



Contract Documents & Specifications

Graham Road Water Main Extensions Phase 2 – Graham Rd Graham Woods Subdivision



Jones County Board of Commissioners

Jones County, Georgia



January, 2024

I&A Project No.: 1160-089-02



Homer Roberts Road Bid Documents



INGRAM & ASSOCIATES
CONSULTING ENGINEERS, LLC

ADDENDUM NO. 1

PLANS, SPECIFICATIONS, AND CONTRACT DOCUMENTS

May 20, 2024

PROJECT: Graham Road Water Main Improvements
I&A Project No.: 1160-089-02

OWNER: Jones County Board of Commissioners

REVISED BID DATE: **May 29, 2024 @ 4:00 pm**

Item 1: REPLACE REVISED BID FORM – 00410. Replace the existing REVISED Bid Form with the attached **REVISED BID FORM – 00410 dated 5/17/2024**

Item 2: REPLACE Plan Sheets 3 with the attached **REVISED Plan Sheets.**

END ADDENDUM NO. 1

PROJECT IDENTIFICATION:

Water Main Extensions to serve

- **Graham Road: Phase 2 – Graham Road from Graham Woods subdivision to Sand Creek Trail**
- **Graham Woods Subdivision; Baker Road**

CONTRACT IDENTIFICATION AND NUMBER:

I & A Project No.: 1160-089-02

THIS BID IS SUBMITTED TO:

Jones County Board of Commissioners

166 Industrial Blvd.

Gray, GA 31032

THIS BID IS SUBMITTED FROM:

Company Name: _____

Contact: _____

Address: _____

Phone: _____

Fax: _____

License No.: _____

The undersigned BIDDER proposes and agrees, if this Bid is accepted, to enter into an agreement with OWNER in the form included in the Contract Documents to perform and furnish all Work as specified or indicated in the Contract Documents for the Contract Price and within the Contract Time indicated in this Bid and in accordance with the other terms and conditions of the Contract Documents.

REVISED - Bid Form

00410-2

BIDDER accepts all of the terms and conditions of the Advertisement or Invitation to Bid and Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for sixty days after the day of Bid opening. BIDDER will sign and submit the Agreement with the Bonds and other documents required by the Bidding Requirements within fifteen days after the date of OWNER's Notice of Award.

In submitting this Bid, BIDDER represents, as more fully set forth in the Agreement, that:

BIDDER has examined copies of all the Bidding Documents and of the following Addenda (receipt of all which is hereby acknowledged):

| Date | Number |
|-------|--------|
| <hr/> | |
| <hr/> | |

BIDDER has familiarized itself with the nature and extent of the Contract Documents, Work, site, locality, and all local conditions and Laws and Regulations that in any manner may affect cost, progress, performance, or furnishing of the Work.

BIDDER has studied carefully all reports and drawings of subsurface conditions and drawings of physical conditions which are identified in the Supplementary Conditions as provided in paragraph 4.2 of the General Conditions, and accepts the determination set forth in paragraph 5 of the Supplementary Conditions of the extent of the technical data contained in such reports and drawings upon which BIDDER is entitled to rely.

BIDDER has obtained and carefully studied (or assumes responsibility for obtaining and carefully studying) all such examinations, investigations, explorations, tests, and studies (in addition to or to supplement those referred to in (c) above) which pertain to the subsurface or physical conditions at the site or otherwise may affect the cost, progress, performance or furnishing of the Work as BIDDER considers necessary for the performance or furnishing of the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of paragraph 4.2 of the General Conditions; and no additional examinations, investigations, explorations, tests, reports or similar information or data are or will be required by BIDDER for such purposes.

BIDDER has reviewed and checked all information and data shown or indicated on the Contract Documents with respect to existing Underground Facilities at or contiguous to the site and assumes responsibility for the accurate location of said Underground Facilities. No additional examinations, investigations, explorations, tests, reports or similar information or data in respect of said Underground Facilities are or will be required by BIDDER in order to perform and furnish the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of paragraph 4.3 of the

General Conditions.

BIDDER has correlated the results of all such observations, examinations, investigations, explorations, tests, reports and studies with the terms and conditions of the Contract Documents.

BIDDER has given ENGINEER written notice of all conflicts, errors or discrepancies that it has discovered in the Contract Documents and the written resolution thereof by ENGINEER is acceptable to BIDDER.

This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with an agreement or rules of any group, association, organization or corporation; BIDDER has not directly or indirectly induced or solicited any other corporation to refrain from bidding; and BIDDER has not sought by collusion to obtain for itself any advantage over any other BIDDER or over OWNER.

BIDDER agrees to commence work under this Agreement on or before a date to be specified in a written "Notice to Proceed" of the OWNER and to fully complete the work within 300 consecutive calendar days from the "Notice to Proceed" date.

BIDDER accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work on time.

This project is funded with the Corona State and Local Fiscal Recovery Funds. Certified Pay Rolls; Davis Bacon Wage Rate and American Iron and Steel will be required for this project.

By submission of this bid, the Bidders accept the provisions for cleanup of the right of way as specified. Final payment will be held for this cleanup.

By submission of this bid, Bidder accepts the provisions to bring each road on-line as each road is completed. Bidder also accepts the provision to complete all grassing for a disturbed area by close of business on Friday of the week it was disturbed.

THE REST OF THIS PAGE INTENTIONALLY LEFT BLANK.

REVISED - Bid Form

00410-4

Water Main Extensions

| ITEM NO. | QTY | UNIT | DESCRIPTION | UNIT PRICE | TOTAL PRICE |
|--|-------|------|---|------------|-------------|
| I. Graham Road: Phase 2 – Graham Road | | | | | |
| 1 | 1434 | LF | 2" Watermain - PVC | \$ | \$ |
| 2 | 556 | LF | 4" Water Main - Ductile Iron | \$ | \$ |
| 3 | 586 | LF | 6" Ductile Iron Lead | \$ | \$ |
| 4 | 2349 | LF | 6" Watermain - PVC | \$ | \$ |
| 5 | 686 | LF | 6" Watermain - Ductile Iron | \$ | \$ |
| 6 | 6120 | LF | 8" Water Main - PVC | \$ | \$ |
| 7 | 220 | LF | 8" Water Main - PVC - Fusible | \$ | \$ |
| 8 | 10068 | LF | 12" Water Main - PVC | \$ | \$ |
| 9 | 3748 | LF | 12" Water Main - Ductile Iron | \$ | \$ |
| 10 | 220 | LF | 12" Water Main - Ductile Iron - Ball & Socket | \$ | \$ |
| 11 | 59 | EA | 6" Gate Valve w/ Box & Concrete Collar | \$ | \$ |
| 12 | 5 | EA | 8" Gate Valve w/ Box & Concrete Collar | \$ | \$ |
| 13 | 7 | EA | 12" Gate Valve w/ Box & Concrete Collar | \$ | \$ |
| 14 | 50 | EA | Three Way Fire Hydrant w/ Base Elbow | \$ | \$ |
| 15 | 75 | LF | 2" Freebore | \$ | \$ |
| 16 | 25 | LF | 4" Freebore | | |
| 17 | 75 | LF | 8" Freebore | \$ | \$ |
| 18 | 110 | LF | 12" Freebore | \$ | \$ |
| 19 | 95 | LF | 14" Steel Casing | \$ | \$ |
| 20 | 60 | LF | Jack & Bore 14" Steel Casing w/ Spacers | \$ | \$ |
| 21 | 155 | LF | Jack & Bore 18" Steel Casing w/ Spacers | \$ | \$ |
| 22 | 1 | EA | 220 LF Horizontal Directional Drill underneath Kinder Morgan Gas Mains | \$ | \$ |
| 23 | 1 | EA | 220 LF Horizontal Directional Drill across the front yard of 163 Graham Woods Drive to avoid disturbing culvert. | \$ | \$ |
| 24 | 2 | EA | Tie to Existing 12" Water Main at the intersection of Graham Road and Graham Woods Drive. | \$ | \$ |
| 25 | 1 | EA | Sand Creek crossing. Not to include ductile iron pipe or turbidity curtain, as those are listed under line items 10 & | \$ | \$ |

| | | | | | |
|----|-------|--------|---|----|----|
| | | | 39. | | |
| 26 | 24483 | LF | 1" 200 PSI Polyethylene Service Tubing - SDR 9 | \$ | \$ |
| 27 | 56 | EA | Short side service connection including taping saddle; corp stop; curb stop; water meter box & fitting for connection to water meter. Jones County to purchase & install water meters. | \$ | \$ |
| 28 | 66 | EA | Longside service connection including taping saddle; corp stop; curb stop; long side bore; 2" SDR 9 service tubing to be used as an outer casing; water meter box & fitting for connection to water meter. Jones County to purchase & install water meters. | \$ | \$ |
| 29 | 10060 | TON | DI Fittings | \$ | \$ |
| 30 | 341 | LF | Gravel Driveway Replacement (GABC) | \$ | \$ |
| 31 | 423 | LF | Concrete Driveway Replacement | \$ | \$ |
| 32 | 160 | LF | Asphalt Driveway Replacement | \$ | \$ |
| 33 | 1193 | SQ. FT | Class 'A' Pavement Cut & Patch | \$ | \$ |
| 34 | 63 | EA | Remove & Replace Mailbox as needed. Install GABC apron as detailed. | \$ | \$ |
| 35 | 2650 | LF | Silt Fence Type "A" | \$ | \$ |
| 36 | 128 | EA | Haybale Checkdams | \$ | \$ |
| 37 | 7.0 | AC | Permanent Grassing | | |
| 38 | 0.4 | AC | Centipede Sodding w/ 4" thick layer of topsoil. Contractor to maintain sod, including watering, for 2 weeks. | \$ | \$ |
| 39 | 0.4 | AC | Bermuda Sodding w/ 4" thick layer of topsoil. Contractor to maintain sod, including watering, for 2 weeks. | \$ | \$ |
| 40 | 1 | EA | Turbidity Curtain | \$ | \$ |
| 41 | 0.5 | AC | Clearing & Grubbing | \$ | \$ |
| 42 | 80 | HR | Exploratory Digging | \$ | \$ |
| 43 | 1 | LS | Mobilization, Bonding, Insurance, Cleanup, Stakeout, Site Preparation, and Disposal of Debris | \$ | \$ |
| 44 | 1 | LS | Erosion & Sedimentation Control including all BMPs not specifically itemized below, inspections, maintenance and temporary grassing/mulching | \$ | \$ |

REVISED - Bid Form

00410-6

| | | | | | |
|-------------------------------|----|----|--|----|----|
| 45 | 1 | LS | NPDES Permit No 100002 Requirements including sampling, inspections, retention of records and reporting for a 6-month period. | \$ | \$ |
| TOTAL BASE BID | | | | | |
| | \$ | | | | |
| | | | | | |

Bidder agrees to furnish all materials, and equipment and to perform all labor necessary for the construction of the **Water Main Extensions to serve: Graham Road: Phase 2 – Graham Road from Graham Woods subdivision; Graham Woods Subdivision** for **Jones County Board of Commissioners** for the **BASE BID** sum of: _____

_____ Dollars (\$_____)

The above lump sum and unit prices shown shall include all labor, materials, equipment, bailing, shoring removal, overhead, profit, insurance, etc., to cover the finished work of the several kinds called for.

BIDDER understands that the OWNER reserves the right to reject any or all bids and to waive any informalities in the bidding.

BIDDER furthermore agrees that, in the case of a failure on his part to execute the Contract Agreement and Bonds within fifteen (15) days after receipt of confirmed contract documents for execution, the Bid Bond accompanying his bid and the monies payable thereon shall be paid into the funds of the OWNER as liquidated damages for such failures.

The following documents are attached to and made a condition of this Bid:

- a. Required Bid Bond for the sum of _____ Dollars (\$_____) according to the conditions of "Instructions to Bidders".

- b. Bid Data submitted by BIDDER that indicates standard specifications, details or drawings with any deviation from the specifications indicated.

SUBMITTED on _____, 20_____

BIDDER: _____

By: _____

Title: _____

Address: _____

Seal: (if bid by a Corporation)

Attested by: _____

END OF SECTION



REVISIONS:

| | |
|---|--------------------------|
| 1 | 2" DIP NOW 4" DIP 5/1/24 |
| 2 | |
| 3 | |
| 4 | |
| 5 | |

ADDITIONAL REQUIRED SITE IMPROVEMENTS SECTION (ILC 2)

D. ALL AREAS SHOWN WITH A RED X ARE TO BE RESTORED TO ORIGINAL CONDITIONS WITHIN THE ACTUAL 24 HOUR PERIOD OF CONSTRUCTION. THE SIGN MUST BE VISIBLE FROM A PUBLIC ROADWAY. THE SIGN MUST IDENTIFY THE FOLLOWING: (1) THE CONSTRUCTION SITE, (2) THE PERMITTER, (3) THE CONTACT PERSONS ALONG WITH THEIR TELEPHONE NUMBERS, AND (4) THE PERMITTED WEBSITE WHERE THE PLAN CAN BE VIEWED. THE PERMITTED WEBSITE MUST BE A PUBLICLY ACCESSIBLE WEBSITE. THE SIGN MUST REMAIN ON SITE AND THE PLAN MUST BE AVAILABLE ON THE PROVIDED WEBSITE UNTIL A NOT HAS BEEN SUBMITTED.

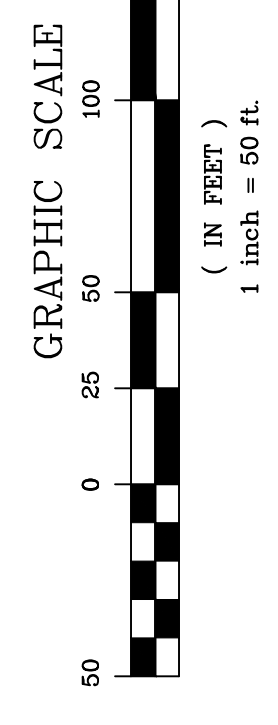
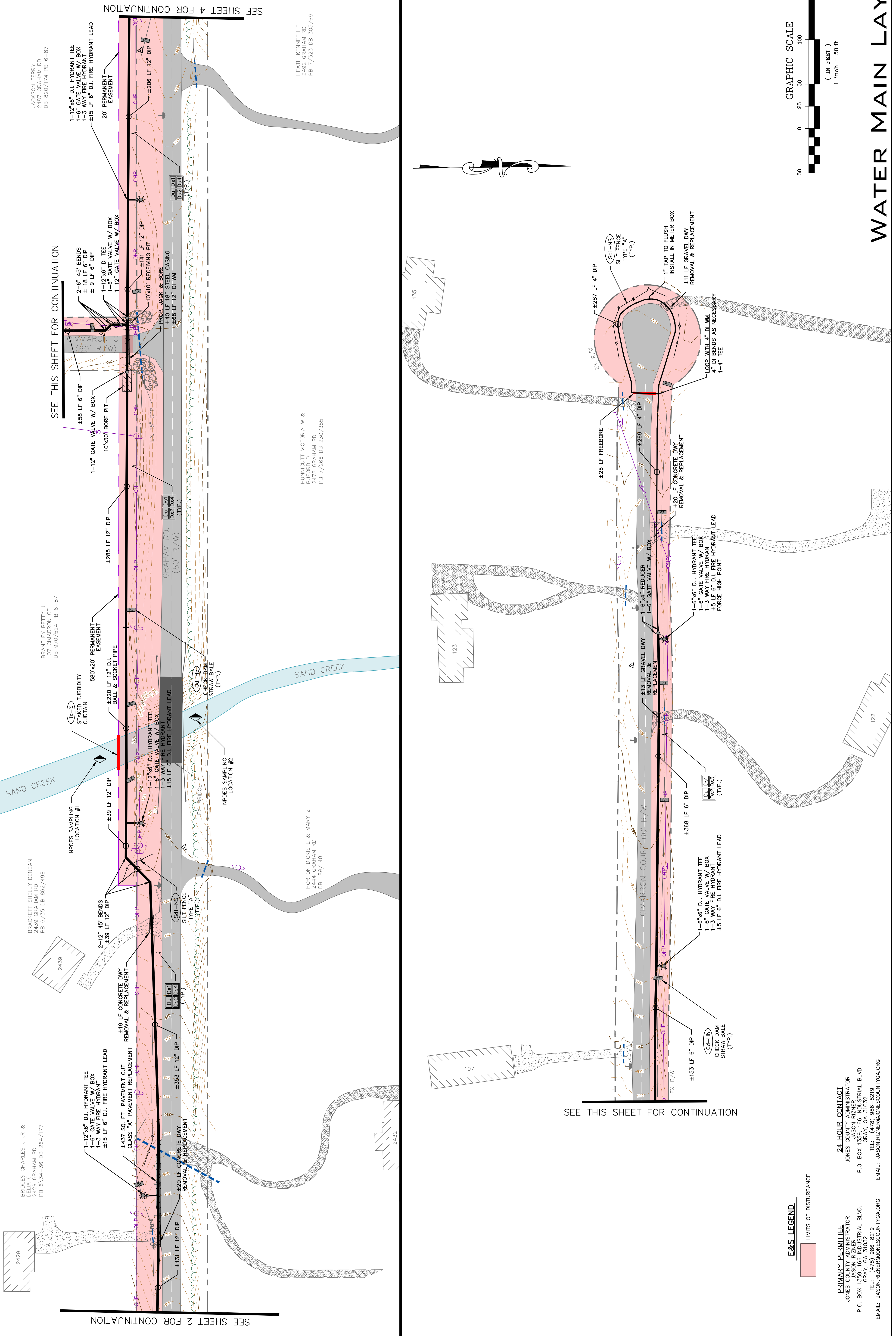
E. USE BLOCKS AND OR CONDUITS AND OR MULTICH TO STABILIZE ALL AREAS LEFT DISTURBED FOR MORE THAN SEVEN (7) CALENDAR DAYS IN CONDUCT TURBIDITY SAMPLING AT EVERY RAIN EVENT OF 0.5 INCH OR GREATER WITHIN ANY 24 HOUR PERIOD. RECOGNIZING THE EXCEPTIONS LISTED BELOW, ALL CALCULATIONS MUST BE INCLUDED ON THE PLAN.

