free from pockets of coarse or fine material.
D. Deposit base course on the roadbed in a uniform manner which will provide the required compacted thickness. Maintain moisture content.
E. Shoulders are an integral part of the embankment. Do not build shoulders to a grade higher than that of the adjacent granular base course. Maintain efficient surface runoff at all times.
F. Compaction: in accordance with Section 312327.
G. Proof roll prior to placing pavements.

3.15 BLASTING
A. Blasting will not be allowed except by permission from the Engineer.
   1. The Contractor shall comply with all laws, ordinances, and applicable safety code requirements and regulations relative to the handling, storage, and use of explosives and protection of life and property.
   2. And he shall be fully responsible for all damage attributable to his blasting operations.
   3. Excessive blasting or overshooting will not be permitted and any material outside the authorized cross-section which may be shattered or loosened by blasting shall be removed by the Contractor.

3.16 ROCK FACES
A. Scale rock cuts of all loose rocks and fragments and leave in a neat and safe condition.

3.17 COMPACTION OF BACKFILL
A. In accordance with Section 312327.

3.18 IMPORTED BACKFILL MATERIAL
A. In the event the native excavated material is not satisfactory for backfilling as determined by the Engineer, the Contractor shall provide imported granular fill in accordance with Section 312324.

3.19 DISPOSAL OF EXCESS MATERIALS
A. All excess material shall be hauled away from the construction site and disposed of by the Contractor.

3.20 HISTORICAL, ARCHAEOLOGICAL, AND PALEONTOLOGICAL AREAS

Protect areas per UDOT Standard Specifications Section 01355 Environmental Protection - Discovery of Historic, Archaeological or Paleontological Objects.

END OF SECTION
SECTION 312343

RESTORATION OF SURFACE IMPROVEMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Restoration of surface improvement requirements.

1.02 GENERAL IMPROVEMENT REQUIREMENTS
   A. The Contractor shall be responsible for the protection and the restoration or replacement of any improvements existing on public or private property at the start of work or placed there during the progress of work.

   B. Existing improvements shall include but are not limited to permanent surfacing, curbs, ditches, driveways, culverts, fences and walls. All improvements shall be reconstructed to equal or better, in all respects, to the existing improvements removed.

PART 2 PRODUCTS

A. Select Fill: In accordance with Section 312324.

B. Concrete: In accordance with Section 033000.

PART 3 EXECUTION

3.01 ROAD BASE REPAIR
   A. Where trenches are excavated through gravel surfaced areas such as roads and driveways, etc., the gravel surface shall be restored and maintained as follows:

      1. The gravel shall be placed deep enough to provide a minimum of 6-inches of material.

      2. The gravel shall be placed in the trench at the time it is backfilled. The surface shall be maintained by blading, sprinkling, rolling, adding gravel, etc., to maintain a safe uniform surface satisfactory to the Engineer. Excess material shall be removed from the premises immediately.

      3. Material for use on gravel surfaces shall be obtained from sound tough durable gravel or rock meeting the requirements of Section 312324.

3.02 BITUMINOUS SURFACE REPAIR
   A. Where trenches are excavated through bituminous surfaced roads, driveways or parking areas, the surface shall be restored and maintained as follows:

      1. Trenches shall be backfilled with untreated base course from the pipe bedding to 3 inches from the top of existing asphalt.

      2. Asphalt shall be saw cut back 12 inches from existing trench wall’s and compacted as shown on standard drawing.
3. Pavement restoration shall include priming of pavement edges with bituminous material and placing and rolling plant mix bituminous material to the level of the adjacent pavement surfaces.

3.03 CONCRETE REPAIR

A. All concrete curbs, gutter, sidewalks, and driveways shall be removed and replaced to the next joint or scoring lining beyond the actually damaged or broken sections.

B. In the event that joints or scoring lines do not exist or are three or more feet from the removed or damaged section, the damaged portions shall be saw cut, removed, and reconstructed to neat, plane faces.

C. All new concrete shall match, as nearly as possible, the appearance of adjacent concrete improvements.

D. Where necessary, lampblack or other pigments shall be added to the new concrete to obtain the desired results.

E. All concrete work shall conform to the requirements of Section 033000 of these Specifications.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES
A. Materials and procedures for installing geotextiles of the type(s) shown on the drawings, and at other locations as directed by the Engineer.

1.02 REFERENCES
A. AASHTO M 288: Geotextile Specifications for Highway Applications.
B. ASTM D 4791: Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

1.03 SUBMITTALS
A. Submit prior to use: Manufacturer’s certificate that each fabric complies with requirements of this Section.

1.04 SAMPLING AND TESTING
A. Follow UDOT Minimum Sampling and Testing Requirements.
B. Prior to shipment, test each individual shipment and lot of geotextile, and send testing reports with the shipment to the job site. Clearly label all rolls as being part of the same production run certified as meeting all material requirements.

1.05 PACKAGING, SHIPPING, AND STORING
A. Protect the geotextile from direct sunlight, chemicals, mud, dirt and debris during shipment and storage. Replace at the Contractor’s sole expense, any geotextile damaged or deteriorated during shipping, storage or construction.
B. Labeling and Tagging:
   1. Identify each package by a tag or label securely affixed to the outside of the roll on at least one end.
   2. Provide the following required information on the tag:
      a. Name of the geotextile manufacturer
      b. Brand name of the product, width, length, and package weight of geotextile
      c. Orange UDOT Certification sticker
1.06 ACCEPTANCE

A. Owner rejects geotextile at installation if it has defects, rips, holes, flaws, deterioration, or damage incurred during manufacture, transport, handling or storage.

B. Non-compliance with UDOT Minimum Sampling and Testing Requirements will be a basis for rejection.

PART 2 PRODUCTS

2.01 EROSION CONTROL GEOTEXTILE

A. Furnish as specified in AASHTO M 288.

2.02 DRAINAGE GEOTEXTILE

A. Furnish non-woven drainage geotextile as specified in AASHTO M 288 with in-situ soil designations as shown on the drawings or as indicated by the Engineer.

B. Notify Engineer if soil conditions are different than shown on the drawings.

2.03 SEPARATION GEOTEXTILE

A. Furnish as specified in AASHTO M 288.

2.04 STABILIZATION GEOTEXTILE

A. Furnish as specified in AASHTO M 288.

2.05 WEED BARRIER GEOTEXTILE

A. Furnish non-woven weed barrier geotextile with elongation less than 50 percent for all weed barrier applications as specified in AASHTO M 288.

PART 3 EXECUTION

3.01 GENERAL

A. Place geotextile on areas that are smooth, and free of projections or depressions. Do not drag the geotextile across the subgrade. Roll geotextile out as smoothly as possible in the direction of vehicle travel.

B. Do not operate construction equipment or traffic directly on geotextile.

C. When placed for construction, cover the geotextile with indicated cover material as soon as possible. Do not leave uncovered for more than 5 days.

D. Place cover material on the geotextile in a manner that the geotextile is not torn, punctured, or shifted. Use a minimum 6 inches thick cover layer, or twice the maximum aggregate size, whichever is thicker. Do not end-dump cover material directly on the geotextile, except as a starter course.
E. Limit construction vehicles in size and mass so rutting in the initial layer above the geotextile is not more than 3 inches deep, or half the layer thickness, whichever is the lesser. Turning of vehicles on the first layer is not permitted.

3.02 INSTALLING EROSION CONTROL GEOTEXTILE

A. Install at locations shown on the drawings.
B. Unless otherwise specified, overlap the geotextile a minimum of 2 feet at all longitudinal and transverse joints, or sew the geotextile. For sewing requirements, refer to this Section, article, “Sewing”.
C. If overlapped, place the geotextile so that the upstream sheet overlaps the downstream sheets.
D. For placement on slopes, overlap each sheet over the next downhill sheet.
E. Anchor the geotextile using key trenches or aprons at the crests and toes of the slope.
F. Pins, usually 18 inches in length may be helpful in securing the geotextile during installation.
G. Repair: Place patch over damaged area and extend 3 feet beyond the perimeter of the tear or damage.

3.03 INSTALLING DRAINAGE GEOTEXTILE FOR SUBSURFACE DRAINAGE

A. Excavate trench to size and depth indicated.
B. Cut geotextile to width required and place in trench. Prevent damage to geotextile.
C. Overlap geotextile 12 inches or the full width of the trench, whichever is less, at the top of the trench.
D. Overlap successive sheets of geotextile a minimum of 12 inches in the direction of flow.
E. Place fill beginning with the sheet(s) overlapped above subsequent sheet(s), to hold geotextile in place.
F. Repair any damage to geotextile by placing patches extending 3 feet in all directions beyond the damaged area.

3.04 INSTALLING SEPARATION GEOTEXTILE

A. Install for pavement sections or other applications at locations shown on the drawings.
B. Unless otherwise specified, overlap the geotextile a minimum of 1 foot at all longitudinal and transverse joints, or sew the geotextile. For sewing requirements, refer to this Section, article, “Sewing.”
C. Repair: Place patch over damaged area and extend 3 feet beyond the perimeter of the tear or damage.
D. Place fill, beginning with the sheet(s) overlapped above subsequent sheet(s), to hold geotextile in place.
E. Pins, usually 18 inches in length, may be helpful in securing the geotextile during installation.

3.05 INSTALLING STABILIZATION GEOTEXTILE
A. Install Stabilization Geotextile at locations shown on the drawings, or as designated by the Engineer.