F. LIMIT THE AMOUNT OF DISTURBED AREA AT ANY ONE TIME TO NO GREATER THAN 25 ACRES OR 50% OF THE TOTAL PLANNED SITE, WHICHEVER IS LESS.

I. ALL CALCULATIONS SHALL BE NO GREATER THAN 3.4 ACRES X .50% = 3.4 ACRES AT ANY ONE TIME.

SHEET NOTES

1. BALL AND SOCKET PIPE TO BE LAID ACROSS THE BOTTOM OF SAND CREEK



WATER MAIN LAYOUT

E&S LEGEND

LIMITS OF DISTURBANCE

24 HOUR CONTACT
JONES COUNTY ADMINISTRATOR
JASON RIZNER
P.O. BOX 1370
GRAHAM, GA 31032
TEL: (778) 986-8219
EMAIL: JASON.RIZNER@JONESCOUNTYGA.ORG

PRIMARY PERMITTEE
JONES COUNTY ADMINISTRATOR
JASON RIZNER
P.O. BOX 1370
GRAHAM, GA 31032
TEL: (778) 986-8219
EMAIL: JASON.RIZNER@JONESCOUNTYGA.ORG

DIVISION 0 – BIDDING & CONTRACT REQUIREMENTS

| <u>Section</u> | <u>Title</u> |
|----------------|---|
| 00100 | Advertisement for Bids |
| 00200 | Instruction to Bidders |
| 00410 | Bid Form |
| 00420 | Bid Bond |
| 00450 | Statement of Bidders Qualifications |
| 00455 | Contractor’s License Certifications |
| 00480 | Non-Collusion Affidavit of Prime Bidder |
| 00500 | Contract Agreement |
| 00510 | Notice of Award |
| 00550 | Notice to Proceed |
| 00610 | Performance Bond |
| 00615 | Payment Bond |
| 00620 | Certification of Owner’s Attorney |
| 00700 | General Conditions |
| 00800 | Supplementary Conditions |

DIVISION 1 – GENERAL REQUIREMENTS

| <u>Section</u> | <u>Title</u> |
|----------------|--|
| 01010 | Summary of Work |
| 01025 | Measurements & Payment |
| 01055 | Construction Staking |
| 01060 | Regulatory Requirements |
| 01091 | Codes & Standards |
| 01200 | Project Meetings |
| 01310 | Construction Schedules |
| 01320 | Construction Photograph |
| 01340 | Submittals, Shop Drawings, Product Data, & Samples |
| 01450 | Testing Laboratory Services |
| 01510 | Temporary Facilities |
| 01540 | Job Site Security |
| 01570 | Traffic Control |
| 01610 | Transportation & Handling |
| 01611 | Storage & Protection |
| 01710 | Cleaning |
| 01720 | Record Documents |
| 01740 | Warranties and Bonds |

DIVISION 2 - SITEWORK

| <u>Section</u> | <u>Title</u> |
|----------------|---|
| 02110 | Clearing & Grubbing |
| 02125 | Erosion & Sedimentation Control |
| 02200 | Basic Pipeline Construction |
| 02204 | Earthwork |
| 02220 | Classified Excavation |
| 02225 | Trench Excavation and Backfill |
| 02229 | Bore and Jack Casings |
| 02250 | Sheeting, Shoring, & Bracing |
| 02320 | Rock Removal |
| 02575 | Removing & Replacing Pavement |
| 02580 | Mobilization and Cleanup |
| 02665 | Water Mains & Accessories |
| 02668 | New Metered Services & Transfer of Services |
| 02910 | Directional Boring |
| 02917 | Soil Preparation |
| 02920 | Grassing |
| 02930 | Sodding |

DIVISION 3 – CONCRETE

| <u>Section</u> | <u>Title</u> |
|----------------|------------------------|
| 03100 | Concrete Formwork |
| 03200 | Reinforcing Steel |
| 03300 | Cast-In-Place Concrete |

DRAWING INDEX

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| Set 1 | Graham Road: Phase 2 - Graham Road from Graham Woods Subdivision |
| Set 2 | Graham Woods Subdivision; Baker Road |

Division 0

Bidding and Contract Requirements



Sealed Bids: Sealed bids for the construction of the project titled **Graham Road Water Main Improvements – Phase 2 – Graham Road & Graham Woods Subdivision** will be received until, **4:00 P.M., May 29, 2024**, at the Jones County Board of Commissioners, 166 Industrial Blvd., Gray, GA 31032, ATTN: Ms. Leslie Faulk or Mr. Jason Rizner at which time and place all Bids will be publicly opened and read in the Commission Chambers, local time prevailing. No bid may be withdrawn after the closing time for receipt of bids for a period of sixty (60) calendar days.

Contractor License: Any Contractor submitting a bid must be licensed by the State of Georgia. License numbers must be written on the face of the bid envelope. No bid will be opened unless it contains the Contractor's license number. See Instructions to Bidders for additional bidding requirements.

Work To Be Done: The work to be done shall consist of furnishing materials and constructing the project titled **Graham Road Water Main Improvements – Phase 2 – Graham Road & Graham Woods Subdivision**. The major items of construction include, 13,250 linear feet of 12” water main; 780 linear feet of 8” water main; 505 linear feet of 6” water main; gate valves; fire hydrants; water services; and miscellaneous appurtenances. The work is considered an expansion of the water distribution system. All work shall be done in accordance with the plans and specifications.

Plans and Contract Documents: Contract Documents are on file for review at the **Jones County Board of Commissioners**, 166 Industrial Blvd, Gray, Georgia 31032 and at the Dodge Plan Room. Copies for bidding purposes can be obtained from **Ingram & Associates Consulting Engineers, L.L.C., 332 New Street, Macon, GA 31201, Phone: (478) 745-3996, Fax: (478) 742-4690**, upon payment of **\$150.00** for each hard copy set or **\$75.00** for each digital set (non-refundable), Attn: Stephanie Watson (stephanie@ingrameng.com).

Bonds: All bid forms must be accompanied by a Bid Bond in an amount not less than ten percent (10%) of the base bid. All bonds shall be by a surety company licensed in Georgia with an “A” minimum rating of performance and a financial strength of at least five (5) times the contract price as listed in the most current publication of “Best’s Key Rating Guide Property Liability”. The successful bidder, if awarded the Contract, will be required to furnish a Performance Bond and Payment Bond, each in the amount of one hundred percent (100%) of the Contract amount. Each bond shall be accompanied by a “Power of Attorney” authorizing the attorney-in-fact to bind the surety and certified to include the date of the bond. All bonds must appear on the Treasury Department's most current Circular 570 Listing.

Funding: Any Contract or Contracts awarded under this Advertisement for Bids are to be funded through Local Funds.

The Owner: reserves the right to reject any or all bids, including without limitation, the right to reject any and all non-conforming, non-responsive, unbalanced or conditional bids and to reject the bid of any bidder whom the owner believes would not be in the best interest of the project to make an award to that bidder whether because the bid is not responsive, the bidder is unqualified, or of doubtful financial ability, or fails to meet any other pertinent standard or criteria established by the owner.

By: Chris Weidner, Chairman
Jones County Board of Commissioners

Ad Dates: 5/2 and 5/16

INTENTION: It is intended that the Instructions to Bidders, General Conditions, Supplementary Conditions, Technical Specifications, and Construction Drawings shall cover the complete work to which they relate.

ARTICLE 1 DEFINED TERMS: Terms used in these Instructions to Bidders which are defined in the standard General Conditions of the construction contract have the meanings assigned to them in the General Conditions (EJCDC 1910-8)(1996). In addition to these terms, the terms used in these Instructions to Bidders have the meanings indicated below which are applicable to both the singular and plural thereof.

- 1.1 **Bidder** – One who submits a Bid directly to Owner as distinct from a sub-bidder, who submits a bid to a Bidder.
- 1.2 **Successful Bidder** – The lowest, responsible, and responsive Bidder to whom Owner (on the basis of Owner’s evaluation as hereinafter provided) makes an award.
- 1.3 **Bid** – A complete and properly signed offer to execute work for the prices stipulated in Bid Form and submitted in accordance with the Bidding Documents.
- 1.4 **Addenda** – Graphic or written documents issued by Engineer prior to the opening of Bids issued to clarify, revise, add to, or delete information in the original bidding documents or in previous addenda.

ARTICLE 2 BID FORM: All bids must be made upon the Bid Forms hereto annexed, and shall state the amount bid for each item shown, and all bids must be for materials and work called for in the specifications. **Deposits for plans and specifications are non-refundable.**

- 2.1 The Bid Form is included with the Bidding Documents; additional copies may be obtained from Engineer.
- 2.2 All blanks on the Bid Form must be completed by printing in black or blue ink or by typewriter.
- 2.3 Bids by corporations or partnerships must be executed in the corporate or partnership name by the president or a vice-president (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal must be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation must be shown below the signature.

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- 2.4 The Bid shall contain an acknowledgment of receipt of all Addenda (the numbers of which must be filled in on the Bid Form).
- 2.5 The address and telephone number for communications regarding the Bid must be shown.
- 2.6 The Bidder shall complete, execute, and submit the following documents, which are attached to these Contract Documents for each division:
 - a. Section 00410-Bid Form
 - b. Section 00420-Bid Bond
 - c. Section 00450-Statements of Bidders Qualifications
 - d. Section 00455-Contractor's License Certification
 - e. Section 00480-Non-Collusion Affidavit of Prime Bidder

ARTICLE 3 QUALIFICATIONS OF BIDDERS:

- 3.1 To demonstrate qualifications to perform the Work, each Bidder must be prepared to submit within five (5) days after Bid opening upon Owner's request detailed written evidence such as financial data, previous experience, present commitments, and other such data as may be necessary to assist Owner in determining Contractor's qualifications.
- 3.2 Each Bid must contain evidence of the Contractor's authority to conduct business in the state where the Work is to be performed. The State Contractor license number, if applicable, must also be shown on the Bid Form.

ARTICLE 4 COPIES OF BIDDING DOCUMENTS:

- 4.1 Complete sets of Bidding Documents in the number and for the deposit sum, if any, stated in the Advertisement or Invitation to Bid may be obtained from the Engineer. The deposit is non-refundable.
- 4.2 Complete sets of Bidding Documents must be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.
- 4.3 Owner and Engineer in making copies of Bidding Documents available on the above terms do so only for the purpose of obtaining Bids on the Work and do not confer a license or grant for any other use.

ARTICLE 5 EXAMINATION OF BIDDING DOCUMENTS, OTHER DATA, AND SITE:

- 5.1 It is the responsibility of each Bidder before submitting a bid:
 - 5.1.1 To examine and study thoroughly the Contract Documents and other related data identified in the Contract Documents;
 - 5.1.2 To visit the work site to ascertain by inspection pertinent location conditions such as location, character and accessibility of the site including existing subsurface conditions in the work area; availability of facilities, location and character of existing work within or adjacent thereto, labor conditions, etc. that may affect cost, progress, performance, and/or furnishing of the Required Work.
 - 5.1.3 To become familiar with and satisfy Bidder as to all federal, state, and local Laws and Regulations that may affect cost, progress, or performance of the Work;
 - 5.1.4 To obtain and carefully study (or assume responsibility for doing so) all addition or supplementary examination investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and underground facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate any aspect of the means, methods, techniques, sequences, and procedures of construction expressly required of the bidding documents, and safety precautions and programs incident thereto;
 - 5.1.5 To promptly notify Engineer of all conflicts, errors, ambiguities or discrepancies which Bidder has discovered in or between the Biding Documents and such other related documents;
 - 5.1.6 To agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies or data are necessary for the determination of its Bid for performance of the work at the price bid and within the times and in accordance with the other terms and conditions of the Bidding Documents;
 - 5.1.7 To become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents;

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- 5.1.8 To determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.
- 5.2 The Owner shall make available to all prospective bidders, previous to receipt of bids, information that it may have as to sub-soil conditions and surface topography at the work site. Such information shall be given as the best factual information available without being considered as a representation of the Owner.
- 5.3 Information and data reflected in the Contract Documents with respect to Underground Facilities at or contiguous to the site is based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities or others, and Owner does not assume responsibility for the accuracy or completeness thereof unless it is expressly provided otherwise in the Supplementary Conditions.
- 5.4 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders on subsurface conditions, Underground Facilities and other physical conditions, and possible changes in the Contract Documents due to differing conditions appear in Paragraphs 4.2 and 4.3 of the General conditions.
- 5.5 Before submitting a Bid, each Bidder will, at Bidder's own expense, make or obtain any additional examinations, investigations, explorations, tests and studies and obtain any additional information and data which pertain to the physical conditions (surface, subsurface, and Underground Facilities) at or contiguous to the site or otherwise which may affect cost, progress, performance or furnishing of the Work and which Bidder deems necessary to determine its Bid for performing and furnishing the Work in accordance with the time, price, and other terms and conditions of the Contract Document.
- 5.6 On request in advance, Owner will provide each Bidder access to the site to conduct such explorations and tests as each Bidder deems necessary for submission of a Bid. Bidder shall fill all holes, clean up, and restore the site to its former condition upon completion of such explorations.
- 5.7 The lands upon which the work is to be performed, rights-of-way and easements for access thereto, and other lands designated for use by Contractor in performing the work are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided by Contractor. Easements for permanent structures or

permanent changes in existing structures are to be obtained and paid for by Owner unless otherwise provided in the Contract Documents.

- 5.8 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 5, that without exception, the Bid is premised upon performing and furnishing the Work required by the Bidding Documents and applying any specific means, methods, techniques, sequences, and procedures of construction that may be shown or indicated or expressly required by the Bidding Documents, that Bidder has given Engineer written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in the Bidding Documents and the written resolutions thereof by Engineer are acceptable to Bidder, and that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

ARTICLE 6 INTERPRETATIONS AND ADDENDA:

- 6.1 All questions about the meaning or intent of the Bidding Documents are to be directed to Engineer. The person submitting the request shall do so in writing and be responsible for its prompt delivery. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by the Engineer as having received the bidding Documents. Questions received less than ten days prior to the date for opening of Bids may not be answered. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.
- 6.2 Owner or Engineer may also issue an addenda to modify the Bidding Documents as deemed advisable.

ARTICLE 7 BID SECURITY:

- 7.1 Each Bid must be accompanied by Bid security made payable to the Owner in an amount of ten percent of Bidder's maximum Bid price and in the form of a certified or bank check or a Bid Bond (on form attached, if a form is prescribed) issued by a surety company licensed in Georgia with an "A" minimum rating of performance and a financial strength of at least five (5) times the contract price as listed in the most current publication of "Best's Key Rating Guide Property Liability".
- 7.2 The Bid security of Successful Bidder will be retained until such Bidder has executed the Agreement, furnished the required contract security and met the other

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conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Agreement and furnish the required contract security within fifteen days after the Notice of Award, Owner may annul the Notice of Award and the Bid security of that Bidder will be forfeited. The Bid security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of the seventh day after the Effective Date of the Agreement or the sixty-first day after the Bid opening, whereupon Bid security furnished by such bidders will be returned. Bid security with Bids, which are not competitive, will be returned within seven days after the Bid opening.