B. Unless otherwise specified, overlap the geotextile a minimum of 2 feet at all longitudinal and transverse joints, or sew the geotextile. For sewing requirements, refer to this Section, article, “Sewing.”

C. For placement on slopes, overlap each sheet over the next downhill sheet.

D. Repair: Place patch over damaged area and extend 3 feet beyond the perimeter of the tear or damage.

E. Place fill, beginning with the sheet(s) overlapped above subsequent sheet(s), to hold geotextile in place.

F. Pins, usually 18 inches long, may be helpful in securing the geotextile during installation.

3.06 INSTALLING WEED BARRIER GEOTEXTILE

A. Preparation:

1. Remove sharp objects, large stones and undesirable vegetation.

2. If placing geotextile over an existing bed, cut an "X" over each plant and push geotextile under plant base. If placing over a new bed, roll geotextile over soil and cut an "X" for each plant hole. Fold excess geotextile under and cover with specified landscaping materials.

B. Surface Cover: Provide a minimum of 4 inches of cover on all areas on the geotextile unless otherwise specified by Engineer. If using large landscape rock, increase thickness of cover material over geotextile up to 3 times the diameter of the largest rock material based on Engineer’s recommendations. Do not leave any portion of geotextile exposed to direct sunlight.

C. Repair: Repair immediately if damaged. Remove the damaged area plus an additional 3 feet and apply geotextile patch.

D. Maintenance: Maintain surfaces and supply additional landscape materials where necessary, including areas affected by erosion.

3.07 SEWING


END OF SECTION
PART 1   GENERAL

1.01 WORK INCLUDED
A. Furnish all labor, materials and equipment as required to apply seed. This includes but is not limited to preparing ground, sowing seeds and other management practices on areas shown on the project drawings and in accordance with this specification.

1.02 DEFINITIONS
A. A sandy soil is one with a USDA soil texture classification of any of the following: sand, loamy sand, sandy clay loam, or a sandy clay.
B. A non-sandy soil is one with a USDA soil texture classification of any of the following: loam, silt loam, silt, clay loam, silty clay loam, silty clay, or clay.

PART 2   PRODUCTS

2.01 SEED
A. Supply seed on a pure live seed (PLS) basis.
B. Meet the Utah Seed Act.
C. Provide inoculated legume seed.
D. Each variety of seed shall be furnished and delivered in separate bags or containers. Provide germination or tetrazolium test data for each variety of seed. Date of tests shall be within nine months of the time of seeding.

2.02 EROSION CONTROL MULCH AND MAT
A. Straw Mulch - straw mulch shall be oat, wheat or rice straw. The straw mulch shall be free of Johnson grass or other noxious weeds and foreign materials. It shall be kept in a dry condition and shall not be molded or rotted.
B. Erosion Control Mat - as described in Section 313500 - Geotextiles.

PART 3   EXECUTION

3.01 GENERAL
A. All seed shall be certified noxious weed free.
B. Do not use wet, moldy or damaged seed.
B. Notify the Engineer two working days before seeding.
C. Complete all seeding on or before October 30.
3.02 SECURE SEED
   A. Submit seed certification based on PLS and results of germination tests. The purchase order should list the common and botanical name for each seed species.

3.03 SEED SUBSTITUTIONS
   A. Before requesting a seed substitution, contact the major seed companies in the state to verify that the seed is unavailable.
   B. Have the Engineer contact the Landscape Architect, who developed the seed mix, to verify the seed is unavailable and to recommend a seed substitution.
   C. Replacement seed shall be of equal or greater function to the originally specified seed.

3.04 MIXING SEED
   A. Mix and bag the different varieties of seed in the presence of the Engineer.
   B. Obtain the seed from the same lots from where it was sampled.
   C. Mix the different seed varieties to provide an even blend.
   D. Bag the mixed seed and label and seal the container.

3.05 SEED APPLICATION RATES PER ACRE
   A. Seed all areas using the appropriate seed mix listed in the following tables according to location and/or soil conditions. Apply at 11.5 lbs per acre bulk and 10 lbs per acre PLS.

<table>
<thead>
<tr>
<th>Seed Mix</th>
<th>Common Name</th>
<th>Botanical Name</th>
<th>Variety</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western Wheatgrass</td>
<td><em>Pascopym smithii</em></td>
<td>Arriba</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>Bluebunch Wheatgrass</td>
<td><em>Pseudoroegneria spicata</em></td>
<td>Anatone, P-7 or Wahluke (no Goldar)</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>Slender Wheatgrass</td>
<td><em>Elymus trachycaulus ssp. trachycaulus</em></td>
<td>San Luis or Firestrike (no Revenue)</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Indian Ricegrass</td>
<td><em>Achnatherum hymenoides</em></td>
<td>Nezpar or Paloma</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Sandberg Bluegrass</td>
<td><em>Poa secunda</em></td>
<td>Mountain Home, Hanford, or Reliable</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Lewis Blue Flax</td>
<td><em>Linum lewisii</em></td>
<td>Maple Grove (no Appar Introduced)</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Utah Sweetvetch</td>
<td><em>Hedysarum boreale</em></td>
<td>Timp</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Western Yarrow</td>
<td><em>Achillea millefolium var. occidentalis</em></td>
<td>Oddicentals or Eable Mountain (no Millefolium Introduced)</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Total = 100
3.06 SEED BED PREPARATION
A. Do not work topsoil or seed when the soil is saturated or frozen.
B. If a crust has formed on the topsoil, loosen the ground surface to a depth of 1 inch.
C. If the topsoil has produced weeds, remove them before seeding.
D. Prior to seeding, moisten the soil to a depth of 6-8 inches.

3.07 METHODS
A. Drill Seeding
   1. Use the drill method of seeding accessible slopes 3:1 and flatter. Use a rangeland type drill equipped with a depth band, seed box agitator, seed metering device, furrow opener, and packer wheels.
   2. Calibrate the drill using the manufacturer’s directions in the presence of the Engineer.
   3. Meet the specified application rate.
   4. Space drill rows 6 to 8 inches and drill seeds 3/8 inch to 1/2-inch in depth.
   5. Drill along the contour of the slope.
   6. Maintain the drill at the calibrated setting throughout the seeding operation.
B. Broadcast Seeding
   1. Use the broadcast method of seeding on all areas that were not drill seeded.
   2. If seed is to be hand broadcast, it shall be broadcast in two directions at right angle to each other.
   3. Rake seed into the soil perpendicular to the slope.

3.08 EROSION CONTROL MULCH
A. On slopes 3:1 and flatter, apply straw mulch with a minimum stalk length of 8 inches and at a minimum rate of 3000 lbs. Per acre or erosion control mat according to section 313500.
B. On slopes steeper than 3:1 install erosion control mat according to section 313500.
B. The moisture content of the straw shall not be greater than 20 percent.
C. Anchor the straw mulch into the soil by the crimping method.

3.09 TIMING
A. All seeding and slope stability measures shall be in place no later than three (3) weeks after topsoil has been placed to finished grade.

3.10 INSPECTION
A. Following the completion of the initial revegetation, the Engineer shall inspect the work to be certain that installation is as per supplier and/or manufacturer recommendations.

B. If the work is not approved, the Contractor shall replant and/or reseed and/or stabilize all areas within the initial area of disturbance and take all other actions reasonably necessary as directed by the Engineer to provide erosion control and slope and/or area stabilization within the initial area of disturbance.

3.11 WARRANTY PERIOD

A. An 18 month warranty period (the Warranty Period) shall commence after work is approved. At the end of the Warranty Period, the Owner will make an inspection to determine whether or not the revegetation growth has taken hold and the disturbed areas are established and stabilized i.e. lack of rill or gully erosion.

B. The technical procedure in determining if the vegetation has been established enough to stabilize the soil against either rill or gully erosion is the quadrant frame method or the step transect method. Both methods are a way of comparing plant production, biomass cover and erosion in the revegetated area with the same in an adjacent undisturbed and/or native site. Either method will be performed at several randomly selected locations along the project.

C. If at the end of the Warranty Period the Owner determines that the vegetation is unsatisfactory, the Contractor shall install new measures or repair the old measures as directed by the Owner.

END OF SECTION
SECTION 331100
WATER DISTRIBUTION AND TRANSMISSION SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Water distribution and transmission system identification, valves, boxes, service connections and accessories.

B. This section is applicable to potable water pressure systems, but may be used to specify non-potable water pressure systems.

1.02 REFERENCES

A. Applicable water company requirements.

B. AWWA C600: AWWA Standard for Installation of Ductile-Iron Water Mains and Their Appurtenances.

C. AWWA C800: AWWA standard for Underground Service Line Valves and Fittings.

D. AWWA C900: AWWA Standard for PVC Pressure Pipe.

1.03 PERFORMANCE REQUIREMENTS

A. A vertical minimum clearance of 10" and a horizontal minimum clearance of 36" shall be maintained from any other underground facility or structure, unless authorized otherwise by Engineer.

B. Depth of Cover:
   1. 48" minimum for service lines.
   2. 48" minimum for main lines.
   3. If Engineer authorizes less cover, provide additional protection to withstand frost and external loads.

C. Piping Testing Schedule: In accordance with Section 331125. Conduct test after thrust blocks have sufficiently hardened. Provide signs and types of equipment connections and fittings which match pipe materials when pressure testing systems.

D. Remove any section of pipe already placed by Contractor which is found to be defective or damaged. Relay or replace without additional cost.

E. Disinfection of Potable Water System: In accordance with Section 331300.

1.04 SUBMITTALS

A. Product Data: Manufacturer's technical product data and installation instruction.
B. Test Reports: Submit testing data indicated in Section 014500.

C. Operating and Maintenance: Include maintenance data, parts lists, product data, and shop drawings.

1.05 PROJECT CONDITIONS

A. Minimize neighborhood traffic interruptions and barricade stockpiles in accordance with the latest version of the MUTCD manual.

B. Secure acceptance of pipeline lateral tie-in work.

C. Repair public and private facilities damaged by Contractor.

D. Clearly identify and promptly set aside defective or damaged pipe.

PART 2 PRODUCTS

2.01 PIPES AND FITTINGS

A. Provide piping materials and factory fabricated piping products of sizes, types, pressure ratings, and capacities indicated.

B. Where not indicated, provide proper selection as determined by installer to comply with installation requirements.

C. Provide sizes and types of equipment connections for fittings of materials which match pipe materials used in pressure piping systems. Where more than one type of material or product is indicated, selection is installer's option.

D. Provide pipe fittings and accessories of same material and weight or class as pipe, with joining method indicated or recommended by manufacturer.

2.02 VALVES

A. As indicated and in accordance with Section 331216.

B. Locate on tee, at each intersection, and not more than 1,000 feet between valves.

2.03 VALVE BOX

A. Markings: On cover of valve box, cast the following as applicable; "WATER" or "IRRIG"

2.04 VALVE CHAMBER

A. Basin: Cast-in-place concrete, with base riser section or precast base riser section with integral floor.

B. Steps: Plastic, cast into valve chamber sidewalls greater than 4 feet deep.

C. Top: Flat slab concrete.
D. Frame and Cover: Asphalt coated, heavy duty ductile iron with flat top design and "Water" (or other applicable utility) lettering. Shape and size as indicated.

2.05 MORTAR AND CONCRETE
A. Mortar: Portland cement.
B. Concrete:
   1. Cast-in-place, Class 3000 minimum.
   2. Precast, Class 4000 minimum.

2.06 TAPPING SADDLES
A. For tapping saddles used for service connections to plastic pipe, provide full circle saddles. For all other pipe provide double strap bronze alloy, ductile iron, or stainless steel saddles.
B. Provide tapping saddles that have a minimum rated working pressure of 300 psi, neoprene Buna N gaskets, and bronze tapered threads.

2.07 ACCESSORIES
A. Anchorages: Provide anchorages for tees, wyes, crosses, plugs, caps, bends, valves, and hydrants. After installation, apply full coat of asphalt or other acceptable corrosion-retarding material to surfaces of ferrous anchorages.
B. Corporation Stops: All bronze with taper threads.
C. Hydrant and Valve: In accordance with Section 331219.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify trench cut is ready to receive Work, and excavations, dimensions, and elevations are as indicated.
B. Beginning of installation means acceptance of existing conditions.

3.02 PREPARATION
A. Hand trim excavations to required elevations. Correct over excavation in accordance with Section 312333.
B. Remove large stones or other hard matter which could damage pipe or impede backfilling or compaction.
C. Examine areas and conditions under which materials and products are to be installed. DO not proceed with system installation until unsatisfactory conditions have been corrected in manner acceptable to system installer.
D. Clearly identify and promptly set aside defective or damaged pipe.
E. Use machine pipe cutting tool acceptable to pipe manufacturer.

3.03 LOCATING POTABLE WATER PIPE

A. Locate potable water pipe at least 10 feet horizontally, from sewer pipe.

B. Where potable water pipe crosses under or within 18” over gravity-flow sewer lines provide pressure pipe with no joint located within 10 feet of the crossing.

C. Do not place potable water lines in the same trench with sewer lines, storm drains or electric wires.

3.04 PIPE AND FITTING INSTALLATION

A. Ductile-iron Pipe: Install in accordance with AWWA C600.

B. Polyethylene Pipe: For 3” and smaller pipe follow AWWA C901. Install all other sizes in accordance with manufacturer's installation instructions.

C. Copper Tube: Install in accordance with CDA “Copper Tube Handbook”.

D. Polyvinyl Chloride Pipe: Install in accordance with AWWA C900.

3.05 SETTING VALVES AND VALVE BOXES

A. Install valves plumb with stems pointing up.

B. Set valve box over valve; adjust to finish grade and plumb.

C. Clean any dirt or foreign material from inside of box.

3.06 SERVICE CONNECTIONS

A. Apply for and pay for applicable permits from the Water District for the indicated size and location of tap to water main. Comply with all connection requirements of the Specifications.

B. Make all service taps with a tapping machine acceptable to the water company. Use teflon tape on all taps unless indicated otherwise.

C. Locate service taps in the upper quadrant of the main line, approximately at 45 degrees. The minimum distance between taps is 24”, with a 5 degree stagger. Do not make service taps within 24” of the end of the main line.

D. Service saddles are required on all taps unless indicated otherwise.

E. Install service lines to property line or as directed by Engineer.

3.07 CONCRETE THRUST BLOCKS

A. Do not make hydrostatic tests until thrust block concrete has set.
B. Provide thrust blocks, or metal tie rods and clamps or shackles, on plugs, caps, tees, and bends deflecting 22-1/2 degrees or more either vertically or horizontally.

C. Unless otherwise indicated or directed by Engineer, place the base and bearing sides of thrust blocking directly against undisturbed earth.

D. Sides of thrust blocking not subject to thrust may be placed against forms. Place thrust blocking so the fitting joints will be accessible for repair.

E. Poly FM No. 1 grease and 8 mil vinyl wrap fittings and spools.

3.08 BACKFILLING
A. Trenches, in accordance with Section 312333.

3.09 CLEANING
A. Flush all pipelines after pressure testing.

B. Flush lines through hydrants or, if a hydrant does not exist at the end of the line, install a tap of sufficient size to meet requirements of Section 331125.

END OF SECTION
SECTION 331111
STEEL PIPING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Steel piping, joints, fittings, pipe lining and coating, and fabricated steel piping fittings and specials.

B. Related Sections:

1. Section 331112 - Basic Piping Materials and Methods.

1.02 REFERENCES

A. American Association of State Highway and Transportation Officials (AASHTO):


B. American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME):

2. B 16.3 - Malleable-Iron Threaded Fittings, Classes 150 and 300.
3. B 16.5 - Pipe Flanges and Flanged Fittings.

C. American Society for Testing and Materials (ASTM):

1. A 47 - Ferritic Malleable Iron Casting.
2. A 53 - Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
3. A 105 - Forgings, Carbon Steel, for Piping Components.
5. A 153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
10. D 395 - Rubber Property-Compression Set.
15. D 429 - Rubber Property-Adhesion to Rigid Substrates.
17. D 2240 - Rubber Property-Durometer Hardness.

D. American Water Works Association (AWWA):

1. C 200 - Steel Water Pipe 6 Inches and Larger.
3. C 206 - Field Welding of Steel Water Pipe.
5. C 208 - Dimensions for Fabricated Steel Water Pipe Fittings.
6. C 606 - Grooved and Shouldered Joints.

E. National Association of Corrosion Engineers (NACE):

1. RP0274-74 - Standard Recommended Practice.

1.03 SYSTEM DESCRIPTION

A. Design Requirements:

1. Design Criteria For Pipe And Pipe Fittings: In accordance with AWWA Manual M11 with the following modifications:
   a. Wall Thickness: As designed or minimum 1/4 inch for pipe from 12 inches in diameter to, and including, 72 inches in diameter or minimum 5/16 inch for pipe larger than 72 inches in diameter, whichever is thicker.
   b. Inside Diameter Of Unlined Pipe: Nominal.
   c. Inside Diameter Of Lined Pipe: As measured from face to face of liner, but not less than nominal.
d. Deflection Of Underground Pipe Inside Diameter: Maximum 2 percent under trench load of H-20 live load in accordance with AASHTO specifications.

e. Working Stress Of Steel: Maximum 50 percent of yield stress.

1.04 SUBMITTALS

A. Shop Drawings: Details of fittings and specials showing thickness and dimensions of plates, detail of welds, and materials; listing of proposed services and locations for use of grooved joint type piping; tabulated layout schedules for cement-mortar lined and coated steel pipe.

B. Product Data: Details of fittings and specials showing thickness and dimensions of plates, detail of welds, and materials; grooved joint piping fittings, gaskets, couplings, grooving of pipe and fittings, and pipe lining and coating.

C. Certificates Of Compliance: Cement-mortar lined and coated steel pipe.

D. Design Calculations: Wall thicknesses for external loading, special loading and internal pressure.

E. Mill Certificates.

F. Test Reports: Rubber gaskets.

1.05 QUALITY ASSURANCE

A. Applicable Standards:

1. Cement-mortar lined and coated steel pipe shall conform to the following standards, as complemented and modified herein:

   b. Cement-Mortar Lining And Coating: AWWA C 205.
   c. Fittings And Specials: AWWA C 208.
   d. Reinforcement Of Fittings And Specials: AWWA M 11.

PART 2 PRODUCTS

2.01 MATERIALS

A. Steel Pipe: All pipe shall be designed for a minimum of 250 psi working pressure.

   1. Type, Pipe 6 Inches And Smaller: ASTM A 53, black or galvanized, seamless or straight seam electric resistance welded. Minimum Schedule 40.