ARTICLE 8 CONTRACT TIME: The number of days within which, or by which the Work is to be (a) Substantially Completed and (b) also completed and ready for final payment are set forth in the Agreement. Provisions for liquidated damages, if any, are set forth in the Agreement.

ARTICLE 9 LIQUIDATED DAMAGES: Provisions for liquidated damages, if any, are set forth in the Agreement.

ARTICLE 10 SUBSTITUTE AND “OR EQUAL” TERMS: Whenever a material, article or piece of equipment is identified on the plans or in the specifications by reference to manufacturer’s vendor’s names, trade names, catalogue numbers, etc., it is intended to establish a standard; and if an equal can perform adequately the duties imposed by the general design, it will be considered equally acceptable provided the material, article, or equipment so proposed, is, in the opinion of the Engineer, of equal substance and function. “Or Equal” equipment, as offered by the Bidder, may be written into the Bid Data as a Substitute. Submittals on proposed “Or Equal” equipment by the Bidder shall be required for review by the Engineer and Owner as provided in paragraph 4 of the supplementary Conditions.

ARTICLE 11 SUBCONTRACTORS, SUPPLIERS, AND OTHERS:

- 11.1 If the Supplementary Conditions require the identify of certain Subcontractors, Suppliers, individuals, or entities to be submitted to Owner in advance of a specified date prior to the Effective Date of the Agreement, the apparent Successful Bidder, and any other Bidder so requested, shall within five days after Bid opening, submit to owner a list of all such Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work for which such identification is required. Such list shall be accompanied by an experience statement with pertinent information

regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, individual, or entity if requested by Owner. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit a substitute,

- 11.2 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable subcontractors, Suppliers, individuals, or entities. Declining to make requested substitutions would not constitute grounds for forfeiture of the bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to revocation of such acceptance after the Effective Date of the Agreement as provided in paragraph 6.06 of the General Conditions.
- 11.3 No contractor shall be required to employ any Subcontractor, Supplier, individual, or entity against whom Contractor has reasonable objection.

ARTICLE 12 SUBMISSION OF BIDS:

- 12.1 Bids shall be submitted at the time and place indicated in the Invitation to Bid and shall be enclosed in a sealed opaque envelope, marked with the project title, and name and address of Bidder, and accompanied by the Bid security and other required documents. If the Bid is sent through the mail or other delivery system, the sealed envelope shall be enclosed in a separate envelope with the notation "BID ENCLOSED" on the face of it. Contractor license number(s) shall be written on the face of the bid envelope, if required.
- 12.2 Each Bidder is responsible for seeing that his Bid is received by the Owner not later than the advertised time set for the opening of Bids.
- 12.3 Bids shall be submitted for each division in a separate envelope. Label each envelope with the particular division the Contractor is bidding.

ARTICLE 13 MODIFICATION AND WITHDRAWAL OF BIDS:

- 13.1 Bids may be modified or withdrawn by an appropriate document duly executed (in the manner that a Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to the opening of bids.

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

ARTICLE 14 OPENING OF BIDS: Bids will be opened and (unless obviously non-responsive) read aloud publicly at the place where Bids are to be submitted. An abstract of the amount of the base Bids and major alternates (if any) will be made available to Bidders after the opening of Bids.

ARTICLE 15 BIDS TO REMAIN SUBJECT TO ACCEPTANCE: Bids may not be withdrawn (except as noted in Paragraph 13) after the time set for the opening of Bids. **Bids will remain subject to acceptance for sixty (60) days after the day of the Bid opening**, but the Owner may, in its sole discretion, release any Bid and return the Bid security prior to expiration of the acceptance period.

ARTICLE 16 AWARD OF CONTRACT:

- 16.1 Owner reserves the right to reject any or all Bids, including without limitation, the rights to reject any or all nonconforming, nonresponsive, unbalanced or conditional Bids and to reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to that Bidder, whether because the Bid is not responsive, or the Bidder is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by the Owner.
- 16.2 Owner also reserves the right to waive all informalities not involving price, time or changes in the Work and to negotiate contract terms with the Successful Bidder. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between words and figures will be resolved in favor of the words.
- 16.3 In evaluating Bids, Owner will consider the qualification of Bidders, whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices and other data, as may be requested in the Bid Form or prior to the Notice of Award.

- 16.4 The Owner will also consider whether the Bidder involved:
- (a) Maintains a permanent place of business;
 - (b) Has adequate plant and equipment to do the work properly and expeditiously;
 - (c) Has suitable financial status to meet obligations incidental to the work;
 - (d) Has appropriate technical experience.
- 16.5 Owner may consider the qualifications and experience of Subcontractors, Suppliers, and other persons and organizations proposed for those portions of the Work as to which the identity of Subcontractors, Suppliers, and other persons and organizations must be submitted as provided in the Supplementary Conditions. Owner also may consider the operating costs, maintenance requirements, performance data and guarantees of major items of materials and equipment proposed for incorporation in the Work when such data is required to be submitted prior to the Notice of Award.
- 16.6 Owner may conduct such investigations as Owner deems necessary to assist in the evaluation of any bid and to establish the responsibility, qualifications and financial ability of Bidders, proposed Subcontractors, Suppliers and other persons and organizations to perform and furnish the Work in accordance with the Contract Documents to Owner's satisfaction within the prescribed time.
- 16.7 If the contract is to be awarded, it will be awarded to the Bidder whose evaluation by Owner indicates to Owner that the award will be in the best interests of the Project.
- 16.8 If the contract is to be awarded, Owner will give Successful Bidder a Notice of Award within sixty (60) days after the day of the Bid opening. All three (3) project areas will be awarded as one (1) project.

ARTICLE 17 MODIFICATIONS OF QUANTITIES: If the lowest bona fide Bid exceeds the money available for the Work, the Owner reserves the right to delete enough of the Work to bring the cost within the available funds. The Owner also reserves the right to delete whichever items or portions of items he considers to be in the best interest of the Owner.

ARTICLE 18 CONTRACT SECURITY: The General Conditions and Supplementary Conditions set forth Owner's requirements as to performance and payment bonds. When the Successful Bidder delivers the executed Agreement to the Owner, it must be accompanied by the required performance and payment bonds.

Instruction to Bidders

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ARTICLE 19 SIGNING THE AGREEMENT: When the Owner gives a Notice of Award to the Successful Bidder, it will be accompanied by the required number of unsigned counterparts of the Agreement with all other written Contract Documents attached. Within fifteen (15) days thereafter, Contractor shall sign and deliver the required counterparts of the Agreement and attached documents to Owner with the required Bonds. Within ten (10) days thereafter, Owner shall deliver one fully signed counterpart to the Contractor.

ARTICLE 20 NON-SEGREGATED FACILITIES: Bidders must certify that they do not and will not, maintain or provide for their employees any facilities that are segregated on a basis of race, color, creed, or national origin.

ARTICLE 21 LAWS AND REGULATIONS: The Contractor shall comply with local, District, County, State and Federal laws applicable to the work.

21.1 The Contractor shall comply with the Department of Labor Safety and Health Regulations for Construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91-596) and under Section 107 of the Contract Work and Safety Standards Act (PL 91-54). The regulations are administered by the Department of Labor and the Contractor shall allow access to the project to personnel from that Department.

ARTICLE 22 CONTRACTOR'S AND SUBCONTRACTOR'S INSURANCE: Contractor shall not commence work under this contract until he has obtained all the insurance required by the Supplementary Conditions.

ARTICLE 23 TERMINATION OF CONTRACT: If the Owner is made to stop construction of the work because of an order from a Court or State Department, the contract shall be terminated. Payment will be made for work completed and a pro-ration of the work underway, materials stored, and for the overhead and profit of the completed work and work underway. Payment will not be made for anticipated profit and overhead on work not completed or underway.

ARTICLE 24 This contract shall be subject to Davis-Bacon Wage Rates; American Iron & Steel Requirements & Certified Payrolls. Certified Payrolls should be submitted weekly. Monthly pay request will NOT be processed without certified payroll.

END SECTION

PROJECT IDENTIFICATION:

Water Main Extensions to serve

- **Graham Road: Phase 2 – Graham Road from Graham Woods subdivision to Sand Creek Trail**
- **Graham Woods Subdivision; Baker Road**

CONTRACT IDENTIFICATION AND NUMBER:

I & A Project No.: 1160-089-02

THIS BID IS SUBMITTED TO:

Jones County Board of Commissioners

166 Industrial Blvd.

Gray, GA 31032

THIS BID IS SUBMITTED FROM:

Company Name: _____

Contact: _____

Address: _____

Phone: _____

Fax: _____

License No.: _____

The undersigned BIDDER proposes and agrees, if this Bid is accepted, to enter into an agreement with OWNER in the form included in the Contract Documents to perform and furnish all Work as specified or indicated in the Contract Documents for the Contract Price and within the Contract Time indicated in this Bid and in accordance with the other terms and conditions of the Contract Documents.

REVISED - Bid Form

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BIDDER accepts all of the terms and conditions of the Advertisement or Invitation to Bid and Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for sixty days after the day of Bid opening. BIDDER will sign and submit the Agreement with the Bonds and other documents required by the Bidding Requirements within fifteen days after the date of OWNER's Notice of Award.

In submitting this Bid, BIDDER represents, as more fully set forth in the Agreement, that:

BIDDER has examined copies of all the Bidding Documents and of the following Addenda (receipt of all which is hereby acknowledged):

| Date | Number |
|-------|--------|
| <hr/> | |
| <hr/> | |

BIDDER has familiarized itself with the nature and extent of the Contract Documents, Work, site, locality, and all local conditions and Laws and Regulations that in any manner may affect cost, progress, performance, or furnishing of the Work.

BIDDER has studied carefully all reports and drawings of subsurface conditions and drawings of physical conditions which are identified in the Supplementary Conditions as provided in paragraph 4.2 of the General Conditions, and accepts the determination set forth in paragraph 5 of the Supplementary Conditions of the extent of the technical data contained in such reports and drawings upon which BIDDER is entitled to rely.

BIDDER has obtained and carefully studied (or assumes responsibility for obtaining and carefully studying) all such examinations, investigations, explorations, tests, and studies (in addition to or to supplement those referred to in (c) above) which pertain to the subsurface or physical conditions at the site or otherwise may affect the cost, progress, performance or furnishing of the Work as BIDDER considers necessary for the performance or furnishing of the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of paragraph 4.2 of the General Conditions; and no additional examinations, investigations, explorations, tests, reports or similar information or data are or will be required by BIDDER for such purposes.

BIDDER has reviewed and checked all information and data shown or indicated on the Contract Documents with respect to existing Underground Facilities at or contiguous to the site and assumes responsibility for the accurate location of said Underground Facilities. No additional examinations, investigations, explorations, tests, reports or similar information or data in respect of said Underground Facilities are or will be required by BIDDER in order to perform and furnish the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of paragraph 4.3 of the

General Conditions.

BIDDER has correlated the results of all such observations, examinations, investigations, explorations, tests, reports and studies with the terms and conditions of the Contract Documents.

BIDDER has given ENGINEER written notice of all conflicts, errors or discrepancies that it has discovered in the Contract Documents and the written resolution thereof by ENGINEER is acceptable to BIDDER.

This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with an agreement or rules of any group, association, organization or corporation; BIDDER has not directly or indirectly induced or solicited any other corporation to refrain from bidding; and BIDDER has not sought by collusion to obtain for itself any advantage over any other BIDDER or over OWNER.

BIDDER agrees to commence work under this Agreement on or before a date to be specified in a written "Notice to Proceed" of the OWNER and to fully complete the work within 300 consecutive calendar days from the "Notice to Proceed" date.

BIDDER accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work on time.

This project is funded with the Corona State and Local Fiscal Recovery Funds. Certified Pay Rolls; Davis Bacon Wage Rate and American Iron and Steel will be required for this project.

By submission of this bid, the Bidders accept the provisions for cleanup of the right of way as specified. Final payment will be held for this cleanup.

By submission of this bid, Bidder accepts the provisions to bring each road on-line as each road is completed. Bidder also accepts the provision to complete all grassing for a disturbed area by close of business on Friday of the week it was disturbed.

THE REST OF THIS PAGE INTENTIONALLY LEFT BLANK.

REVISED - Bid Form

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Water Main Extensions

| ITEM NO. | QTY | UNIT | DESCRIPTION | UNIT PRICE | TOTAL PRICE |
|--|-------|------|---|------------|-------------|
| I. Graham Road: Phase 2 – Graham Road | | | | | |
| 1 | 1434 | LF | 2" Watermain - PVC | \$ | \$ |
| 2 | 556 | LF | 4" Water Main - Ductile Iron | \$ | \$ |
| 3 | 586 | LF | 6" Ductile Iron Lead | \$ | \$ |
| 4 | 2349 | LF | 6" Watermain - PVC | \$ | \$ |
| 5 | 686 | LF | 6" Watermain - Ductile Iron | \$ | \$ |
| 6 | 6120 | LF | 8" Water Main - PVC | \$ | \$ |
| 7 | 220 | LF | 8" Water Main - PVC - Fusible | \$ | \$ |
| 8 | 10068 | LF | 12" Water Main - PVC | \$ | \$ |
| 9 | 3748 | LF | 12" Water Main - Ductile Iron | \$ | \$ |
| 10 | 220 | LF | 12" Water Main - Ductile Iron - Ball & Socket | \$ | \$ |
| 11 | 59 | EA | 6" Gate Valve w/ Box & Concrete Collar | \$ | \$ |
| 12 | 5 | EA | 8" Gate Valve w/ Box & Concrete Collar | \$ | \$ |
| 13 | 7 | EA | 12" Gate Valve w/ Box & Concrete Collar | \$ | \$ |
| 14 | 50 | EA | Three Way Fire Hydrant w/ Base Elbow | \$ | \$ |
| 15 | 75 | LF | 2" Freebore | \$ | \$ |
| 16 | 25 | LF | 4" Freebore | | |
| 17 | 75 | LF | 8" Freebore | \$ | \$ |
| 18 | 110 | LF | 12" Freebore | \$ | \$ |
| 19 | 95 | LF | 14" Steel Casing | \$ | \$ |
| 20 | 60 | LF | Jack & Bore 14" Steel Casing w/ Spacers | \$ | \$ |
| 21 | 155 | LF | Jack & Bore 18" Steel Casing w/ Spacers | \$ | \$ |
| 22 | 1 | EA | 220 LF Horizontal Directional Drill underneath Kinder Morgan Gas Mains | \$ | \$ |
| 23 | 1 | EA | 220 LF Horizontal Directional Drill across the front yard of 163 Graham Woods Drive to avoid disturbing culvert. | \$ | \$ |
| 24 | 2 | EA | Tie to Existing 12" Water Main at the intersection of Graham Road and Graham Woods Drive. | \$ | \$ |
| 25 | 1 | EA | Sand Creek crossing. Not to include ductile iron pipe or turbidity curtain, as those are listed under line items 10 & | \$ | \$ |

| | | | | | |
|----|-------|--------|---|----|----|
| | | | 39. | | |
| 26 | 24483 | LF | 1" 200 PSI Polyethylene Service Tubing - SDR 9 | \$ | \$ |
| 27 | 56 | EA | Short side service connection including taping saddle; corp stop; curb stop; water meter box & fitting for connection to water meter. Jones County to purchase & install water meters. | \$ | \$ |
| 28 | 66 | EA | Longside service connection including taping saddle; corp stop; curb stop; long side bore; 2" SDR 9 service tubing to be used as an outer casing; water meter box & fitting for connection to water meter. Jones County to purchase & install water meters. | \$ | \$ |
| 29 | 10060 | TON | DI Fittings | \$ | \$ |
| 30 | 341 | LF | Gravel Driveway Replacement (GABC) | \$ | \$ |
| 31 | 423 | LF | Concrete Driveway Replacement | \$ | \$ |
| 32 | 160 | LF | Asphalt Driveway Replacement | \$ | \$ |
| 33 | 1193 | SQ. FT | Class 'A' Pavement Cut & Patch | \$ | \$ |
| 34 | 63 | EA | Remove & Replace Mailbox as needed. Install GABC apron as detailed. | \$ | \$ |
| 35 | 2650 | LF | Silt Fence Type "A" | \$ | \$ |
| 36 | 128 | EA | Haybale Checkdams | \$ | \$ |
| 37 | 7.0 | AC | Permanent Grassing | | |
| 38 | 0.4 | AC | Centipede Sodding w/ 4" thick layer of topsoil. Contractor to maintain sod, including watering, for 2 weeks. | \$ | \$ |
| 39 | 0.4 | AC | Bermuda Sodding w/ 4" thick layer of topsoil. Contractor to maintain sod, including watering, for 2 weeks. | \$ | \$ |
| 40 | 1 | EA | Turbidity Curtain | \$ | \$ |
| 41 | 0.5 | AC | Clearing & Grubbing | \$ | \$ |
| 42 | 80 | HR | Exploratory Digging | \$ | \$ |
| 43 | 1 | LS | Mobilization, Bonding, Insurance, Cleanup, Stakeout, Site Preparation, and Disposal of Debris | \$ | \$ |
| 44 | 1 | LS | Erosion & Sedimentation Control including all BMPs not specifically itemized below, inspections, maintenance and temporary grassing/mulching | \$ | \$ |

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| | | | | | |
|-------------------------------|----|----|--|----|----|
| 45 | 1 | LS | NPDES Permit No 100002 Requirements including sampling, inspections, retention of records and reporting for a 6-month period. | \$ | \$ |
| TOTAL BASE BID | | | | | |
| | \$ | | | | |
| | | | | | |

Bidder agrees to furnish all materials, and equipment and to perform all labor necessary for the construction of the **Water Main Extensions to serve: Graham Road: Phase 2 – Graham Road from Graham Woods subdivision; Graham Woods Subdivision** for **Jones County Board of Commissioners** for the **BASE BID** sum of: _____

_____ Dollars (\$_____)

The above lump sum and unit prices shown shall include all labor, materials, equipment, bailing, shoring removal, overhead, profit, insurance, etc., to cover the finished work of the several kinds called for.

BIDDER understands that the OWNER reserves the right to reject any or all bids and to waive any informalities in the bidding.

BIDDER furthermore agrees that, in the case of a failure on his part to execute the Contract Agreement and Bonds within fifteen (15) days after receipt of confirmed contract documents for execution, the Bid Bond accompanying his bid and the monies payable thereon shall be paid into the funds of the OWNER as liquidated damages for such failures.

The following documents are attached to and made a condition of this Bid:

- a. Required Bid Bond for the sum of _____ Dollars (\$_____) according to the conditions of "Instructions to Bidders".

- b. Bid Data submitted by BIDDER that indicates standard specifications, details or drawings with any deviation from the specifications indicated.

SUBMITTED on _____, 20_____

BIDDER: _____

By: _____

Title: _____

Address: _____

Seal: (if bid by a Corporation)

Attested by: _____

END OF SECTION

STATE OF GEORGIA

County of Jones

KNOW ALL MEN BY THESE PRESENTS, that we, _____, as Principal,
and _____, as Surety, are held and firmly bound
unto the _____ Dollars
(\$ _____) lawful money of the United States, for the payment of which
sum well and truly to be made, we bind ourselves, our heirs, personal representatives, successors
and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted to the Owner a Proposal for construction of:

Water Main Extensions to serve

- **Graham Road: Phase 2 – Graham Road from Graham Woods Subdivisions**
- **Graham Woods Subdivision; Baker Road**

NOW THEREFORE, the conditions of this obligation are such that if the Bid be accepted, the Principal shall within ten days after receipt of conformed contract documents execute a contract in accordance with the Bid upon the terms, conditions and prices set forth therein, and in the form and manner required by the Owner and execute a sufficient and satisfactory Performance Bond and Payment Bond payable to the Owner, each in an amount of one hundred percent (100%) of the total contract price, in form and with security satisfactory to the Owner, or in the event of the failure of the Contractor to execute and deliver the Contract Agreement and give said Performance and Payment Bonds, the Contractor shall pay the Owner the difference not to exceed the penalty hereof between the amount specified in said Proposal and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said Proposal, and execute the Special Assurances form, then this obligation shall be void; otherwise, it shall be and remain in full force and virtue in law; and the Surety shall, upon failure of the Principal to comply with any or all of the foregoing requirements within the time specified above, immediately pay to the aforesaid Owner, upon demand, the amount hereof in good and lawful money of the United States of America, not as a penalty, but as liquidated damages.

This bond is given pursuant to and in accordance with the provisions of O.C.G.A. Section 36-10-1 et seq and all the provisions of the law referring to this character of bond as set forth in said sections or as may be hereinafter enacted and these are hereby made a part hereof to the same extent as if set out herein in full.

Bid Bond

00420-2

IN WITNESS WHEREOF, the said Principal has hereunder affixed its signature and said Surety has hereunto caused to be affixed its corporate signature and seal, by its duly authorized officers, on this _____ day of _____, 2023.

PRINCIPAL: _____

Signed and sealed in
the presence of

By: _____

1. _____

Title: _____

2. _____

SURETY: _____

Signed and sealed in
the presence of:

By: _____

1. _____

Title: _____

2. _____

End of Section

TO BE COMPLETED AND SUBMITTED WITH BID

All questions must be answered and the data given must be clear and comprehensive. This statement must be notarized. If necessary, questions may be answered on separate attached sheets. The Bidder may submit any additional information desired. Attach all additional sheets to this statement.

- 1. Name of Bidder: _____

- 2. Permanent main office address: _____

- 3. When organized: _____
- 4. If a Corporation, where incorporated: _____
- 5. How many years have you been engaged in the contracting business under your present firm or trade name? _____
- 6. Contracts on hand: (Schedule these, showing amount of each contract and the appropriate anticipated dates of completion): _____

- 7. General description of work performed by your company: _____

- 8. Have you ever failed to complete any work awarded to you? If so, where, and why? _____

- 9. Have you ever defaulted on a contract? If so, where, and why? _____

- 10. List the most important projects recently completed by your company, stating the approximate cost for each, and the month and year completed: _____

Statement of Bidder's Qualifications

00450-2

- 11. List your major equipment available for this contract: _____

- 12. Experience in construction work similar in importance to this project: _____

- 13. Background and experience of the principal members of your organization, including officers: _____

- 14. Credit Available: \$ _____

- 15. Give Bank Reference: _____

- 16. Will you upon request, fill out a detailed financial statement and furnish any other information that may be required by the Owner/Engineer? _____

- 17. The undersigned hereby authorizes and requests any person, firm, or corporation to furnish any information requested by the local public agency in verification of the recitals comprising his Statement of Bidder's Qualifications.

Statement of Bidder's Qualifications

00450-3

Dated this _____ day of _____, 20____

BIDDER: _____

By: _____
(Signature)

Title: _____

State of _____

County of _____

_____ being duly sworn deposes and
says that he _____
of _____ and that the answers to the foregoing
questions and all statements therein contained are true and correct. Subscribed and sworn to
before me this _____ day of _____, 2023.

Notary Public: _____
(Signature)

My Commission Expires: _____
(Date)

(Seal)

END OF SECTION

Contractor's License Certifications

00455-1

Contractor's Name: _____

Contractor's License Number: _____

Utility Contractor's License Number: _____

Expiration Date of License: _____

I certify that the above information is true and correct and that the classification noted is applicable to the Bid for this Project.

Signed: _____

Printed: _____

Date: _____

END OF SECTION

(To Be Completed and Submitted with Bid)

State of _____ County of _____

_____, being first duly sworn, deposed and says that:

- (1) He is _____ of _____, (owner, partner, officer, representative, or agent) the Bidder that has submitted the attached Bid;
- (2) He 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, agents, representatives, employees or parties in interest, including this affidavit, has in any way colluded, conspired, connived or agreed, directly or indirectly with any other Bidder, firm or person to submit a collusive or 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 the price or prices in the attached Bid or of any other Bidder, or to fix any 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 any advantage against the _____ (Local Public Agency) or any person interested in the proposed Contract and:
- (5) The price or 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 affidavit.

By: _____

Title: _____

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

(Notary Public)

My commission expires _____

END OF SECTION

THIS AGREEMENT is dated as of the ____ day of _____ in the year **2023** by _____ and between the **Jones County Board of Commissioners** (hereinafter called OWNER) and (hereinafter called CONTRACTOR).

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

ARTICLE 1. WORK.

CONTRACTOR shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

**Water Main Extensions to serve:
Graham Road: Phase 2 – Graham Road from Graham Woods Subdivision
Graham Woods Subdivision; Baker Road**

The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows:

**Water Main Extensions to serve:
Graham Road: Phase 2 – Graham Road from Graham Woods Subdivision
Graham Woods Subdivision; Baker Road**

ARTICLE 2. ENGINEER.

2.1 The Project has been designed by **Ingram & Associates Consulting Engineers, L.L.C.**, who is hereinafter called ENGINEER and who is to act as OWNER's representative, assume all duties and responsibilities and have the rights and authority assigned to ENGINEER in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents.

ARTICLE 3. CONTRACT TIME.

3.1 CONTRACTOR agrees to commence Work under this Agreement on or before a date to be specified on a written "Notice to Proceed" of the OWNER and to fully complete the Work within **300** consecutive calendar days from the "Notice to Proceed" date.

3.2 Liquidated Damages. OWNER and CONTRACTOR recognize that time is of the essence of this Agreement and that OWNER will suffer financial loss if the Work is not completed within the times specified in paragraph 3.1 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. They also recognize the delays, expense and difficulties involved in proving in a legal or arbitration proceeding the actual

Contract Agreement

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loss suffered by OWNER if the Work is not completed on time. Accordingly, instead of requiring any such proof, OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) CONTRACTOR shall pay OWNER **\$200.00** for each day that expires after the time specified in paragraph 3.1.

ARTICLE 4. CONTRACT PRICE.

4.1 OWNER shall pay CONTRACTOR for completion of the Work in accordance with the Contract Documents in current as follows:

Dollars \$ _____

ARTICLE 5. PAYMENT PROCEDURES.

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

5.1 Progress Payments; Retainage. OWNER shall make progress payments on account of the Contract Price on the basis of CONTRACTOR'S Applications for Payment as recommended by ENGINEER, on or about the 25th day of each month during performance of the Work as provided in paragraphs 5.1.1, 5.1.1.2 and 5.2 below. All such payments will be measured by the schedule of values established in paragraph 2.07 of the General Conditions (and in the case of Unit Price Work based on the number of units completed) as provided in the General Requirements.

5.1.1 For Cost of Work: Progress payments on account of the Cost of the Work will be made:

5.1.1.1 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 ENGINEER shall determine, or OWNER may withhold, in accordance with paragraph 14.02 of the General Conditions.

90% of the Work completed (with the balance being retainage). If Work has been 50% completed as determined by ENGINEER, and if the character and progress of the Work have been satisfactory to OWNER and ENGINEER, OWNER, on recommendation of ENGINEER, may determine that as long as the character and progress of the Work remain satisfactory to them, there will be no additional retainage on account of Work completed, in which case the remaining progress payments prior to Substantial Completion will be in an amount equal to 100% of the Work completed. 90% of the Cost of the

Work (with the balance being retainage) applicable to materials and equipment not incorporated in the Work (but delivered, suitably stored and accompanied by documentation satisfactory to OWNER as provided in paragraph 14.02.A.1 of the General Conditions).

5.1.1.2 Upon Substantial Completion, in an amount sufficient to increase the total payments to CONTRACTOR to 95% of the Cost of the Work, (with the balance being retainage), less such amounts as ENGINEER shall determine, or OWNER may withhold, in accordance with paragraph 14.7 of the General Conditions.

5.2 Final Payment. Upon final completion and acceptance of the Work in accordance with paragraph 14.07 of the General Conditions, OWNER shall pay the remainder of the Contract Price as recommended by ENGINEER as provided in said paragraph 14.13.

ARTICLE 6. CONTRACTOR'S REPRESENTATIONS.

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

- 6.1 CONTRACTOR has familiarized itself with the nature and extent of the Contract Documents, Work, site, locality, and all local conditions and Laws and Regulations that in any manner may affect cost, progress, performance or furnishing of the Work.
- 6.2 CONTRACTOR has studied carefully all reports of explorations and tests of subsurface conditions and drawings of physical conditions which are identified in the Supplementary Conditions as provided in paragraph 4.2 of the General Conditions, and accepts the determination set forth in paragraph 5 of the Supplementary Conditions of the extent of the technical data contained in such reports and drawings upon which CONTRACTOR is entitled to reply.
- 6.3 CONTRACTOR has obtained and carefully studied (or assumes responsibility for obtaining and carefully studying) all such examinations, investigations, explorations, tests, reports and studies (in addition to or to supplement those referred to in paragraph 6.2 above) which pertain to the subsurface or physical conditions at or contiguous to the site or otherwise may affect the cost, progress, performance or furnishing of the Work as CONTRACTOR considers necessary for the performance or furnishing of the Work at the Contract Price, within the Contract Time and in accordance of paragraph 4.2 of the General Conditions; and no additional examinations, investigations, explorations, tests, reports, studies or similar information or data are or will be required by CONTRACTOR for such purposes.
- 6.4 CONTRACTOR has reviewed and checked all information and data shown or indicated on

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the Contract Documents with respect to existing Underground Facilities at or contiguous to the site and assumes responsibility for the accurate location of said Underground Facilities. No additional examinations, investigations, explorations, tests, reports, studies or similar information or data in respect of said Underground Facilities are or will be required by CONTRACTOR in order to perform and furnish the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of paragraph 4.3 of the General Conditions.

- 6.5 CONTRACTOR has correlated the results of all such observations, examinations, investigations, explorations, tests, reports, and studies with the terms and conditions of the Contract Documents.
- 6.6 CONTRACTOR has given ENGINEER written notice of all conflicts, errors or discrepancies that he has discovered in the Contract Documents, and the written resolution thereof by ENGINEER is acceptable to CONTRACTOR.

ARTICLE 7. CONTRACT DOCUMENTS.

- 7.1. This Agreement
- 7.2 Exhibits to this Agreement
- 7.3 Performance and other Bonds
- 7.4 Notice of Award
- 7.5 General Conditions
- 7.6 Supplementary Conditions
- 7.7 Drawings, consisting of 3 sets, inclusive with each sheet bearing the following general title:
**Water Main Extensions to serve: Graham Road: Phase 2 – Graham Road from Graham Woods
Subdivision Graham Woods Subdivision; Baker Road**
- 7.8 Addenda numbers ___ to ___, inclusive.
- 7.9 CONTRACTOR's Bid
- 7.10 Documentation submitted by CONTRACTOR prior to Notice of Award.
- 7.11 The following which may be delivered or issued after the Effective Date of the Agreement

and are not attached hereto: All Written Amendments and other documents amending, modifying, or supplementing the Contract Documents pursuant to paragraphs 3.4 and 3.5 of the General Conditions.

- 7.12 The documents listed in paragraphs 7.2 et seq. above are attached to this Agreement (except as expressly noted otherwise above).

There are no Contract Documents other than those listed above in this Article 7. The Contract Documents may only be amended, modified, or supplemented as provided in paragraphs 3.4 and 3.5 of the General Conditions.

ARTICLE 8. MISCELLANEOUS

- 8.1 Terms used in this Agreement which are defined in Article 1 of the General Conditions will have the meanings indicated in the General Conditions.
- 8.2 No assignment by a party hereto of any rights under or interests in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and specifically but without limitation moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.
- 8.3 OWNER and CONTRACTOR each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect of all covenants, agreements, and obligations contained in the Contract Documents.

ARTICLE 9. RETAINAGE OF CONTRACTOR'S PAYMENT.

The retainage shall be an amount equal to 10% of Contractor's partial pay estimate until 50% of the work has been completed. At 50% completion, further partial payments shall be made in full to the Contractor and no additional amounts may be retained unless the Engineer certifies that the job is not proceeding satisfactorily, but amounts previously retained shall not be paid to the Contractor. At 50% completion or any time thereafter when the progress of the Work is not satisfactory, additional amounts may be retained but in no event shall the total retainage be more than 20% of the value of the work completed. Upon substantial completion of the work, any amount retained may be paid to the Contractor. When the Work has been substantially completed except for Work which cannot be completed because of weather conditions, lack of materials or other reasons which in the judgment of the Owner are valid reasons for noncompletion, the Owner may make additional payments, retaining at all times an amount sufficient to cover the estimated cost of the Work still to be completed.

Contract Agreement

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Partial pay estimates may include stored materials. Contractor must submit invoices and all materials must be located at the site of the work. Retainage will not be held on stored materials.

ARTICLE 10. INTEREST

10.1 All monies not paid when due as provided in Article 14 of the General conditions shall bear interest at the maximum rate allowed by law at the place of the project.