   2. Type, From 6 To 12 Inches: ASTM A 53, black, seamless.

   3. Type, Larger Than 12 Inches: AWWA C 200, without butt strap, riveted, or swaged joints; wall thickness as specified in Article 1.03.

   4. Type, 24 Inches And Larger, with Grooved Type Couplings and Wall Thickness Less than 1/2 Inch: Provided with stub ends, sized as follows, for grooves.

      a. Thickness: As recommended by coupling manufacturer, but not less than 1/2 inch.
      b. Length: Width of coupling plus 1 inch, but not less than 6 inches.
B. Steel Pipe Fittings:

1. Screwed Fittings:
   b. Cast Iron Drainage: ANSI B 16.12; galvanized in accordance with ASTM A 153 where used with galvanized pipe.

2. Flanged Fittings:
   a. Type For 12 Inch And Smaller Pipe: AWWA C207, Class E; or ANSI B 16.5, steel, galvanized in accordance with ASTM A 153 where used with galvanized pipe.
   b. Type For Larger Than 12 Inch Pipe: ANSI B 16.5, steel, 150 pounds; galvanized in accordance with ASTM A 153 where used with galvanized pipe; or AWWA C 207 and AWWA C 208, fabricated from flanges and steel pipe, respectively.
   c. Companion Flanges For 4 Inches And Smaller Pipe: AWWA C207, Class E; ANSI B 16.5, steel, 150 pounds, slip-on or welding neck; or ammonia type for use on chlorine liquid or gas piping.
   d. Companion Flanges For Larger Than 4 Inch To And Including 12 Inch Pipe: ANSI B 16.5, slip-on or welding neck type.
   e. Companion Flanges For Larger Than 12 Inch Pipe: ANSI B 16.5, steel, 150 pounds; galvanized in accordance with ASTM A 153 where used with galvanized pipe; or AWWA C 207, steel plate or raised hub type.
   f. Weld flanges to pipe or fittings before applying lining.
   g. Machine flanges or provide tapered filler for changes in grade or to slope lines for drainage.
   h. Flange Bolts: ANSI B 16.1 for typical applications; or Type 304 or 316 stainless steel, or Everdur for underground or underwater applications.
      1) Cut and finish flange bolts to project a maximum of 1/4 inch beyond outside face or nut after assembly.
      2) Tap holes for cap screws or stub bolts when used.
   i. Gaskets: In accordance with Section 15052.

3. Welding Fittings:
   a. Welding Fittings For Piping 8 Inches And Less In Nominal Diameter: Butt-welding fittings in accordance with ANSI B 16.9, standard wall or standard weight.
   b. Welding Fittings For Piping Larger Than 8 Inches In Nominal Diameter: Butt-welding fittings in accordance with ANSI B 16.9, or, at the option of the Contractor, made up out of sections of pipe welded together, except where smooth bends are indicated for air lines.
   c. Fittings made up of sections of pipe welded together shall be made of pipe of at least the same wall thickness as the pipe with which used, and bends shall be miter bends, fabricated in accordance with AWWA C 208 and as supplemented by AWWA Manual M 11. Welding of these made-up fittings shall be in accordance with AWWA C 206.
      1) Design and fabricate outlets and 4 branch fittings in accordance with AWWA Manual M 11.
      2) Bends may be welded to adjacent pipe sections.
         a) Bends shall be manufactured of the following number of pieces:
            (1) Bends from 0 to 30 degrees angle, 2 pieces.
(2) Bends from 30 to 45 degrees angle, 3 pieces.
(3) Bends from 45 to 67-1/2 degrees angle, 4 pieces.
(4) Bends from 67-1/2 to 90 degrees angle, 5 pieces.

4. Grooved Joint Fittings:
   a. Fittings For Grooved Joint Steel Piping: Rigid-grooved type, and as follows:
      1) Grooves: Cut; rolled grooves are not acceptable.
      2) Couplings: Cast in 2 or more segments of ductile iron conforming to ASTM A 536, Grade 65-45-12 or malleable iron conforming to ASTM A 47, Grade 32510.
      3) Bolts And Nuts: ASTM A 183, Grade 2.
      4) Gaskets: Composition water-sealing designed so that the internal piping pressure serves to increase the seal's watertightness.
         a) Gaskets for water service and oil-free air systems at temperatures less than 230 degrees Fahrenheit shall be made of ethylene propylene diene monomers (EPDM) in accordance with ASTM D 2000 Line Call Out 2CA615A25B24.
         b) Gaskets for use with cement-mortar lined steel piping shall be captured between the ends of the pipe to protect exposed metal from corrosion, and shall be made of nitrile in accordance with ASTM D 2000, Line Call Out 2CA615A25B24.
      5) Perform grooving of the pipe wall only on standard or heavier schedule weight pipe.
         a) For pipe with wall thickness less than standard weight, weld a shouldered end on the pipe in accordance with AWWA C 606.
         b) Fabricated pipe, pipe conforming to AWWA C 200, shall have shouldered ends welded onto the pipe.
         c) Shoulder: Type B or D in accordance with AWWA C 606.
   b. Fittings For Grooved Joint Piping: Ductile iron conforming to ASTM A 536, Grade 65-45-12, or malleable iron conforming to ASTM A 47, Grade 32510, and as follows:
      1) Where cast fittings are not made, standard fittings including large diameter elbows shall be made of forged steel conforming with ASTM A 105, Grade B with 0.375 inch wall thickness, or shall be standard segmentally welded fittings fabricated of Schedule 40 carbon steel pipe.
         a) Grooves: As specified in the preceding Subparagraph 1.f.
      2) Fittings for grooved joint piping shall be furnished by the manufacturer of the grooved joint material.
      3) Fittings for grooved joint piping shall be for rigid-grooved type joints.
      4) Connection to flanged units shall be by means of flange to grooved joint adapters.
         a) Where the flanged to grooved joint adapters interfere with the operation of adjacent valves, pumps, or other
items, the connection shall be by means of a spool with one end flanged and the other grooved, long enough to prevent interference with adjacent valves, pumps, or other items.

C. Steel Pipe Lining And Coating:

1. General:
   a. Except where otherwise specified in the Specifications and indicated on the Drawings, lining and coating for steel pipe shall be as specified hereinafter.
   b. Pipe Coating:
      1) Except as otherwise specified or indicated on the Drawings, provide underground steel piping with one of the coatings specified hereinafter.
      2) Extend pipe coating for underground piping 6 inches above finish grade or finish floor, and neatly terminate.
      3) Field paint aboveground steel pipe as specified in Part 3 of this Section.

2. Cement-Mortar Lining And Coating:
   a. Lining:
      1) Epoxy Paint interior and exterior according to Section 09900.
   b. Coating:
      1) Cement-mortar coating for steel pipe exterior: In accordance with AWWA C 205, modified as follows:
         a) Portland cement: ASTM C 150, Type II, low alkali.
         b) Sand: AWWA C 205 except that the total percentage of deleterious material shall not exceed 3 percent.

D. Fabricated Steel Piping Fittings And Specials:

1. General: Specified herein are the design and fabrication of fabricated steel piping fittings and specials, which include elbows, branches, nozzles, manifolds, headers, heads, collars, stiffeners, reinforcements, and other steel fabrications relating to steel piping, but shall not include steel pipe.

2. Design:
   a. Contractor shall design and detail fittings and specials.
      1) Design: In accordance with the recommended procedures in AWWA Manual M 11, as complemented and modified herein.
      3) Design reinforcing for fittings and specials for the specified test pressure.
      4) Fittings shall conform in dimension to AWWA C 208, complemented with the provisions specified herein.
      5) The working stress for steel used for fabrication of pipe shall not exceed 50 percent of the yield stress.
   b. The thickness of pipe, large elbows, and headers, except header nozzles, shall be the thicker of:
      1) The thickness designed in accordance with the design methods specified in the preceding Subparagraph 1.
      2) The thickness indicated on the Drawings.
      3) The thickness specified in the following Subparagraphs 1) and 2).
a) For Pipes Smaller Than 72 Inches in Diameter: Minimum 1/4 inch.

b) For Pipes 72 Inches in Diameter And Larger: Minimum 5/16 inch.

c. Elbows shall be of the number of pieces specified in Paragraph 2.02-C., Welding and Fittings, and thickness of material shall conform to thickness of pipe or manifold shells specified.

d. Ends of fittings to be welded to pipe shall be beveled for welding.

3. Fabrication:
   a. Shop fabricate steel piping fittings and specials in units as long as practicable for safe hauling and installation. Minimize number of field welds.
   b. Fabricate fittings and specials to uniform lengths with proper end clearance for the specified types of joint or attachment.
   c. Fabricate fittings and specials to allow field assembly without cutting or special work.
   d. Where specified in the Piping Schedule in Section 150520 - Pipes and Pipe Fittings, or indicated on the Drawings, the inside of fabricated steel manifolds and other fittings and specials shall receive a cement-mortar lining in accordance with AWWA C 205.
      1) Reinforce lining for piping 24 inches in diameter and larger with wire fabric.
   e. Do not weld flanges to nozzles until the nozzles and reinforcements are completely welded to the header.
      1) Accurately space and align flanges so that when connections have been made there will be no stress on the header, piping, or equipment. Properly locate and align equipment.