ARTICLE 11. ALL OTHER PROVISIONS

IN WITNESS WHEREOF, OWNER and CONTRACTOR have signed this Agreement in **five (5) counterparts**. One counterpart each has been delivered to OWNER, CONTRACTOR and ENGINEER. All portions of the Contract Documents have been signed or identified by OWNER and CONTRACTOR or by ENGINEER on their behalf.

This Agreement will be effective on _____, 2023

OWNER:

Jones County Board of Commissioners

CONTRACTOR: _____

By _____
[CORPORATE SEAL]

By: _____
[CORPORATE SEAL]

Attest _____

Attest: _____

Address for giving notices

Address for giving notices

PO Box 1359 _____

Gray, GA 31032 _____

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

License No. _____

Agent for service of process: _____

(If CONTRACTOR is a corporation, attach evidence of authority to sign.)

END OF SECTION

PROJECT DESCRIPTION:

**Water Main Extensions to serve:
Graham Road: Phase 2 – Graham Road from Graham Woods Subdivision
Graham Woods Subdivision; Baker Road**

The OWNER has considered the BID submitted by you for the above-described WORK in response to its Advertisement for Bids date _____, and all associated Addenda's and Instruction to Bidders.

You are hereby notified that your BID has been accepted for items in the amount of _____ Dollars \$ _____

You are required by the Instructions to Bidders to execute the Agreement and furnish the required Contractor's Performance BOND, Payment BOND and Certificates of Insurance with fifteen (15) calendar days from the date of the Notice to you.

If you fail to execute said Agreement and to furnish said BONDS within five (5) 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 and ENGINEER

Dated this _____ day of _____, 2023

Jones County Board of Commissioners

Owner

By: _____

Title: _____

**ACCEPTANCE OF NOTICE
(CONTRACTOR)**

Receipt of the above NOTICE OF AWARD is hereby acknowledged by

This _____ day of _____, 2023

By: _____

Title: _____

END OF SECTION

To: _____ Date: _____

Project: **Water Main Extensions to serve: Graham Road: Phase 2 – Graham Road from Graham Woods Subdivision Graham Woods Subdivision; Baker Road**

You are hereby notified to commence WORK in accordance with the Agreement dated _____, 2023, on or before _____, 2023, and you are to complete the WORK within 300 consecutive calendar days thereafter. The date of completion of all WORK is therefore _____, 20_____.

Jones County Board of Commissioners
Owner

By: _____

Title: _____

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO PROCEED is hereby acknowledged by:

this the _____ day of _____, 2023.

By: _____

Title: _____

END OF SECTION

STATE OF GEORGIA

County of Jones

KNOW ALL MEN BY THESE PRESENTS, that we, _____, as Principal (hereinafter known as "CONTRACTOR"), and we, _____, as Surety, do hereby acknowledge ourselves indebted and firmly bound and held unto the Jones County Board of Commissioners for the use and benefit of those entitled thereto, in the sum of _____ Dollars \$ _____ for the payment of which well and truly to be made, in lawful money of the United States, we do hereby bind ourselves, successors, assigns, heirs, and personal representatives.

BUT THE CONDITION OF THE FOREGOING OBLIGATION OR BOND IS THIS:

WHEREAS, the OWNER has engaged the said CONTRACTOR for the sum of of _____ Dollars \$ _____ for the proposed **Water Main Extensions to serve: Graham Road: Phase 2 – Graham Road from Graham Woods Subdivision Graham Woods Subdivision; Baker Road for the Jones County Board of Commissioners** as more fully appears in a written Agreement bearing the date of _____, 2023, a copy of which Agreement is by reference hereby made a part hereof.

NOW, THEREFORE, if said Contractor shall fully and faithfully perform all the undertakings and obligations under the said agreement or contract herein before referred to and shall fully indemnify and save harmless the said OWNER from all costs and damage whatsoever which it may suffer by reason of any failure on the part of said CONTRACTOR to do so, and shall fully reimburse and repay the said default, and shall guarantee all products and workmanship against defects for a period of one year, then this obligation or bond shall be null and void, otherwise, it shall remain in full force and effect.

And for value received it is hereby stipulated and agreed that no change, extension of time, alteration or addition to the terms of the said Agreement or Contract or in the work to be performed thereunder, or the Specifications accompanying the same shall in any way affect the obligations under the obligation or bond, and notice is hereby waived of any such damage, extension of time, alteration or addition to the terms of the Agreement or Contract or to the work or to the Specifications.

This bond is given pursuant to and in accordance with the provisions of O.C.G.A. Section 36-10-1 et seq and 36-82-100 et seq and all the provisions of the law referring to this character of bond as set forth in said sections or as may be hereinafter enacted and these are hereby made a part hereof to the same extent as if set out herein in full.

Performance Bond

00610-2

IN WITNESS WHEREOF, the said CONTRACTOR has hereunder affixed its signature and said Surety has hereunto caused to be affixed its corporate signature and seal, by its duly authorized officers, on this ____ day of _____, 2023. Executed in five (5) counterparts.

CONTRACTOR: _____

Signed and sealed in
the presence of:

By: _____

1. _____

Title: _____

2. _____

(SEAL)

SURETY: _____

Signed and sealed in
the presence of:

By: _____

1. _____

Title: _____

2. _____

(SEAL)

NOTE: Date of bond must not be prior to date of contract. If CONTRACTOR is a PARTNERSHIP, all partners should execute bond.

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

END OF SECTION

STATE OF GEORGIA

County of Jones

KNOW ALL MEN BY THESE PRESENTS, that we _____, as Principal (hereinafter know as "CONTRACTOR"), and we, _____, as Surety, do hereby acknowledge ourselves indebted and firmly bound and held unto the **Jones County Board of Commissioners** the use and benefit of those entitled thereto, in the sum of _____ Dollars \$ _____ for the payment of which well and truly to be made, in lawful money of the United States, we do hereby bind ourselves, successors, assigns, heirs, and personal representatives.

BUT THE CONDITION OF THE FOREGOING OBLIGATION OR BOND IS THIS:

WHEREAS, the OWNER has engaged the said CONTRACTOR for the sum of _____ Dollars \$ _____ for proposed **Water Main Extensions to serve: Graham Road: Phase 2 – Graham Road from Graham Woods Subdivision Graham Woods Subdivision; Baker Road for the Jones County Board of Commissioners** as more fully appears in a written Agreement bearing the date of _____, 2023 a copy of which Agreement is by reference hereby made a part hereof.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if said CONTRACTOR and all subcontractors to whom any portion of the work provided for in said Contract is sublet and all assignees of said Contractor and of such subcontractors shall promptly make payments to all persons supplying him or them with labor, products, services, or supplies for or in the prosecution of the work provided for in such Contract, or in any amendment or extension of or addition to said Contract, and for the payment of reasonable attorney's fees, incurred by the claimants in suits on this bond, then the above obligation shall be void; otherwise, it shall remain in full force and effect.

HOWEVER, this bond is subject to the following conditions and limitations:

- (a) Any person, firm or corporation that has furnished labor, products, or supplies for or in the prosecution of the work provided for in said Contract shall have a direct right of action against the CONTRACTOR and Surety on this bond, which right of action shall be asserted in a proceeding, instituted in the County in which the work provided for in said Contract is to be performed or in any county in which Contractor or Surety does business. Such right of action shall be asserted in proceedings instituted in the name of the claimant or claimants for his or their use and benefit against said CONTRACTOR or Surety or either of them (but not later than one year after the final settlement or said Contract) in which action such claim or claims shall be adjudicated and judgment rendered thereon.
- (b) The Principal and Surety hereby designate and appoint _____

Payment Bond

00615-2

as the agent of each of them to receive and accept service of process or other pleading issued or filed in any proceeding instituted on this bond and hereby consent that such service shall be the same as personal service on the CONTRACTOR and/or Surety.

(c) In no event shall the Surety be liable for a greater sum than the penalty of this bond, or subject to any suit, action, or proceeding thereon that is instituted later than one year after the final settlement of said Contract.

(d) This bond is given pursuant to and in accordance with provisions of O.C.G.A. Section 13-10-1 et seq and 36-82-100 et seq and all the provisions of law referring to this character of bond as set forth in said sections or as may be hereinafter enacted, and these are hereby made a part hereof to the same extent as if set out herein in full.

IN WITNESS WHEREOF, the said CONTRACTOR has hereunder affixed its signature and said Surety has hereunto caused to be affixed its corporate signature and seal, by its duly authorized officers, on this ____ day of _____, 2023. Executed in five (5) counterparts.

CONTRACTOR: _____

Signed and sealed in the presence of:

By: _____

1. _____

Title: _____

2. _____

(SEAL)

SURETY: _____

Signed and sealed in the presence of:

By: _____

1. _____

Title: _____

2. _____

(SEAL)

NOTE: Date of bond must not be prior to date of contract. If CONTRACTOR is a PARTNERSHIP, all partners should execute bond.

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

END OF SECTION

I, the undersigned, _____, the duly authorized and acting legal representative of the _____, do hereby certify as follows:
(Name of Owner)

I have examined the foregoing contract and surety bonds and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements has been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said agreements on behalf of the respective parties named thereon; and that the foregoing agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with terms, conditions and provisions thereof.

Signature of Attorney

Date

Division 1

General Requirements



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GENERAL CONDITIONS

ARTICLE 1 - DEFINITIONS

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

Addenda - Written or graphic instruments issued prior to the opening of Bids which clarify, correct or change the bidding documents or the Contract Documents.

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

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

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

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

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

Contract Documents - The Agreement, Addenda (which pertain to the Contract

Documents), CONTRACTOR'S Bid (including documentation accompanying the Bid and any post-Bid documentation submitted prior to the Notice of Award) when attached as an exhibit to the Agreement, the Bonds, these General Conditions, the Supplementary Conditions, the Specifications and the Drawings as the same are more specifically identified in the Agreement, together with all amendments, modifications and supplements issued pursuant to paragraphs 3.4 and 3.5 on or after the Effective Date of the Agreement.

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

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

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

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

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

Effective Date of the Agreement - The date indicated in the Agreement on which it becomes effective, but if no such date is indicated it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

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

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

General Requirements - Sections of Division 1 of the Specifications.

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

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

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

OWNER - The public body or authority, corporation, association, firm, or person with whom CONTRACTOR has entered into the Agreement and for whom the Work is to be provided.

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

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

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

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

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

Subcontractor - An individual, firm or corporation having a direct contract with CONTRACTOR or with any other

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Subcontractor for the performance of a part of the Work at the site.

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

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

Supplier - A manufacturer, fabricator, supplier, distributor, material man or vendor.

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

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

Work - The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. Work is the result of performing services, furnishing labor and

furnishing and incorporating materials and equipment into the construction, all as required by the Contract Documents.

Work Directive Change - A written directive to CONTRACTOR, issued on or after the Effective Date of the Agreement and signed by OWNER and recommended by ENGINEER, ordering and addition, deletion or revision in the Work, or responding to differing or unforeseen physical conditions under which the Work is to be performed as provided in paragraph 4.2 or 4.3 or to emergencies under paragraph 6.22. A Work Directive Change may not change the Contract Price or the Contract Time, but is evidence that the parties expect that the change directed or documented by a Work Directive Change will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Time as provided in paragraph 10.2.

Written Amendment - A written amendment of the Contract Documents, signed by OWNER and CONTRACTOR on or after the Effective Date of the Agreement and normally dealing with the none engineering or non-technical rather than strictly Work-related aspects of the Contract Documents.

ARTICLE 2 - PRELIMINARY MATTERS

Delivery of Bonds:

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

Copies of Documents:

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

Commencement of Contract Time; Notice to Proceed:

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

Starting the Project:

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

Before Starting Construction:

2.5. Before undertaking each part of the Work, CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon and all applicable field measurements.

CONTRACTOR shall promptly report in writing to ENGINEER any conflict, error or discrepancy which CONTRACTOR may discover and shall obtain a written interpretation or clarification from ENGINEER before proceeding with any Work affected thereby; however, CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any conflict, error or discrepancy in the Contract Documents, unless CONTRACTOR had actual knowledge thereof or should reasonably have known thereof.

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

2.6.1. an estimated progress schedule indicating the starting and completion dates of the various stages of the Work;

2.6.2. A preliminary schedule of Shop Drawing submissions; and

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

2.7. Before any Work at the site is started, CONTRACTOR shall deliver to OWNER, with a copy to ENGINEER, certificates (and other evidence of insurance requested by

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OWNER) which CONTRACTOR is required to purchase and maintain in accordance with paragraphs 5.3 and 5.4, and OWNER shall deliver to CONTRACTOR certificates (and other evidence of insurance requested by CONTRACTOR) which OWNER is required to purchase and maintain in accordance with paragraphs 5.6 and 5.7.

Pre-construction Conference:

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

Finalizing Schedules:

2.9. At least ten days before submission of the first Application for Payment a conference attended by CONTRACTOR, ENGINEER and others as appropriate will be held to finalize the schedules submitted in accordance with paragraph 2.6. The finalized progress schedule will be acceptable to ENGINEER as providing an orderly progression of the Work to completion within the Contract Time, but such acceptance will neither impose on ENGINEER responsibility for the progress or scheduling of the Work nor relieve CONTRACTOR from full responsibility therefore. The finalized schedule of Shop Drawing submissions will be acceptable to ENGINEER as providing a workable arrangement for processing the submissions. The finalized schedule of values will be

acceptable to ENGINEER as to form and substance.

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

Intent:

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

3.2. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any Work, materials or equipment that may reasonably be inferred from the Contract Documents, as being required to produce the intended result will be supplied whether or not specifically called for. When words, which have a well-known technical or trade meaning are used to describe Work, materials or equipment such words shall be interpreted in accordance with that meaning. Reference to standard specifications, manuals or codes of any technical society, organization or association, or to the Laws or Regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code or Laws or Regulations in effect at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated. However, no provision of any referenced standard specification, manual or code

(whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties and responsibilities of OWNER, CONTRACTOR or ENGINEER, or any of their consultants, agents or employees from those set forth in the Contract Documents, nor shall it be effective to assign to ENGINEER, or any of ENGINEER's consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.15 or 9.16. Clarifications and interpretations of the Contract Documents shall be issued by ENGINEER as provided in paragraph 9.4.

3.3. If, during the performance of the Work, CONTRACTOR finds a conflict, error or discrepancy in the Contract Documents, CONTRACTOR shall so report to ENGINEER in writing at once and before proceeding with the Work affected thereby shall obtain a written interpretation or clarification from ENGINEER; however, CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any conflict, error or discrepancy in the Contract Documents unless CONTRACTOR had actual knowledge thereof or should reasonable have known thereof.

Amending and Supplementing Contract Documents:

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

3.4.1. A formal Written Amendment,

3.4.2. A Change Order (pursuant to paragraph 10.4), or

3.4.3. A Work Directive Change (pursuant to paragraph 10.1).

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

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

3.5.1. A Field Order (pursuant to paragraph 9.5),

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

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

Reuse of Documents:

3.6. Neither CONTRACTOR nor any Subcontractor or Supplier or other person or organization performing or furnishing any of the Work under a direct or indirect contract with OWNER shall have or acquire any title to or ownership rights in any of the Drawings, Specifications or other documents (or copies of any thereof) prepared by or bearing the seal of ENGINEER; and they shall not reuse any of them on extensions of the Project or any other project without written consent of OWNER and ENGINEER and specific written verification or adaptation by ENGINEER.

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ARTICLE 4 - AVAILABILITY OF LANDS; PHYSICAL CONDITIONS; REFERENCE POINTS

Availability of Lands:

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

Physical Conditions:

4.2.1. *Explorations and Reports:* Reference is made to the Supplementary Conditions for identification of those reports of explorations and tests of subsurface conditions at the site that have been utilized by ENGINEER in preparation of the Contract Documents. CONTRACTOR may rely upon the accuracy of the technical data contained in such reports, but not upon non-technical data, interpretations or opinions contained therein or for the completeness thereof for CONTRACTOR's purposes. Except as indicated in the immediately preceding sentence and in

paragraph 4.2.6, CONTRACTOR shall have full responsibility with respect to subsurface conditions at the site.

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

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

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

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

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

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

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

4.2.6. *Possible Price and Time Adjustments:* In each such case, an increase or decrease in the Contract Price or an extension or shortening of the Contract Time, or any combination thereof, will be allowable to the extent that they are attributable to any such inaccuracy of difference. If OWNER and CONTRACTOR are unable to agree as to the amount or length thereof, a claim may be made therefor as provided in Articles 11 and 12.

Physical Conditions - Underground Facilities:

4.3.1. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the site is based on information and data furnished to OWNER or ENGINEER by the owners of such Underground Facilities or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

4.3.1.1. OWNER and ENGINEER shall not be responsible for the accuracy or completeness or any such information or data; and,

4.3.1.2. CONTRACTOR shall have full responsibility for reviewing and checking all such information and data, for locating all Underground Facilities shown or indicated in the Contract Documents, for coordination of the Work with the owners of such Underground Facilities during construction, for the safety and protection thereof as provided in paragraph 6.20 and repairing any damage thereto resulting from the Work, the cost of all of which will be considered as having been included in the Contract Price.

4.3.2. *Not Shown or Indicated.* If an Underground Facility is uncovered or revealed at or contiguous to the site which was not shown or indicated in the Contract Documents and which CONTRACTOR could not reasonably have been expected to be aware of, CONTRACTOR shall, promptly after becoming aware thereof and before performing any Work affected thereby (except in an emergency as permitted by paragraph 6.22), identify the owner of such Underground Facility and give written notice thereof to that owner and to OWNER and ENGINEER. ENGINEER will promptly review the Underground Facility to determine the extent to which the Contract Documents should be modified to reflect and document the consequences of the existence of the Underground Facility, and the Contract Documents will be amended or supplemented to the extent necessary. During such time, CONTRACTOR shall be responsible for the safety and protection of such Underground Facility as provided in paragraph 6.20.

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CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, to the extent that they are attributable to the extent to the existence of any Underground Facility that was not shown or indicated in the Contract Documents and which CONTRACTOR could not reasonably have been expected to be aware of. If the parties are unable to agree as to the amount or length thereof, CONTRACTOR may make a claim therefor as provided in Articles 11 and 12.

Reference Points:

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

ARTICLE 5 - BONDS AND INSURANCE

Performance and Other Bonds:

5.1. CONTRACTOR shall furnish performance and payment Bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all CONTRACTOR's obligations

under the Contract Documents. These Bonds shall remain in effect at least until one year after the date when final payment becomes due, except as otherwise provided by Law or Regulation or by the Contract Documents. CONTRACTOR shall also furnish such other Bonds as are required by the Supplementary Conditions. All Bonds shall be in the forms prescribed by Law or Regulation or by the Contract Documents and be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff Bureau of Accounts, U.S. Treasury Department. All Bonds signed by an agent must be accompanied by a certified copy of the authority to act.

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

Contractor's Liability Insurance:

5.3. CONTRACTOR shall purchase and maintain such comprehensive general liability and other insurance as is appropriate for the Work being performed and furnished and as will provide protection from claims set forth below which may arise out of or result from CONTRACTOR's performance and furnishing of the Work and CONTRACTOR's other obligations under the Contract Documents, whether it is to be performed or furnished by CONTRACTOR, by any Subcontractor, by anyone directly or indirectly

employed by any of them to perform or furnish any of the Work, or by anyone for whose acts any of them may be liable.

5.3.1. Claims under workers' or workmen's compensation, disability benefits and other similar employee benefit acts;

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

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

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

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

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

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

The insurance required by this paragraph 5.3 shall include the specific coverage's and be written for not less than the limits of liability and coverage's provided in the Supplementary Conditions, or required by law, whichever is greater. The comprehensive general liability insurance shall include completed operations insurance. All of the policies of insurance so required to be purchased and maintained (or the certificates or other evidence thereof) shall contain a provision or endorsement that the coverage afforded will not be cancelled, materially changed or renewal refused until at least thirty days' prior written notice has been given to OWNER and ENGINEER by certified mail. All such insurance shall remain in effect until final payment and at all times thereafter when CONTRACTOR may be correcting, removing or replacing *defective* Work in accordance with paragraph 13.12. In addition, CONTRACTOR shall maintain such completed operations insurance for at least two years after final payment and furnish OWNER and with evidence of continuation of such insurance at final payment and one year thereafter.

Contractual Liability Insurance:

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

Owner's Liability Insurance:

5.5. OWNER shall be responsible for purchasing and maintaining OWNER's own liability insurance and, at OWNER's option, may purchase and maintain such insurance as will protect OWNER against claims which

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may arise from operations under the Contract Documents.

Property Insurance:

5.6. Unless otherwise provided in the Supplementary Conditions, CONTRACTOR shall purchase and maintain property insurance upon the Work at the site to the full insurable value thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER and ENGINEER's consultants in the Work, all of whom shall be listed as insured or additional insured parties, shall insure against the perils of fire and extended coverage and shall include "all risk" insurance for physical loss and damage including theft, vandalism and malicious mischief, collapse and water damage, and such other perils as may be provided in the Supplementary Conditions, and shall include damages, losses and expenses arising out of or resulting from any insured loss or incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers, architects, attorneys and other professionals). If not covered under the "all risk" insurance or otherwise provided in the Supplementary Conditions, CONTRACTOR shall purchase and maintain similar property insurance on portions of the Work stored on and off the site or in transit when such portions of the Work are to be included in an Application for Payment.

5.7. CONTRACTOR shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or

Laws and Regulations which will include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER and ENGINEER's consultants in the Work, all of whom shall be listed as insured or additional insured parties.

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

5.9 OWNER shall not be responsible for purchasing and maintaining any property insurance to protect the interests of CONTRACTOR, Subcontractors or others in the Work to the extent of any deductible amounts that are provided in the Supplementary Conditions. The risk of loss within the deductible amount, will be borne by CONTRACTOR, Subcontractor or others suffering any such loss and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

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

other insurance has been procured by CONTRACTOR.

Waiver of Rights:

5.11.1. OWNER and CONTRACTOR waive all rights against each other for all losses and damages caused by any of the perils covered by the policies of insurance provided in response to paragraphs 5.6 and 5.7 and any other property insurance applicable to the Work, and also waive all such rights against the Subcontractors, and all other parties names as insured in such policies for losses and damages so caused. As required by paragraph 6.11, each subcontract between CONTRACTOR and a Subcontractor will contain similar waiver provisions by the Subcontractor in favor of OWNER, CONTRACTOR, ENGINEER, ENGINEER's consultants and all other parties named as insured. None of the above waivers shall extend to the rights that any of the insured parties may have to the proceeds of insurance held by CONTRACTOR as trustee or otherwise payable under any policy so issued.

5.11.2 OWNER and CONTRACTOR intend that any policies provided in response to paragraphs 5.6 and 5.7 shall protect all of the parties insured and provide primary coverage for all losses and damages caused by the perils covered thereby. Accordingly, all such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any of the parties named as insureds or additional insureds, and if the insurers require separate waiver forms to be signed by ENGINEER or ENGINEER's consultant, OWNER will obtain the same, and if such waiver forms are required of any Subcontractor, CONTRACTOR will obtain the same.

Receipt and Application of Proceeds:

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

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

Acceptance of Insurance:

5.14. If OWNER has any objection to the coverage afforded by or other provisions of the insurance required to be purchased and maintained by CONTRACTOR in accordance with paragraphs 5.3 and 5.4 on the basis of its not complying with the Contract Documents,

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

Partial Utilization - Property Insurance:

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

ARTICLE 6-CONTRACTOR'S

RESPONSIBILITIES

Supervision and Superintendence:

6.1. CONTRACTOR shall supervise and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences and procedures of construction, but CONTRACTOR shall not be responsible for the negligence of others in the design or selection of a specific means, method, technique, sequence or procedure of construction which is indicated in and required by the Contract Documents. CONTRACTOR shall be responsible to see that the finished Work complies accurately with the Contract Documents.

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

Labor, Materials and Equipment:

6.3. CONTRACTOR shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract

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

6.4. Unless otherwise specified in the General Requirements, CONTRACTOR shall furnish and assume full responsibility for all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water sanitary facilities, temporary facilities and all other facilities and incidentals necessary for the furnishing, performance, testing, start-up and completion of the Work.

6.5. All materials and equipment shall be of good quality and new, except as otherwise provided in the Contract Documents. If required by ENGINEER, CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the instruction of the applicable Supplier except as otherwise provided in the Contract Documents; but no provision of any such instructions will be effective to assign to ENGINEER, or any of ENGINEER's consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.15 or 9.16.

Adjusting Progress Schedule:

6.6 CONTRACTOR shall submit to ENGINEER for acceptance (to the extent indicated in paragraph 2.9) adjustments in the progress schedule to reflect the impact thereon of new developments; these will conform generally to the progress schedule then in effect and additionally will comply with any provisions of the General Requirements applicable thereto.

Substitutes or "Or-Equal" Items:

6.7.1. Whenever materials or equipment are specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier the naming of the item is intended to establish the type, function and quality required. Unless the name is followed by words indicating that no substitution is permitted, materials or equipment of other Suppliers may be accepted by ENGINEER if sufficient information is submitted by CONTRACTOR to allow ENGINEER to determine that the material or equipment proposed is equivalent or equal to that named. The procedure for review by ENGINEER will include the following as supplemented in the General Requirements. Requests for review of substitute items of material and equipment will not be accepted by ENGINEER from anyone other than CONTRACTOR. If CONTRACTOR wishes to furnish or use a substitute item of material or equipment, CONTRACTOR shall make written application to ENGINEER for acceptance thereof, certifying that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, be similar and of equal substance to that specified and be suited to the same use as that specified. The application

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will state that the evaluation and acceptance of the proposed substitute will not prejudice CONTRACTOR's achievement of Substantial Completion on time, whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with OWNER for work on the Project) to adapt the design to the proposed substitute and whether or not incorporation or use of the substitute in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute from that specified will be identified in the application and available maintenance, repair and replacement service will be indicated. The application will also contain an itemized estimate of all costs that will result directly or indirectly from acceptance of such substitute, including costs or redesign and claims of other contractors affected by the resulting change, all of which shall be considered by ENGINEER in evaluating the proposed substitute. ENGINEER may require CONTRACTOR to furnish at CONTRACTOR's expense additional data about the proposed substitute.

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

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

Concerning Subcontractors, Suppliers and Others:

6.8.1. CONTRACTOR shall not employ any Subcontractor, Supplier or other person or organization (including those acceptable to OWNER and ENGINEER as indicated in paragraph 6.8.2), whether initially or as a substitute, against whom OWNER or ENGINEER may have reasonable objection. CONTRACTOR shall not be required to employ any Subcontractor, Supplier or other person or organization to furnish or perform any of the Work against whom CONTRACTOR has reasonable objection.

6.8.2. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers or other persons or organizations (including those who are to furnish the principal items of materials and equipment) to

be submitted to OWNER in advance of the specified date prior to the Effective Date of the Agreement for acceptance by OWNER and ENGINEER and if CONTRACTOR has submitted a list thereof in accordance with the Supplementary Conditions, OWNER's or ENGINEER's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the bidding documents or the Contract Documents) of any such Subcontractor, Supplier or other person or organization so identified may be revoked on the basis of reasonable objection after due investigation, in which case CONTRACTOR shall submit an acceptable substitute, the Contract Price will be increased by the difference in the cost occasioned by such substitution and an appropriate Change Order will be issued or Written Amendment signed. No acceptance by OWNER or ENGINEER of any such Subcontractor, Supplier or other person or organization shall constitute a waiver of any right of OWNER or ENGINEER to reject defective Work.

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

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

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

Patent Fees and Royalties:

6.12. CONTRACTOR shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product or device which is the subject of patent rights or copyrights held by others. If a particular invention, design process, product or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of OWNER or ENGINEER its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by OWNER in the Contract Documents. CONTRACTOR shall indemnify and hold harmless OWNER and ENGINEER and anyone directly or indirectly employed by either of them from and against all claims,

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damages, losses and expenses (including attorneys' fees and court and arbitration costs) arising out of any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product or device not specified in the Contract Documents, and shall defend all such claims in connection with any alleged infringement of such rights.

Permits:

6.13. Unless otherwise provided in the Supplementary Conditions, CONTRACTOR shall obtain and pay for all construction permits and licenses. OWNER shall assist CONTRACTOR, when necessary, in obtaining such permits and licenses. CONTRACTOR shall pay all governmental charges and inspection fees necessary for the prosecution of the Work, which are applicable at the time of opening the Bids, or if there are no Bids on the Effective Date of the Agreement. CONTRACTOR shall pay all charges of utility owners for connections to the Work, and OWNER shall pay all charges of such utility owners for capital costs related thereto such as plant investment fees.

Laws and Regulations:

6.14.1. CONTRACTOR shall give all notices and comply with all Laws and Regulations applicable to furnishing and performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither OWNER nor ENGINEER shall be responsible for monitoring CONTRACTOR's compliance with any Laws or Regulations.

6.14.2. If CONTRACTOR observes that the Specifications or Drawings are at variance with any Laws or Regulations,

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

Taxes:

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

Use of Premises:

6.16. CONTRACTOR shall confine construction equipment, the storage of materials and equipment and the operations of workers to the Project site and land and areas identified in and permitted by the Contract Documents and other land and areas permitted by Laws and Regulations, rights-of-way, permits and easements, and shall not unreasonably encumber the premises which construction equipment or other materials or equipment. CONTRACTOR shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof or of any land or areas contiguous thereto, resulting from the performance of the

Work. Should any claim be made against OWNER or ENGINEER by any such owner or occupant because of the performance of the Work, CONTRACTOR shall promptly attempt to settle with such other party by agreement or otherwise resolve the claim by arbitration or at law. CONTRACTOR shall, to the fullest extent permitted by Laws and Regulations, indemnify and hold OWNER and ENGINEER harmless from and against all claims damages, losses and expenses (including, but not limited to fees or engineers, architects, attorneys and other professionals and court and arbitration costs) arising directly, indirectly or consequentially out of any action, legal or equitable, brought by any such other party against OWNER or ENGINEER to the extent based on a claim arising out of CONTRACTOR's performance of the Work.

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

6.18. CONTRACTOR shall not load 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 property to stresses or pressures that will endanger it.

Record Documents:

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

Safety and Protection:

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

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

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

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

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CONTRACTOR shall comply with all applicable Laws and Regulations of any public body (Including OSHA) having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. CONTRACTOR shall notify owners of adjacent property and of Under-ground Facilities and utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation and replacement of their property. All damage, injury or loss to any property referred to in paragraph 6.20.2 or 6.20.3 caused, directly or indirectly, in whole or in part, by CONTRACTOR, any Sub-contractor, Supplier or any other person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, shall be remedied by CONTRACTOR (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 either of them or anyone for whose acts either of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of CONTRACTOR). CONTRACTOR's duties and responsibilities for the safety and protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to OWNER and CONTRACTOR in accordance with paragraph 14.13 that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.21. CONTRACTOR shall designate a responsible representative at the site whose duty shall be the prevention of accidents. This person shall be CONTRACTOR's

superintendent unless otherwise designated in writing by CONTRACTOR to OWNER.

Emergencies:

6.22. In emergencies affecting the safety or protection of persons or the Work or property at the site or adjacent thereto, CONTRACTOR, without special instruction or authorization from ENGINEER or OWNER, is obligated to act to prevent threatened damage, injury or loss. CONTRACTOR shall give ENGINEER prompt written notice if CONTRACTOR believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby. If ENGINEER determines that a change in the Contract Documents is required because of the action taken in response to an emergency, a Work Directive Change or Change Order will be issued to document the consequences of the changes or variations.

Shop Drawings and Samples:

6.23. After checking and verifying all field measurements and after complying with applicable procedures specified in the General Requirements, CONTRACTOR shall submit to ENGINEER for review and approval in accordance with the accepted schedule of Shop Drawing submissions (see paragraph 2.9), or for other appropriate action if so indicated in the Supplementary Conditions, five copies (unless otherwise specified in the General Requirements) of all Shop Drawings, which will bear a stamp or specific written indication that CONTRACTOR has satisfied CONTRACTOR's responsibilities under the Contract Documents with respect to the

review submission. All submissions will be identified as ENGINEER may require. The data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials and similar data to enable ENGINEER to review the information as required.

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

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

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

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

6.27. ENGINEER's review and approval of Shop Drawings or samples shall not relieve CONTRACTOR from responsibility for any variation from the requirements of the Contract Documents unless CONTRACTOR has in writing called ENGINEER's attention to each such variation at the time of submission as required by paragraph 6.25.2 and ENGINEER has given written approval of each such variation by a specific written notation thereof incorporated in or accompanying the Shop Drawing or sample approval; nor will any approval by ENGINEER relieve CONTRACTOR from responsibility for errors or omissions in the Shop Drawings or from responsibility for having complied with the provisions of paragraph 6.25.1.