4. Dished Heads:
   a. Dished heads on 84 inch diameter and smaller manifolds: 1 piece (seamless) spherically dished (torispherical) heads.
      1) Larger heads may be seamed.
   b. Dish radius: Same dimension as the outside diameter of the head measured at skirt.
   c. Skirt face length: Not less than 3 inches.

5. Testing: No shop testing will be required for manifolds or piping connected thereto.

PART 3 EXECUTION

3.01 INSTALLATION

A. Joints:

1. Steel pipe joints shall be screwed, welded, flanged, grooved, or made with flexible joints. The type of joint for piping is specified in the Piping Schedule in Section 331112.

2. In addition to the joints indicated on the Drawings, provide unions, flexible couplings, flanged joints, and other types of joints or means necessary to allow ready assembly and disassembly of the piping.
3. Unless otherwise indicated on the Drawings or specified in the Piping Schedule in Section 331112, pipe joints shall be as follows:
   a. Pipe smaller than 2 inches in nominal diameter shall have screwed joints or flexible couplings.
   b. Pipe 2 inches to 4 inches in nominal diameter shall have screwed joints, flanged joints, welded joints, or joints made with flexible couplings.
   c. Pipe larger than 4 inches in nominal diameter shall have flanged joints, welded joints, or joints made with flexible couplings.

B. Screwed Joints:
   1. Perform threading with clean, sharp dies.
      a. Wavy, rough, or otherwise defective pipe threads are not acceptable.
   2. Make screwed joints tight and clean with an application of Teflon tape or approved paste compound applied to the male threads only, except as follows:
      a. Make up liquid and dry chlorine lines, and liquefied petroleum gas lines, with litharge and glycerine.
   3. Provide railroad type unions with bronze-to-iron seat, galvanized where used with galvanized pipe.
      a. Flanged joints may be used instead of unions.

C. Flanged Joints:
   1. In flanged joints, flanges shall come together at the proper orientation with no air gaps between the flanges after the gaskets are in place.
   2. Attach slip-on flanges to pipe by two fillet welds, in accordance with AWWA C 207.
   3. Secure welding neck flanges with full penetration butt welds without backing rings.
      a. After welding in place, the faces of flanges shall be perpendicular to the axis of the pipe, or, in the case of fittings, at the proper angle to each other, and bolt holes shall be in proper alignment.

D. Welded Joints:
   1. Welded joints shall be electric welded in accordance with AWWA C 206.
   2. Welders shall be qualified pursuant to the provisions of AWWA C 206.
      a. Welders' testing shall be at the Contractor's expense, including cost of test nipples, welding rods, and equipment.
   3. Do not weld galvanized pipe.

E. Grooved Joints:
   1. Piping with grooved joints shall be installed where indicated on the Drawings and may be installed in place of flanged piping and screwed piping, except that grooved joint piping shall not be used in the following installations:
      a. In underground and underwater installations.
      b. In piping subject to test pressures of 150 pounds per square inch gauge, or more.
      c. In steam and gas piping.
2. Assemble in accordance with manufacturer's published instructions.

3. Support grooved-end pipe in accordance with manufacturer's recommendations. In addition, provide at least 1 support between consecutive couplings.

F. Lining And Coating:

1. Field paint aboveground steel pipe as specified in Section 099000.

2. Field applied cement-mortar lining shall be of the same density, smoothness, and thickness as shop applied lining, and shall conform to applicable portions of AWWA C 602.

3. Protect lining of fabricated steel piping fittings and specials during hauling, installation, and operation.

4. Finish joints of fabricated steel piping fittings and specials as specified for pipe lining after field welding is done.

5. After final field welding of fabricated steel piping fittings and specials, complete the lining and exterior painting at and near the welded connections.
   a. Repair or replace lining damaged as a result of welding heat, handling, or other causes.

END OF SECTION
SECTION 331112
BASIC PIPING MATERIALS AND METHODS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Basic piping materials and methods.

B. Related Sections:

1. Section 331125 - Pipeline Testing.

2. Utah State Division of Drinking Water R309-545-11. ANSI/NSF International, Standard 61. ANSI/NSF Standard 61 Certification. All interior surfaces or coatings shall consist of products which are certified by laboratories approved by ANSI and which comply with ANSI/NSF Standard 61 or other standards approved by the Executive Secretary. This requirement applies to any pipes and fittings, protective materials (e.g. paints, coatings, concrete admixtures, concrete release agents, concrete sealers), joining and sealing materials (e.g. adhesives, caulks, gaskets, primers and sealants) and mechanical devices (e.g. electrical wire, switches, sensors, valves, submersible pumps) which are located so as to come into contact with the drinking water.

1.02 DEFINITIONS

A. Aboveground Piping: Piping within buildings, tunnels, or other structures without regard to elevation of piping, or exposed piping outside buildings and structures.

B. Underground Piping: Piping actually buried in soil or cast in concrete.

1.03 INTENT OF DRAWINGS AND SPECIFICATIONS

A. Except in details, piping is indicated diagrammatically. Sizes and locations are indicated on the Drawings. Not every offset and fitting, or structural difficulty that may be encountered has been indicated on the Drawings.

B. Perform minor modifications to piping alignment where necessary to avoid structural, mechanical, or other type of obstructions that cannot be removed or changed.

1. Modifications are intended to be of minor scope, not involving a change to the design concept or a change to the Contract Price or Contract Time.

1.04 SYSTEM DESCRIPTION

A. Performance Requirements:

1. Venting Piping Under Pressure:
a. Lay piping under pressure flat or at a continuous slope without air traps, unless otherwise indicated on the Drawings.
b. Install plug valves as air bleeder cocks at high points in piping. Provide one inch plug valves for water lines, and 2 inch plug valves for sewage and sludge lines, unless otherwise indicated on the Drawings.
c. Provide additional pipe taps with plug cocks and riser pipes along piping as required for venting during initial filling, disinfecting, and sampling.
d. Before piping is placed into service, close plug valves and install plugs.

2. Restraining Piping:
   a. Restrain piping at valves and at fittings where piping changes direction, changes sizes, and at ends.
      1) When piping is underground, use concrete thrust block or mechanical restraints.
      2) When piping is aboveground or under water, use mechanical or structural restraints.
      3) Determine thrust forces by multiplying the nominal cross sectional area of the piping by design test pressure of the piping.
   b. Provide restraints with ample size to withstand thrust forces resulting from test pressures.
      1) During testing, provide suitable temporary restraints where piping does not require permanent restraints.
   c. Place concrete thrust blocks against undisturbed soil. Place concrete so piping joints, fittings, and other appurtenances are accessible for assembly and disassembly.
   d. Provide underground mechanical restraints where specified in the Piping Schedule.
   e. Concrete blocking next to the new water tank will be difficult to construct against solid undisturbed earth. Therefore, properly compact soil according to Section 312327 - Soil Compaction before placing concrete blocking.

3. Connections To Existing Piping:
   a. Expose existing piping to which connections are to be made with sufficient time to permit, where necessary, field adjustments in line, grade, or fittings.
      1) Protect domestic water supplies from contamination.
         a) Make connections between domestic water supply and other water systems in accordance with requirements of public health authorities.
         b) Provide devices approved by owner of domestic water supply system to prevent flow from other sources into the domestic supply system.
   b. Make connections to existing piping and valves after sections of new piping to be connected have been tested and found satisfactory.
   c. Provide sleeves, flanges, nipples, couplings, adapters, and other fittings needed to install or attach new fittings to existing piping and to make connections to existing piping.

PART 2 PRODUCTS

2.01 GASKETS

A. Gaskets for Ductile Iron and Steel Piping:
1. Suitable for pressures equal to and less than 200 pounds per square inch gauge, temperatures equal to and less than 100 degrees Fahrenheit, and raw sewage service.

2. Neoprene with minimum durometer hardness value of 70 when tested in accordance with ASTM D 2240, Type A; minimum 3/32 inch thick for less than 10 inch pipe; minimum 1/8 inch thick for 10 inch and larger pipe. Provide gaskets with inserted 13 ounce nylon fabric cloth for pipes 20 inch or larger.

3. Manufacturers: One of the following or equal:
   a. Garlock.
   b. John Crane.

B. Gaskets for Flanged Joints in Polyvinyl Chloride, High Density Polyethylene, Chlorinated Polyvinyl Chloride, Ductile Iron, or Steel Water Piping:
   1. Suitable for hot or cold water, pressures equal and less than 150 pounds per square inch gauge, and temperatures equal and less than 160 degrees Fahrenheit.
   2. Material: Teflon ring; or teflon envelope with nonasbestos filler.
   3. Manufacturers: One of the following or equal:
      a. Garlock.
      b. Bluegard.
      c. John Crane.

2.02 SERVICE CONNECTIONS

A. Provide and install according to standard drawings.

B. Service Connections.
   1. Install branch saddle reducing tee electrofusion tapping tee or socket fusion joint into HDPE pipe. No extrusion welding will be allowed.
   2. Central Double-O-Seal Transition Fittings with IPS threaded or approved equal will be required to connect to corporation stop.
   3. Mueller Corporation Stop or approved equal CTS COMX MIP w/ Ford insert stiffener will be required next to distribution line.
   4. Provide single length (no splices) of HDPE PE 4710 DR-9 Blue-Stripe pipe (CTS) with compression fittings.
   5. Locate service taps in the upper quadrant of the main line, approximately at 45 degrees. The minimum distance between taps is 24", with a 5 degree stager. Do not make service taps within 24" of the end of the main line.
   6. Meter Boxes: Plastic or asphalt-dipped corrugated metal fiber meter boxes are not acceptable. Provide a meter box with ring and cover of sufficient strength to withstand loadings in vehicular traffic areas without breaking.