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6.28. Where a Shop Drawing or sample is required by the Specifications, any related Work performed prior to ENGINEER's review and approval of the pertinent submission will be the sole expense and responsibility of CONTRACTOR.

Continuing the Work:

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

Indemnification:

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

indemnified hereunder or arises by or is imposed by Law and Regulations regardless of the negligence of any such party.

6.31. In any and all claims against OWNER or ENGINEER or any of their consultants, agents or employees by any employee of CONTRACTOR, any Subcontractor, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, the indemnification obligation under paragraph 6.30 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for CONTRACTOR or any such Subcontractor or other person or organization under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts.

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

ARTICLE 7 - OTHER WORK

Related Work at Site:

7.1. OWNER may perform other work related to the Project at the site by OWNER's own forces, have other work performed by utility owners or let other direct contracts therefor which shall contain General Conditions similar to these. If the fact that such other work is to be performed was not noted in the Contract Documents, written notice thereof will be given to CONTRACTOR prior to starting any such

other work; and, if CONTRACTOR believes that such performance will involve additional expense to CONTRACTOR or requires additional time and the parties are unable to agree as to the extent thereof, CONTRACTOR may make a claim therefor as provided in Articles 11 and 12.

7.2. CONTRACTOR shall afford each utility owner and other contractor who is a party to such a direct contract (or OWNER, if OWNER is performing the additional work with OWNER's employees) proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such work, and shall properly connect and coordinate the Work with theirs. CONTRACTOR shall do all cutting, fitting and patching of the Work that may be required to make its several parts come together properly and integrate with such other work. CONTRACTOR shall not endanger any work of others by cutting, excavating or otherwise altering their work and will only cut or alter their work with the written consent of ENGINEER and the others whose work will be affected. The duties and responsibilities of CONTRACTOR under this paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of CONTRACTOR in said direct contracts between OWNER and such utility owners and other contractors.

7.3. If any part of CONTRACTOR's Work depends for proper execution or results upon the work of any such other contractor or utility owner (or OWNER), CONTRACTOR shall inspect and promptly report to ENGINEER in writing any delays, defects or deficiencies in such work that render it unavailable or unsuitable for such proper execution and results. CONTRACTOR's failure so to report

will constitute an acceptance of the other work as fit and proper for integration with CONTRACTOR's Work except for latent or non-apparent defects and deficiencies in the other work.

Coordination:

7.4. If OWNER contracts with others for the performance of other work on the Project at the site, the person or organization who will have authority and responsibility for coordination of the activities among the various prime contractors will be identified in the Supplementary Conditions, and the specific matters to be covered by such authority and responsibility will be itemized, and the extent of such authority and responsibilities will be provided in the Supplementary Conditions. Unless otherwise provided in the Supplementary Conditions, neither OWNER nor ENGINEER shall have any authority or responsibility in respect of such coordination.

ARTICLE 8 - OWNER'S RESPONSIBILITIES

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

8.2. In case of termination of the employment of ENGINEER, OWNER shall appoint an engineer against whom CONTRACTOR makes no reasonable objection, whose status under the Contract Documents shall be that of the former ENGINEER. Any dispute in connection with such appointment shall be subject to arbitration.

8.3 OWNER shall furnish the data required of OWNER under the Contract Documents

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promptly and shall make payments to CONTRACTOR promptly after they are due as provided in paragraphs 14.4 and 14.13.

8.4. OWNER's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in paragraphs 4.1 and 4.4.

Paragraph 4.2 refers to OWNER's identifying and making available to CONTRACTOR copies of reports of explorations and tests of subsurface conditions at the site and in existing structures which have been utilized by ENGINEER in preparing the Drawings and Specifications.

8.5. OWNER's responsibilities in respect of purchasing and maintaining liability insurance are set forth in paragraphs 5.5 through 5.8.

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

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

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

ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION

Owner's Representative:

9.1. ENGINEER will be OWNER's representative during the construction period. The duties and responsibilities and the limitations of authority of ENGINEER as OWNER's representative during construction

are set forth in the Contract Documents and shall not be extended without written consent of OWNER and ENGINEER.

Visits to Site:

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

Project Representation:

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

and limitations of authority of such other person will be as provided in the Supplementary Conditions.

Clarifications and Interpretation:

9.4. ENGINEER will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents (in the form of Drawings or otherwise) as ENGINEER may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents. If CONTRACTOR believes that a written clarification or interpretation justifies an increase in the Contract Price or an extension of the Contract Time and the parties are unable to agree to the amount or extent thereof, CONTRACTOR may make a claim therefor as provided in Article 11 or Article 12.

Authorized Variations in Work:

9.5. ENGINEER may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve as adjustment in the Contract Price or the Contract Time and are consistent with the overall intent of the Contract Documents. These may be accomplished by a Field Order and will be binding on OWNER, and also on CONTRACTOR who shall perform the Work involved promptly. If CONTRACTOR believes that a Field Order justifies an increase in the Contract Price or an extension of the Contract Time and the parties are unable to agree as to the amount or extent thereof, CONTRACTOR may make a claim therefor as provided in Article 11 or 12.

Rejecting Defective Work:

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

Shop Drawings, Change Orders and Payments:

9.7. In connection with ENGINEER's responsibility for Shop Drawings and samples, see paragraphs 6.23 through 6.29 inclusive.

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

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

Determinations for Unit Prices:

9.10. ENGINEER will determine the actual quantities and classifications of Unit Price Work performed by CONTRACTOR. ENGINEER will review with CONTRACTOR ENGINEER's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). ENGINEER's written decisions thereon will be final and binding upon OWNER and CONTRACTOR, unless, within ten days after the date of any such decision, either OWNER or CONTRACTOR delivers to the other party to the Agreement

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and to ENGINEER written notice of intention to appeal from such a decision.

Decisions on Disputes:

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

9.12. When functioning as interpreter and judge under paragraphs 9.10 and 9.11, ENGINEER will not show partiality to OWNER or CONTRACTOR and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity. The rendering of a decision by ENGINEER pursuant to paragraphs 9.10 and 9.11 with respect to any such claim, dispute or other matter (except any which have been waived by the making or acceptance of final

payment as provided in paragraph 14.16) will be a condition precedent to any exercise by OWNER or CONTRACTOR of such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any such claim, dispute or other matter.

Limitations on ENGINEER's Responsibilities:

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

9.14. Whenever in the Contract Documents the terms "as ordered", "as directed", "as required", "as allowed", "as approved" or terms of like effect or import are used, or the adjectives "reasonable", "suitable", "acceptable", "proper" or "satisfactory" or adjectives of like effect or import are used to describe a requirement, direction, review or judgement of ENGINEER as to the Work, it is intended that such requirement, direction, review or judgment will be solely to evaluate the Work for compliance with the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective shall not be effective to assign to ENGINEER any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.15 or 9.16.

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

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

ARTICLE 10 - CHANGES IN THE WORK

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

10.2. If OWNER and CONTRACTOR are unable to agree as to the extent, if any, of an increase or decrease in the Contract Price or an extension or shortening of the Contract Time that should be allowed as a result of a Work Directive Change, a claim may be made therefor as provided in Article 11 or Article 12.

10.3. CONTRACTOR shall not be entitled to an increase in the Contract Price or an extension of the Contract Time with respect to any Work performed that is not required by the Contract Documents as amended,

modified and supplemented as provided in paragraphs 3.4 and 3.5, except in the case of an emergency as provided in paragraph 6.22 and except in the case of uncovering Work as provided in paragraph 13.9.

10.4. OWNER and CONTRACTOR shall execute appropriate Change Orders (or Written Amendments)

10.4.1. changes in the Work which are ordered by OWNER pursuant to paragraph 10.1, are required because of acceptance of *defective* Work under paragraph 13.13 or correcting *defective* Work under paragraph 13.14, or are agreed to by the parties;

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

10.4.3. changes in the Contract Price or Contract Time which embody the substance of any written decision rendered by ENGINEER pursuant to paragraph 9.11;

provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, CONTRACTOR shall carry on the Work and adhere to the progress schedule as provided in paragraph 6.29.

10.5. If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Time) is required by the provisions of any Bond to be given to a surety, the giving of any such notice will be CONTRACTOR's responsibility, and

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the amount of each applicable Bond will be adjusted accordingly.

ARTICLE 11 - CHANGE OF CONTRACT PRICE

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

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

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

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

11.3.2. By mutual acceptance of a lump sum (which may include an allowance for overhead and profit not necessarily in accordance with paragraph 11.6.2.1.).

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

Cost of the Work:

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

11.4.1. Payroll costs for employees in the direct employ of CONTRACTOR in the performance of the Work under schedules of job classifications agreed upon by OWN-

ER and CONTRACTOR. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits which shall include social security contributions unemployment, excise and payroll taxes, workers' or workmen's compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. Such employees shall include superintendents and foremen at the site. The expenses of performing Work after regular working hours, on Saturday, Sunday or legal holidays, shall be included in the above to the extent authorized by OWNER.

11.4.2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to CONTRACTOR unless OWNER deposits funds with CONTRACTOR with which to make payments, in which case the cash discounts shall accrue to OWNER. All trade discounts, rebates and refunds and all returns from sale of surplus materials and equipment shall accrue to OWNER, and CONTRACTOR shall make provisions so that they may be obtained.

11.4.3. Payments made by CONTRACTOR to the Subcontractors for Work performed by Subcontractors. If required by OWNER, CONTRACTOR shall

obtain competitive bids from Subcontractors acceptable to CONTRACTOR and shall deliver such bids to OWNER who will then determine, with the advice of ENGINEER, which bids will be accepted. If a subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work Plus a Fee, the Subcontractor's Cost of the Work shall be determined in the same manner as CONTRACTOR's Cost of the Work. All subcontracts shall be subject to the other provisions of the Contract Documents insofar as applicable.

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

11.4.5. Supplemental costs including the following:

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

11.4.5.2. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office and temporary facilities at the site and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost less market value of such items used by not consumed which remain the property of CONTRACTOR.

11.4.5.3. Rentals of all construction equipment and machinery and the parts thereof whether rented from CONTRACTOR or others in accordance with rental agreements approved by OWNER with the advice of ENGINEER, and the costs of transportation, loading, unloading, installation, dismantling and removal thereof - all in accordance with terms of said rental agreements. The rental of any such equipment, machinery or parts shall cease when the use thereof is not longer necessary for the Work.

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

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

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

for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of OWNER. No such losses, damages and expenses will be included in the Cost of Work for the purpose of determining CONTRACTOR's Fee. If, however, any such loss or damage requires reconstruction and CONTRACTOR is placed in charge thereof, CONTRACTOR shall be paid for services a fee proportionate to that stated in paragraph 11.6.2.

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

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

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

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

11.5.1. Payroll costs and other compensation of CONTRACTOR's officers, executives, principals (of partnership and sole proprietorships), general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks and other

personnel employed by CONTRACTOR whether at the site or in CONTRACTOR's principal or a branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in paragraph 11.4.1 or specifically covered by paragraph 11.4.4 - all of which are to be considered administrative costs covered by the CONTRACTOR's Fee.

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

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

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

11.5.5. Cost 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.

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

CONTRACTOR's Fee:

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

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

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

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

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

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

11.6.2.4 the amount of credit to be allowed by CONTRACTOR to OWNER for any such change which results in a net decrease in cost will be the amount of the actual net decreases plus a deduction in CONTRACTOR's

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Fee by an amount equal to ten percent of the net decrease; and

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

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

Cash Allowances:

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

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

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

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

Unit Price Work:

11.9.1. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the established unit prices for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by CONTRACTOR will be made by ENGINEER in accordance with Paragraph 9.10.

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

11.9.3. Where the quantity of any item of Unit Price Work performed by CONTRACTOR differs materially and significantly from the estimated quantity of such item indicated in the Agreement and there is no corresponding adjustment with respect to any other item of Work and if CONTRACTOR believes that CONTRACTOR has incurred additional expenses as a result thereof, CONTRACTOR may make a claim

for an increase in the Contract Price in accordance with Article 11 if the parties are unable to agree as to the amount of any such increase.

ARTICLE 12 - CHANGE OF CONTRACT TIME

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

12.2. The Contract Time will be extended in an amount equal to time lost due to delays beyond the control of CONTRACTOR is a claim is made therefor as provided in paragraph 12.1. Such delays shall include, but not be limited to, acts or neglect by OWNER or others performing additional work as

contemplated by Article 7, or to fires, floods, labor disputes, epidemics, abnormal weather conditions or acts of God.

12.3. All time limits stated in the Contract Documents are of the essence of the Agreement. The provisions of this Article 12 shall not exclude recovery for damages (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and court and arbitration costs) for delay by either party.

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

Warranty and Guarantee:

13.1 CONTRACTOR warrants and guarantees to OWNER and ENGINEER that all Work will be in accordance with the Contract Documents and will not be *defective*. Prompt notice of all defects shall be given to CONTRACTOR. All *defective* Work, whether or not in place, may be rejected, corrected or accepted as provided in this Article 13.

Access to Work:

13.2 ENGINEER and ENGINEER's representatives, other representative of OWNER, testing agencies and governmental agencies with jurisdictional interests will have access to the Work at reasonable times for their observation, inspecting and testing. CONTRACTOR shall provide proper and safe conditions for such access.

Tests and Inspection:

13.3. CONTRACTOR shall give ENGINEER timely notice of readiness of the Work for all required inspection, tests or approvals.

13.4. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) to specifically be inspected, tested or approved, CONTRACTOR shall assume full responsibility therefor, pay all costs in connection therewith and furnish ENGINEER the required certificates of inspection, testing or approval. CONTRACTOR shall also be responsible for and shall pay all costs in connection with any inspection or testing required in connection with OWNER's or ENGINEER's acceptance of a Supplier of materials or equipment proposed to be incorporated in the Work, or of materials or equipment submitted for approval prior to CONTRACTOR's purchase thereof for incorporation in the Work. The cost of all inspections, tests and approvals in addition to the above which are required by the Contract Documents shall be paid by OWNER (unless otherwise specified).

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

13.6. If any Work (including the work of others) that is to be inspected, tested or approved is covered without written concurrence of ENGINEER, it must, if requested by ENGINEER, be uncovered for observation. Such uncovering shall be at

CONTRACTOR's expense unless CONTRACTOR has given ENGINEER timely notice of CONTRACTOR's intention to cover the same and ENGINEER has not acted with reasonable promptness in response to such notice.

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

Uncovering Work:

13.8. If any Work is covered contrary to the written request of ENGINEER, it must, if requested by ENGINEER, be uncovered for ENGINEER's observations and replaced at CONTRACTOR's expense.

13.9. If ENGINEER considers it necessary or advisable that covered Work be observed by ENGINEER or inspected or tested by others, CONTRACTOR, at ENGINEER's request, shall uncover, expose or otherwise make available for observation, inspection or testing as ENGINEER may require, that portion of the Work in question, furnishing all necessary labor, material and equipment. If it is found that such Work is *defective*, CONTRACTOR shall bear all direct, indirect and consequential costs of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction, (including but not limited to fees and charges of engineers, architects, attorneys and other professionals), and OWNER shall be entitled to an appropriate decrease in the CONTRACT Price, and, if the parties are unable to agree as to the amount thereof, may make a claim therefor as provided in Article 11. If, however, such Work is not found to be

defective, CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction; and, if the parties are unable to agree as to the amount or extent thereof, CONTRACTOR may make a claim therefor as provided in Articles 11 and 12.

Owner May Stop the Work:

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

Correction or Removal of Defective Work:

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

One Year Correction Period:

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

Acceptance of Defective Work:

13.13. If, instead of requiring correction or removal and replacement of *defective* Work, OWNER (and, prior to ENGINEER's recommendation of final payment, also ENGINEER) prefers to accept it, OWNER may do so. CONTRACTOR shall bear all direct, indirect and consequential costs attributable to OWNER's evaluation of and determination to accept such *defective* Work (such costs to be approved by ENGINEER as

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to reasonableness and to include but not be limited to fees and charges of engineers, architects, attorneys and other professionals). If any such acceptance occurs prior to ENGINEER's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and OWNER shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, OWNER may make a claim therefor as provided in Article 11. If the acceptance occurs after such recommendation, an appropriate amount will be paid by CONTRACTOR to OWNER.