PART 3 EXECUTION
3.01 EXAMINATION

A. Verification of Existing Conditions:

1. Locate and expose existing structures, piping, conduits, and other facilities and obstructions which may affect construction of underground piping before starting excavation for new underground piping and appurtenances.

2. Verify sizes, elevations, locations, and other relevant features of existing facilities and obstructions. Determine conflicts for the construction of the new underground piping and appurtenances.

3. Make piping location and grade adjustments to resolve conflicts between new piping and existing facilities and obstructions.

3.02 BURIED PIPING

A. Bury piping with minimum 5 foot cover without air traps, unless otherwise indicated on the Drawings.

B. Where 2 similar services run parallel to each other, piping for such services may be laid in the same trench. Lay piping with sufficient room for assembly and disassembly of joints, for thrust blocks, for other structures, and to meet separation requirements of public health authorities having jurisdiction.

C. Laying Piping, as specified herein.

1. Lay piping in finished trenches free from water or debris. Begin at the lowest point with bell ends up slope.

2. Place piping with top or bottom markings with markings in proper position.

3. Lay piping on an unyielding foundation with uniform bearing under the full length of barrels.

4. Where joints require external grouting, banding, or pointing, provide space under and immediately in front of the bell end of each section laid with sufficient shape and size for grouting, banding, or pointing of joints.

5. At the end of each day's construction, plug open ends of piping temporarily to prevent entrance of debris or animals.

D. Laying HDPE Piping, as specified herein.

1. Lay piping in finished trenches free from water or debris.

2. Pipe up to 8" diameter and weighing roughly 6 lbs. per foot or less can usually be placed in the trench manually. Heavier, larger diameter pipe will require appropriate handling equipment to lift, move, and lower the pipe into the trench. (Refer to manufacturer’s publications.)

3. Lay piping on an unyielding foundation with uniform bearing under the full length of pipe.
4. Field bending radius is determined by the pipe diameter and dimension ratio. (Refer to manufacturer’s publications for maximum bending radius.)
   a. When a fitting or flange connection is present in the bend, the allowable field bending radius is controlled by the rigidity of the fitting or flange connection.
   b. Field bending involves excavating the trench to the desired bend radius, then sweeping or pulling the pipe string into the required bend, and placing it into the trench. Temporary restraints may be required to bend and to maintain the bend while placing the pipe in the trench and placing initial backfill. Temporary blocks or restraints must be removed before installing final backfill and any voids must be filled with compacted initial backfill.
   c. Observe appropriate safety precautions during field bending.

5. At the end of each day’s construction, plug open ends of piping temporarily to prevent entrance of debris or animals.

6. Water mains shall be laid at least 10 feet horizontally from any exiting or proposed sewer main. The distance shall be measured edge to edge. Water mains crossing over sewer mains shall be laid to provide a minimum vertical distance of 18 inches between the outside of the water main and the outside of the sewer.

3.03 PIPING ALTERNATES
   A. Provide piping in accordance with this Section, unless indicated on the Drawings or specified otherwise.
   B. Valves in Piping Sections: Capable of withstanding specified test pressures for piping sections and fabricated with ends to fit piping.

3.04 INSTALLATION - SERVICE CONNECTIONS
   A. The Engineer must inspect the installation before burying or backfilling.
   C. Lids shall be flush with top of existing ground.

3.05 CLEANING
   A. Piping Cleaning:
      1. Upon completion of installation, clean piping interior of foreign matter and debris. Perform special cleaning when required by the Contract Documents.
3.06 PIPING SCHEDULE

A. Abbreviations

1. Abbreviations to designate piping include the following:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CI</td>
<td>Cast iron</td>
</tr>
<tr>
<td>Cl</td>
<td>Class, followed by the designation</td>
</tr>
<tr>
<td>DIP</td>
<td>Ductile iron piping</td>
</tr>
<tr>
<td>RCP</td>
<td>Reinforced concrete piping</td>
</tr>
<tr>
<td>Sch.</td>
<td>Schedule, followed by the designation</td>
</tr>
<tr>
<td>PVC</td>
<td>Poly Vinyl Chloride</td>
</tr>
<tr>
<td>HDPE</td>
<td>High Density Polyethylene</td>
</tr>
</tbody>
</table>

END OF SECTION
SECTION 331114

HIGH DENSITY POLYETHYLENE PIPE

PART 1: GENERAL

1.01 SUMMARY

A. DESCRIPTION: The work in this section consists of providing High Density Polyethylene (HDPE) pipe and fittings.

B. RELATED SECTIONS
   1. Excavation and Backfilling Operations – Section 312333.
   2. Valves – Section 331216
   3. Pipeline Testing – Section 331125


D. SUBMITTALS: Material list naming each product to be used identified by manufacturer and type number, in accordance with Section 013300.

E. PRODUCT HANDLING: Handle pipe and fittings to insure delivery in a sound undamaged condition.

F. JOB CONDITIONS: Do not lay pipe when trenches or weather conditions are not suitable for such work.

PART 2 PRODUCTS

2.01 HIGH DENSITY POLYETHYLENE PIPE AND FITTINGS

A. The HDPE pipe shall be manufactured in a plant capable of providing continuous quality control through inspection. The facility shall have the necessary testing equipment to verify that the pipe meets the requirements of AWWA C901 or C906, NSF Standard #61 and ASTM standards.

B. The facility shall have the necessary testing equipment to verify that the fittings meet the requirements of AWWA C901 for sizes ½” to 2” and AWWA C906 for sizes 3” through 54”.

C. Polyethylene pipe and fittings shall be made from resin meeting the requirements of the Plastic Pipe Institute as PE 4710. The resin shall meet the requirements of ASTM D3350 with a cell classification of 445474C or higher. The requirements of this cell classification are:

HDPE Resin Specifications
<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>SPECIFICATION</th>
<th>UNIT</th>
<th>TYPICAL VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material Designation</td>
<td>PPI / ASTM</td>
<td></td>
<td>PE4710</td>
</tr>
<tr>
<td>Material Classification</td>
<td>ASTM D 1248</td>
<td></td>
<td>III C 5 P34</td>
</tr>
<tr>
<td>Cell Classification</td>
<td>ASTM D 3350</td>
<td></td>
<td>445474C or higher</td>
</tr>
<tr>
<td>Density</td>
<td>ASTM D 1505</td>
<td>g/cm³</td>
<td>0.947 to 0.955</td>
</tr>
<tr>
<td>Melt Index</td>
<td>ASTM D 1238</td>
<td>gm/10 min</td>
<td>&lt;0.15</td>
</tr>
<tr>
<td>Flexural Modulus</td>
<td>ASTM D 790</td>
<td>psi</td>
<td>110,000 to 160,000</td>
</tr>
<tr>
<td>Tensile Strength</td>
<td>ASTM D 638</td>
<td>psi</td>
<td>3,500 to 4,000</td>
</tr>
<tr>
<td>Slow Crack Growth ESCR</td>
<td>ASTM D 1693</td>
<td>hours in 100% igepal</td>
<td>&gt;5,000</td>
</tr>
<tr>
<td>PENT</td>
<td>ASTM F 1473</td>
<td>hours</td>
<td>&gt;500</td>
</tr>
<tr>
<td>HDB @ 73 deg F</td>
<td>ASTM D 2837</td>
<td>psi</td>
<td>1,600</td>
</tr>
<tr>
<td>UV Stablizer</td>
<td>ASTM D 1603</td>
<td>%C</td>
<td>2 to 2.5%</td>
</tr>
</tbody>
</table>

D. High-density polyethylene pipe and fittings can be supplied by different manufacturers as long as they meet the above ASTM D3350 cell classification.

E. Pipe shall have a manufacturing standard of ASTM F-714. Pipe O.D. sizes 4” to 24” shall be available in ductile iron pipe sizes (DIPS). Pipe O.D. sizes 26” to 54” shall be available in ductile iron pipe sizes (DIPS) or iron pipe size (IPS). Pipe shall be DR 11 (202 psi WPR) unless otherwise specified on the plans. The pipe shall contain no recycled compounds except that generated in the manufacturer's own plant from resin of the same specification from the same raw material. All pipes shall be suitable for use as pressure conduits per AWWA C906 Pressure Class (PC) 100 have a nominal burst value of three and one-half times the Working Pressure Rating (WPR) of the pipe.

F. HDPE fittings shall be of the same material as the pipe. PE4710 HDPE, Cell Classification of 445474C as determined by ASTM D3350-02, and approved for AWWA use shall also be approved if the same pressure rating is maintained. Butt fusion fittings shall have a manufacturing standard of ASTM D3261. Molded & fabricated fittings shall have a pressure rating equal to the pipe unless otherwise specified in the plans. Fabricated fittings are to be manufactured using Data Loggers. Temperature, fusion pressure and a graphic representation of the fusion cycle shall be part of the Quality Control records. All fittings shall be suitable for use as pressure conduits, and per AWWA C906, have nominal burst values of three and one-half times the Working Pressure Rating (WPR) of the fitting.

G. The pipe manufacturer shall have an ongoing Quality Control program for incoming and outgoing materials. High-density polyethylene (HDPE) resins for manufacturing of pipe shall be checked for density, melt flow rate, and contamination. The manufacturer of the HDPE resin shall certify the Cell Classification as indicated in section 2.01 C. These incoming resins shall be approved by plant Quality Control before being converted to pipe.

H. Pipe shall be checked for outside diameter, wall thickness, length, roundness, and surface finish on the inside and outside and end cut.

I. The fitting manufacturer shall have an on-going quality control program for incoming and outgoing materials. The resin shall be checked as indicated in section 2.01 C. Pipe for fabricated fittings shall be checked as indicated in 2.01 H. Molded fittings shall be inspected for voids and knit lines. All fabricated fittings shall be inspected for joint quality and alignment. All fabricated fittings welds shall be made using a DataLogger. A record of the temperature, pressure and graph of the fusion cycle shall be maintained by the fitting manufacturer.

J. The Manufacturer of the pipe and fittings shall maintain permanent QC and QA records. DataLogger records shall be maintained on fabricated fittings.
K. If requested, the pipe or fittings manufacturer can be required to retest or verify certification data. All retesting shall be at the requestor’s expense, and shall be performed as required in the specifications.

PART 3 EXECUTION

A. BUTT FUSION JOINING

1. The butt fusion procedures shall be in accordance with the manufacturer or the PPI. The fusion equipment operator shall receive training using the recommended procedure. The Contractor shall be responsible to verify that the fusion equipment is in good operating condition and that the operator has been trained within the past twelve months. The fusion equipment shall be equipped with a Datalogger. Records of the welds (heater temperature, fusion pressure, and a graph of the fusion cycle) shall be maintained for five (5) years. Fusion beads shall not be removed.

2. The supplier of the pipe and fittings shall provide a person certified by the pipe manufacturer and the fusion equipment manufacturer to train contractor fusion equipment operators and inspectors representing the Owner.

B. OTHER JOINING METHODS

1. Polyethylene pipe and fittings may be joined together using Flange Adapters. These fittings shall be made from PE 4710 HDPE, with a Cell Classification of 445474C as determined by ASTM D3350-02. Flanged adapters shall have a manufacturing standard of ASTM D3261. They shall have a pressure rating equal to the pipe unless otherwise specified on the plans.

2. Polyethylene pipe and fittings may be joined using approved electrofusion couplings. Fittings shall be PE 4710 HDPE, Cell Classification of 445474C as determined by ASTM D3350-02. Electrofusion Fittings shall have a manufacturing standard of ASTM F1055. Fittings shall have a pressure rating equal to the pipe unless otherwise specified on the plans. All electrofusion fittings shall be suitable for use as pressure conduits, and per AWWA C906, have nominal burst values of three and one-half times the Working Pressure Rating (WPR) of the fitting.

C. INSTALLATION

1. Pipe and fittings shall be installed using procedures recommended by the manufacturer.

2. Pipe and fittings shall be packaged in a manner suitable for shipment by a commercial carrier. Upon receipt at job site, a receiving inspection shall be prepared. The quantity shall be verified and any shipping damage shall be reported to the supplier within 7 days.

3. Trenches shall be excavated in accordance with the plans and specifications. OSHA standards or Owner safety policies regarding safety shall be followed regarding trench safety. If groundwater is encountered, it shall be removed by the Contractor.

4. Shoring of the trench, where required is the responsibility of the contractor.
5. Flanges adapters shall be attached to pipe and fittings using butt fusion. The flange adapters shall be aligned and centered relative to the pipe. Flange adapters should be square with the valve or other flange before tightening of bolts. Bolts should not be used to draw flanges into alignment. Bolt threads shall be lubricated, and flat washers shall be used under flange nuts. Bolts shall be tightened using a “star tightening pattern”. See manufacturer’s recommendations. Twenty-four hours after first tightening the flange bolts, they must be re-tightened using the same “star tightening pattern used above. The final tightening torque shall be as indicated by the manufacturer.

5. Install pipe on grade and on a stable foundation. Unstable soil or muck shall be removed from the trench bottom. A 6” foundation or bedding of compacted Class 1 material shall be in the bottom of the trench. This bedding material shall be installed on grade. Water shall be removed from the trench before bringing the bedding material and pipe to grade and backfilling. When a trench is cut through solid rock, it shall be excavated to 6” below the pipe bottom grade, and bedded with Class 1 bedding. All slabs of rock, boulders and large rocks shall be removed. ASTM D2321 is the reference specification for installation of HDPE pipe. Bedding shall be Class 1 per this specification.

6. A nylon fabric choker sling capable of safely handling the weight of the pipe or fitting, shall be used to lift, place and move pipe and fittings.

7. Class I and II backfill shall be used for pipe embedment backfill. This material shall be compacted to at least 95% Standard Proctor Density in 6” lifts to at least 6” above the crown of the pipe.

8. Final backfill shall be placed in the trench and compacted to finished grade. Native soils without roots, limbs, large rocks, boulders, clumps, or frozen clods or any object that could damage the pipe can be used subject to requirements in section 312323.

9. Pressure testing shall be conducted in accordance with ASTM F2164, Field Leak Testing of Polyethylene Pressure Piping Systems Using Hydrostatic Pressure. The HDPE pipe shall be filled with water, raised to test pressure and allowed to stabilize. The test pressure shall be 1.5 times the operating pressure at the lowest point in the system. In accordance with section 9.8, the pipe shall pass if the final pressure is with 5% of the test pressure for 1 hour. For safety reasons, hydrostatic testing only will be used.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES
A. Testing requirements for potable water piping systems.

1.02 DEFINITIONS
A. Leakage: The quantity of water required to maintain the specified hydrostatic test pressure after the pipeline has been filled with water and the air expelled.
B. Non-rigid Pipe: Any pipe which required bedding and backfill material for structural support.

1.03 SUBMITTALS
A. Pipeline Test Report: Include the following items:
   1. Type of test.
   2. Identification of pipe system.
   3. Size, type, location and length of pipe in test section.
   4. Test pressure and time.
   5. Amount of leakage versus allowable.
   6. Date of test approval.
   7. Signature of test supervisor.
   8. Signature of the Engineer or Inspector witnessing and approving the test.

1.04 PROJECT CONDITIONS
A. Repair pipeline system at no additional cost to Owner until it passes subsequent retesting.
B. Recording Equipment:
   1. Supply all necessary equipment to perform pressure testing.
   2. Secure Engineer’s approval of pressure gages.
   3. Locate all gages and recording equipment away from affect of sunshine or other weather conditions.
   4. Place, vents, pressure taps and drains for the test. Repair pipeline at the completion of the test at no cost to the Owner.
PART 2 PRODUCTS

2.01 TESTING MATERIALS

A. Medium: Water as required by test.

B. Equipment: Temporary motors, pumps, pumping apparatus, pressure gages, connections, power, etc. for making the tests.

PART 3 EXECUTION

3.01 PREPARATION

A. Pipeline pressure and leakage testing shall be done in accordance with AWWA standards. AWWA C600-99 for ductile iron pipes and AWWA C605-94 for PVC pipes.

B. Notify the Engineer 48 hours in advance of test.

C. Carry out tests as pipeline construction progresses to ensure construction methods are producing satisfactory results.

3.02 PRESSURE TEST

A. Test pressure may be limited by valves, or other lower pressure rated components. Such components may not withstand the required test pressure. They should be either removed, or isolated from the test section to avoid possible damage, or failure of these devices. Isolated equipment should be vented.

B. Expel all air from the pipeline before applying the specified test pressure. Provide air release taps at points of highest elevations before testing. Insert permanent plugs after test has been completed.

C. A minimum pressure 50% in excess of the maximum line operation pressure shall be maintained on the portion being tested for a minimum period of two hours, using hydraulic means to maintain the pressure.

D. Maximum leakage during the test shall not exceed 0.092 gallons per inch of diameter per 1000 feet of pipe per hour, for non-polyethylene pipe.

E. Polyethylene pipe testing:

   1. For polyethylene pipe test pressure is1.5 times the system operating design pressure, the total test time including initial expansion, and time at test pressure, must not exceed eight (8) hours. If the test is not completed due to leakage, equipment failure, etc., depressurize the test section, then allow it to “relax” for at least eight (8) hours before bringing the test section up to test pressure again.

   2. The test procedure consists of initial expansion, and test phases. During the initial expansion phase, the test section is pressurized to the test pressure, and enough make-up liquid is added each hour for three (3) hours to return to test pressure.
3. The test phase follows immediately, and may be two (2), or three (3) hours. At the end of the test time, the test section is returned to test pressure by adding a measured amount of liquid. If the amount of make-up liquid added does not exceed the following values leakage is not indicated:

<table>
<thead>
<tr>
<th>Nominal Pipe Size (IPS) (in.)</th>
<th>Make-Up Water Allowance (U.S. Gallons/100 ft. Pipe)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2 hour test</td>
</tr>
<tr>
<td>1 1/4</td>
<td>0.10</td>
</tr>
<tr>
<td>1 1/2</td>
<td>0.10</td>
</tr>
<tr>
<td>2</td>
<td>0.11</td>
</tr>
<tr>
<td>4</td>
<td>0.25</td>
</tr>
<tr>
<td>6</td>
<td>0.6</td>
</tr>
<tr>
<td>8</td>
<td>1.0</td>
</tr>
<tr>
<td>10</td>
<td>1.3</td>
</tr>
<tr>
<td>12</td>
<td>2.3</td>
</tr>
<tr>
<td>14</td>
<td>2.8</td>
</tr>
</tbody>
</table>

4. An alternate leakage test consists of initial expansion, and test phases. For the initial expansion phase, make-up water is added as required to maintain the test pressure for three (3) hours. For the test phase, the test pressure is reduced by 10 psi. If the pressure remains steady (within 5% of the target value) for an hour, no leakage is indicated.

F. Suitable means shall be provided by the Contractor for determining water lost by leakage under the test pressure.

G. Locate and repair the defective joints and retest until the leakage is within the specified allowance.

H. Repair any noticeable leakage even if total leakage is less than allowable.

I. Flushing:

1. After pressure testing all pipelines shall be flushed.

2. Flushing shall be accomplished through hydrants or, if a hydrant does not exist at the end of the line, the Contractor shall install a tap of sufficient size to provide for a 2.5 foot per second flushing velocity in the line.
3. The following is the flow quantity required to provide a 2.5 foot per second flushing velocity:

<table>
<thead>
<tr>
<th>Pipe Size (In.)</th>
<th>Flow (gpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>100</td>
</tr>
<tr>
<td>6</td>
<td>220</td>
</tr>
<tr>
<td>8</td>
<td>390</td>
</tr>
<tr>
<td>10</td>
<td>610</td>
</tr>
<tr>
<td>12</td>
<td>880</td>
</tr>
<tr>
<td>16</td>
<td>1567</td>
</tr>
</tbody>
</table>

3.03 OBSTRUCTION TEST

A. Visually examine pipe internally for obstructions.

B. When required by the Engineer, a round incompressible madrel which is 1" less in diameter that the internal diameter of the pipeline and 2 times the diameter in length will be passed through the pipeline.

3.04 PIPE TESTING SCHEDULE

A. Potable Water System:
   1. Obstruction test.
   2. Pressure test.

END OF SECTION
SECTION 331216

VALVES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Gate, ball, pressure reducing, solenoid valves, and their installation.

1.02 REFERENCES


C. AWWA C508": AWWA Standard for Swing-Check Valves for Waterworks Service, 2 In. Through 24 In. NPS.


F. AWWA C600: AWWA Standard for Installation of Ductile-Iron Water Mains and Their Appurtenances.

1.03 SUBMITTALS

A. Manufacturer's affidavit certifying product was manufactured, tested and supplied in accordance with applicable references in this section together with a report of the test results and the date each test was completed.

B. Provide detailed technical information as required by the Engineer for evaluating the quality of the valve. This shall include complete dimensions, weights, materials lists and operation charts, etc.

1.04 WARRANTY

A. Provide 2-year warranty.

PART 2 PRODUCTS

2.01 VALVES - GENERAL

A. Submerged or Above Water: Stainless steel nuts and bolts.

B. Underground: Unless otherwise indicated, provide the following:
   1. 2.5" and larger: Flanged ends or designed for bolting to flanged pipe.
   2. Less than 2.5": Screwed ends.
3. For valves exceeding 3” diameter, provide with non-rising stems and a 2” square operating nut. Provide low alloy steel bolts in accordance with AWWA C111.

C. Below and Operating Deck: Provide shaft extension from the valve to deck level.

D. Above Ground: Non-rising stems and equipped with a handwheel unless indicated otherwise.

E. Manually Operated Valves Over 6’ Above Operating Level: Provide with chain operated handles.

F. Install so that handles clear all obstruction when moved from open to closed.

G. Rated Working Pressure: 250 psi unless indicated otherwise.

H. Unless otherwise indicated coat non-plastic valves in accordance with AWWA C550.

2.02 GATE VALVES

A. Furnish gate valves 3” through 48” that conform to the requirements of AWWA C509, with cast iron body, bronze mounted, resilient wedge, non-rising stem design with double "O" ring seals and epoxy coated in conformance with AWWA C550.

B. Operating Direction: Open counterclockwise.

C. Buried Valves: Flanged or mechanical joint.

D. Operators shall be suitable for buried service and shall have an operator shaft extension to finished grade, a 2-inch square AWWA nut, valve box, and cover.

E. Maximum shutoff pressure of 250 psi.

2.03 BUTTERFLY VALVES

A. Material, in accordance with AWWA C504. Protective coatings shall be as specified in Section 15 of AWWA C 504.

B. Records of tests shall be furnished as specified in AWWA C 504. Valve discs for valves on liquid service shall be stainless steel disc to 12 inches and stainless steel disc or stainless steel mating edge on ni-resist cast iron or cast iron disc above 12 inches. Method of attaching edge to disc shall be subject to approval by the Engineer.

C. Valves and operators shall be designed for a flow through the valve corresponding to a pipeline velocity of 16 feet per second with the vane in the position of maximum coefficient of torque or for the maximum torque that may occur under the specified operating conditions of flow, pressure, valve angle, including seating, unseating, and bearing torque, with the safety factors as required in AWWA C 504 standards and as recommended in Table 2A, Appendix A, of AWWA C 504, whichever is greater.

D. Body Type: Short body or long body at the option of the Contractor as determined by their installation. Short body valves may only be used where the disc will not interfere with adjacent fittings.

E. Wafer Butterfly valves shall not be used as isolation valves.
F. The valve key, shaft, dowel pins, or taper pins used for attaching the valve shaft to the valve disc shall be Type 304 or Type 316 stainless steel or equivalent corrosion resistant material. All portions of the shaft bearings shall be stainless steel, bronze, nylon, or fiberglass and Teflon in accordance with AWWA C 504.

G. Valve disc shall seal in a position of 90 degrees to the pipe axis and shall rotate 90 degrees between full open and tight closed position.

H. All nuts and screws used with clamps and discs for rubber seats shall be securely held from loosening from vibration or cavitation effects.

I. Butterfly valves shall be provided with 150 lb. flanges. Maximum shutoff pressure shall be 250 psi.

J. Valves larger than 6 inches that are buried in the ground shall be provided with a totally enclosed worm gear operator mounted on the valve. The valve shaft shall extend from the valve to the operator and shall be as specified for valve shafts. The operator shall be gasketed for watertightness. Operators shall be suitable for buried service and shall have an operator shaft extension to finished grade, a 2-inch square AWWA nut, valve box, and cover.

K. Manual operators on butterfly valves larger than 6-inches shall be geared operated; except valves 10 inches and smaller on low pressure air services may be lever operated.

L. Wafer Valves: subject to approval of Engineer.

M. Valve Shafts: Install horizontal.

2.04 CHECK VALVES

A. Valves: In accordance with AWWA C508.

B. Valve shall be Cla-Val Series 582W Two Door Check or approved equal.

C. Working pressure of 250 psi.

2.05 PRESSURE RELIEF VALVE

A. Valve shall open quickly at an adjustable pre-set overpressure to dissipate damaging surge, and close slowly at adjustable speed after restoration of normal line pressure.

B. A needle valve shall be furnished to regulate valve closing speed.

C. The valve shall have only one flanged cover at the valve top from which all internal parts shall be accessible. There shall be no stems, stem guides or spokes within the waterway. There shall be no springs to assist the valve operation. All controls and piping shall be of non-corrosive construction.

D. Valve seat will be renewable without removing valve body from pipe installation.

E. Valve interior trim shall be bronze B-62. The valve shall be supplied completely piped ready for installation.

F. Valve shall be flanged suitable for 250 psi working pressure and for discharging 250 psi to atmosphere without damage to the valve or seat.
G. Valve shall be by Cla-Val (model 90-01) or Singer (106-RPS).

H. Provide a 120 V electrical contact switch and extension rod to allow activation of alarm in the event the valve opens.

2.06 SOLENOID VALVES

A. The Contractor shall furnish and install solenoid valves where indicated on the Plans and as specified herein. All solenoid valves shall be as manufactured by Automatic Switch Company, Florham Park, New Jersey; Skinner Electric Valve Division, The Skinner Chuck Company, New Britain, Connecticut; or equal. Size shall be as required by application.

B. Valves shall be capable of manual operation.

2.07 AIR VALVES

A. Designed to allow large quantities of air to escape out of the orifice when filling pipeline and to close water tight when water enters. The air and vacuum valve shall also permit large quantities of air to enter through the orifice when the pipeline is being drained to break the vacuum. The air release valve shall allow air to discharge when air accumulates in the pipe under pressure.

B. This discharge orifice area shall be larger or equal to the inlet of valve.

C. The valve shall consist of a body, cover, baffle, float and seat. The baffle will be designed to protect the float from direct contact of the rushing air and water to prevent the float from closing prematurely in the valve. The seat shall be fastened into the valve cover without distortion and shall be easily removed if necessary.

D. The float shall be stainless steel designed to withstand 1000 psi or more. The float shall be center guided for positive seating.

E. Valve shall be by Apco or approved equal.

F. The valves must be painted with a heavy coat of red lead TTP86 type IV for resistance to corrosion.

G. All materials of construction shall be certified in writing to conform to A.S.T.M. specifications as follows:

<table>
<thead>
<tr>
<th>Material</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body, Cover and Baffle</td>
<td>Cast Iron, ASTM A48 Class 30</td>
</tr>
<tr>
<td>Float</td>
<td>Stainless Steel, ASTM A240</td>
</tr>
<tr>
<td>Seat</td>
<td>Buna-N</td>
</tr>
</tbody>
</table>

PART 3 EXECUTION

3.01 INSTALLATION

A. Flush all line before valve installation.

B. In ductile iron water mains install valves in accordance with AWWA C600.

END OF SECTION