OWNER May Correct Defective Work:

13.14. If CONTRACTOR fails within a reasonable time after written notice of ENGINEER to proceed to correct and to correct *defective* Work or to remove and replace rejected Work as required by ENGINEER in accordance with paragraph 13.11, or if CONTRACTOR fails to perform the Work in accordance with the Contract Documents, or if CONTRACTOR fails to comply with any other provision of the Contract Documents, OWNER may, after seven days' written notice to CONTRACTOR, correct and remedy any such deficiency. In exercising the rights and remedies under this paragraph OWNER shall proceed expeditiously. To the extent necessary to complete corrective and remedial action, OWNER may exclude CONTRACTOR from all or part of the site, take possession of all or part of the Work, and suspend CONTRACTOR's services related thereto, take possession of CONTRACTOR's tools, appliances, construction equipment and machinery at the site and incorporate in the Work all materials and equipment stored at the site or for which OWNER has paid CONTRACTOR but which are stored

elsewhere. CONTRACTOR shall allow OWNER, OWNER's representatives, agents and employees such access to the site as many be necessary to enable OWNER to exercise the rights and remedies under this paragraph. All direct, indirect and consequential costs of OWNER in exercising such rights and remedies will be charged against CONTRACTOR in an amount approved as to reasonableness by ENGINEER, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and OWNER shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, OWNER may make a claim therefore as provided in Article 11. Such direct, indirect and consequential costs will include but not be limited to fees and charges of engineers, architects, attorneys and other professionals, all court and arbitration costs and all costs of repair and replacement of work of others destroyed or damaged by correction, removal or replacement of CONTRACTOR's *defective* Work. CONTRACTOR shall not be allowed an extension of the Contract Time because of any delay in performance of the Work attributable to the exercise by OWNER of OWNER's rights and remedies hereunder.

ARTICLE 14 -PAYMENTS TO
CONTRACTOR AND
COMPLETION

Schedule of Values:

14.1 The schedule of values established as provided in paragraph 2.9 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to ENGINEER. Progress

payments on account of Unit Price Work will be based on the number of units completed.

Application for Progress Payment:

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

CONTRACTOR's Warranty of Title:

14.3. CONTRACTOR warrants and guarantees that title to all Work, materials and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to OWNER no later than the time of payment free and clear of all Liens.

Review of Applications for Progress Payment:

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

14.5. ENGINEER's recommendation of any payment requested in an Application for Payment will constitute a representation by ENGINEER to OWNER, based on ENGINEER's on-site observations of the Work in progress as an experienced and qualified design professional and on ENGINEER's review of the Application for Payment and the accompanying data and schedules that the Work has progressed to the point indicated; that, to the best of ENGINEER's knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under paragraph 9.10, and to any other qualifications stated in the recommendation); and that CONTRACTOR is entitled to payment of the

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amount recommended. However, by recommending any such payment ENGINEER will not thereby be deemed to have represented that exhaustive or continuous on-site inspections have been made to check the quality or the quantity of the Work beyond the responsibilities specifically assigned to ENGINEER in the Contract Documents or that there may not be other matters or issues between the parties that might entitle CONTRACTOR to be paid additionally by OWNER or OWNER to withhold payment to CONTRACTOR.

14.6. ENGINEER's recommendation of final payment will constitute an additional representation by ENGINEER to OWNER that the conditions precedent to CONTRACTOR's being entitled to final payment as set forth in paragraph 14.13 have been fulfilled.

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

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

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

14.7.3. OWNER has been required to correct *defective* Work or complete

Work in accordance with paragraph 13.14, or

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

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

Substantial Completion:

14.8. When CONTRACTOR considers the entire Work ready for its intended use CONTRACTOR shall notify OWNER and ENGINEER in writing that the entire Work is substantially complete (except for items specifically listed by CONTRACTOR as incomplete) and request that ENGINEER issue a certificate of Substantial Completion. Within a reasonable time thereafter, OWNER, CONTRACTOR and ENGINEER shall make an inspection of the Work to determine the status of completion. If ENGINEER does not consider the Work substantially complete, ENGINEER will notify CONTRACTOR in writing giving the reasons therefor. If ENGINEER considers the Work substantially complete ENGINEER will prepare and deliver to OWNER a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of

items to be completed or corrected before final payment. OWNER shall have seven days after receipt of the tentative certificate during which to make written objection to ENGINEER as to any provisions of the certificate or attached list. If, after considering such objections, ENGINEER concludes that the Work is not substantially complete, ENGINEER will within fourteen days after submission of the tentative certificate to OWNER notify CONTRACTOR in writing, stating the reasons therefor. If, after consideration of OWNER's objections, ENGINEER considers the Work substantially complete, ENGINEER will within said fourteen days execute and deliver to OWNER and CONTRACTOR a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as ENGINEER believes justified after consideration of any objections from OWNER. At the time of delivery of the tentative certificate of Substantial Completion ENGINEER will deliver to OWNER and CONTRACTOR a written recommendation as to division of responsibilities pending final payment between OWNER and CONTRACTOR with respect to security, operation, safety, maintenance, heat, utilities, insurance and warranties. Unless OWNER and CONTRACTOR agree otherwise in writing and so inform ENGINEER prior to ENGINEER's issuing the definitive certificate of Substantial Completion, ENGINEER's aforesaid recommendation will be binding on OWNER and CONTRACTOR until final payment.

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

Partial Utilization:

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

14.10.1. OWNER at any time may request CONTRACTOR in writing to permit OWNER to use any such part of the Work which OWNER believes to be ready for its intended use and substantially complete. If CONTRACTOR agrees, CONTRACTOR will certify to OWNER and ENGINEER that said part of the Work is substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. CONTRACTOR at any time may notify OWNER and ENGINEER in writing that CONTRACTOR considers any such part of the Work ready for its intended use and substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. Within a reasonable time after either such request, OWNER, CONTRACTOR and ENGINEER shall make an inspection of that part of the Work to determine its status of completion. If ENGINEER does not consider that part of the Work to be substantially complete, ENGINEER

will notify OWNER and CONTRACTOR in writing giving the reasons therefor. If ENGINEER considers that part of the Work to be substantially complete, the provisions of paragraphs 14.8 and 14.9 will apply with respect to certification of Substantial Completion of that part of the Work and the division or responsibility in respect thereof and access thereto.

14.10.2. OWNER may at any time request CONTRACTOR in writing to permit OWNER to take over operation of any such part of the Work although it is not substantially complete. A copy of such request will be sent to ENGINEER and within a reasonable time thereafter OWNER, CONTRACTOR and ENGINEER shall make an inspection of that part of the Work to determine its status of completion and will prepare a list of the items remaining to be completed or corrected thereon before final payment. If CONTRACTOR does not object in writing to OWNER and ENGINEER that such part of the Work is not ready for separate operation by OWNER, ENGINEER will finalize the list of items to be completed or corrected and will deliver such list to OWNER and CONTRACTOR together with a written recommendation as to the division of responsibilities pending final payment between OWNER and CONTRACTOR with respect to security, operation, safety, maintenance, utilities, insurance warranties and guarantees for that part of the Work which will become binding upon OWNER and CONTRACTOR at the time when

OWNER takes over such operation (unless they shall have otherwise agreed in writing and so informed ENGINEER). During such operation and prior to Substantial Completion of such part of the Work, OWNER shall allow CONTRACTOR reasonable access to complete or correct items on said list and to complete other related Work.

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

Final Inspection:

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

Final Application for Payment:

14.12. After CONTRACTOR has completed all such corrections to the satisfaction of ENGINEER and delivered all maintenance and operating instruction, schedules, guarantees, Bonds, certificates of inspection, marked-up record documents (as provided in paragraph 6.19) and other documents - all as required by the Contract Documents, and after ENGINEER has indicated that the Work is acceptable (subject to the provisions of paragraph 14.16), CONTRACTOR may make

application for final payment following the procedure for progress payments. The final Application for Payment shall be accompanied by all documentation called for in the Contract Documents, together with complete and legally effective releases of waivers (satisfactory to OWNER) of all Liens arising out of or filed in connection with the Work. In lieu thereof and as approved by OWNER, CONTRACTOR may furnish receipts or leases in full; an affidavit of CONTRACTOR that the releases and receipts include all labor, services, material and equipment for which a Lien could be filed, and that all payrolls, material and equipment bills, and other indebtedness connected with the Work for which OWNER or OWNER's property might in any way be responsible, have been paid or otherwise satisfied; and consent of the surety, if any, to final payment. If any Subcontractor of Supplier fails to furnish a release or receipt in full, CONTRACTOR may furnish a Bond or other collateral satisfactory to OWNER to indemnify OWNER against any Lien.

Final Payment and Acceptance:

14.13. If, on the basis of ENGINEER's observation of the Work during construction and final inspection, and ENGINEER's review of the final Application for Payment and accompanying documentation - all as required by the Contract Documents, ENGINEER is satisfied that the Work has been completed and CONTRACTOR's other obligations under the Contract Documents have been fulfilled, ENGINEER will, within ten days after receipt of the final Application for Payment, indicate in writing ENGINEER's recommendation of payment and present the Application to OWNER for payment. Thereupon ENGINEER will give written notice to OWNER and CONTRACTOR that the Work is

acceptable subject to the provisions of paragraph 14.16. Otherwise, ENGINEER will return the Application to CONTRACTOR, indicating in writing the reasons for refusing to recommend final payment, in which case CONTRACTOR shall make the necessary corrections and resubmit the Application. Thirty days after presentation to OWNER of the Application and accompanying documentation, in appropriate form and substance, and with ENGINEER's recommendation and notice of acceptability, the amount recommended by ENGINEER will become due and will be paid by OWNER to CONTRACTOR.

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

Contractor's Continuing Obligation:

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

Waiver of Claims:

14.16. The making and acceptance of final payment will constitute:

14.16.1. a waiver of all claims by OWNER against CONTRACTOR, except claims arising from unsettled Liens, from *defective* Work appearing after final inspection pursuant to paragraph 14.11 or from failure to comply with the Contract Documents or the terms of any special guarantees specified therein; however, it will not constitute a waiver by OWNER of any rights in respect of CONTRACTOR's continuing obligations under the Contract Documents; and

14.16.2. A waiver of all claims by CONTRACTOR against OWNER

other than those previously made in writing and still unsettled.

ARTICLE 15 -SUSPENSION OF WORK AND TERMINATION

Owner May Suspend Work:

15.1. OWNER may, at any time and without cause, suspend the Work or any portion thereof for a period of not more than ninety days by notice in writing to CONTRACTOR and ENGINEER which will fix the date on which Work will be resumed. CONTRACTOR shall resume the Work on the date so fixed. CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension if CONTRACTOR makes an approved claim therefore as provided in Articles 11 and 12.

Owner May Terminate:

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

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

15.2.2. if a petition is filed against CONTRACTOR under any chapter of the Bankruptcy Code as now or hereafter in effect at the time of filing,

or if a petition is filed seeking any such equivalent or similar relief against CONTRACTOR under any other federal or state law in effect at the time relating to bankruptcy or insolvency;

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

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

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

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

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

15.2.8. if CONTRACTOR disregards the authority of ENGINEER; or

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

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

15.3. Where CONTRACTOR's services have been so terminated by OWNER, the termination will not affect any rights or remedies of OWNER against CONTRACTOR when existing or which may

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thereafter accrue. Any retention or payment of moneys due CONTRACTOR by OWNER will not release CONTRACTOR from liability.

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

Contractor May Stop Work or Terminate:

15.5. If, through no act or fault of CONTRACTOR, the Work is suspended for a period of more than ninety days by OWNER or under an order of court or other public authority, or ENGINEER fails to act on any Application for Payment within thirty days after it is submitted, or OWNER fails for thirty days to pay CONTRACTOR any sum finally determined to be due, then CONTRACTOR may, upon seven days' written notice to OWNER and ENGINEER, terminate the Agreement and recover from OWNER payment for all Work executed and any expense sustained plus reasonable termination expenses. In addition, and in lieu of terminating the Agreement, if ENGINEER has failed to act on an Application for Payment or OWNER has failed to make any payment as aforesaid, CONTRACTOR may upon seven days' written notice to OWNER and ENGINEER stop the Work until payment of all amounts then due. The provisions of this under paragraph 6.29 to carry on the

Work in accordance with the progress schedule and without delay during disputes and disagreements with OWNER.

ARTICLE 16 - ARBITRATION

16.1. All claims, disputes and other matters in question between OWNER and CONTRACTOR arising out of, or relating to the Contract Documents or the breach thereof (except for claims which have been waived by the making or acceptance of final payment as provided by paragraph 14.16) will be decided by arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association then obtaining subject to the limitations of this Article 16. This agreement so to arbitrate and any other agreement or consent to arbitrate entered into accordance herewith as provided in this Article 16 will be specifically enforceable under the prevailing law of any court having jurisdiction.

16.2. No demand for arbitration of any claim, dispute or other matter that is required to be referred to ENGINEER initially for decision in accordance with paragraph 9.11 will be made until the earlier of (a) the date of which ENGINEER has rendered a decision or (b) the tenth day after the parties have presented their evidence to ENGINEER if a written decision has not been rendered by ENGINEER before that date. No demand for arbitration of any such claim, dispute or other matter will be made later than thirty days after the date on which ENGINEER has rendered a written decision in respect thereof in accordance with paragraph 9.11; and the failure to demand arbitration within said thirty days' period shall result in ENGINEER's decision being final and binding upon OWNER and CONTRACTOR. If EN-

ENGINEER renders a decision after arbitration proceedings have been initiated, such decision may be entered as evidence but will not supersede the arbitration proceedings, except where the decision is acceptable to the parties concerned. No demand for arbitration of any written decision of ENGINEER rendered in accordance with paragraph 9.10 will be made later than ten days after party making such demand has delivered written notice of intention to appeal as provided in paragraph 9.10.

16.3. Notice of the demand for arbitration will be filed in writing with the other party to the Agreement and with the American Arbitration Association, and a copy will be sent to ENGINEER for information. The demand for arbitration will be made within the thirty-day or ten-day period specified in paragraph 16.2 as applicable, and in all other cases within a reasonable time after the claim, dispute or other matter in question has arisen, and in no event shall any such demand be made after the date when institution of legal or equitable proceedings based on such claim, dispute or other matter in question would be barred by the applicable statute of limitations.

16.4. No arbitration arising out of or relating to the Contract Documents shall include by consolidation, joinder or in any other manner any other person or entity (including ENGINEER, ENGINEER's agents, employees or consultants) who is not a part to this contract unless:

16.4.1. the inclusion of such other person or entity is necessary if complete relief is to be afforded among those who are already parties to the arbitration.

16.4.2. such other person or entity is substantially involved in a question of

law or fact which is common to those who are already parties to the arbitration and which will arise in such proceedings, and

16.4.3. the written consent of the other person or entity sought to be included and of OWNER and CONTRACTOR has been obtained for such inclusion, which consent shall make specific reference to this paragraph; but no such consent shall constitute consent to arbitration of any dispute not specifically described in such consent or to arbitration with any party not specifically identified in such consent.

16.5. The award rendered by the arbitrators will be final, judgment may be entered upon it in any court having jurisdiction thereof, and will not be subject to modification or appeal except to the extent permitted by Sections 10 and 11 of the Federal Arbitration Act (9 U.S.C. 10,11).

ARTICLE 17 - MISCELLANEOUS

Giving Notice:

17.1. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

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Computation of Time:

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

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

General:

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

17.4 The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto, and, in particular but without limitation, the warranties, guarantees and obligations imposed upon CONTRACTOR by paragraphs 6.30, 13.1, 13.12, 13.14, 14.3 and 15.2 and all of the rights and remedies available to OWNER and ENGINEER thereunder, are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to 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 Documents, and the provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right and remedy to which they apply. All representations, warranties and guarantees made in the Contract Documents will survive final payment and termination or completion of the Agreement.

END OF SECTION

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Supplementary General Conditions

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1. SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement the General Conditions and other provisions of the Contract Documents as indicated below. All provisions which are not so amended or supplemented remain in full force and effect. The terms used in these Supplementary Conditions which are defined in the Standard General Conditions of the Construction Contract have the meanings assigned to them in the General Conditions.

2. SCOPE OF THE WORK

- 2.1 The Work includes the furnishing of all necessary machinery, equipment, tools, labor and other construction means, and all materials and equipment required to perform the Work including the placing of the Work into satisfactory operation.

3. CONSTRUCTION DRAWINGS

- 3.1 The Work shall conform to the following construction drawings:

| | <u>Page No</u> | <u>Page Title</u> |
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| Subdivision | Set 1 | Graham Road: Phase 2 – Graham Road from Graham Woods |
| | Set 2 | Graham Woods Subdivision; Baker Road |

4. SUBSTITUTIONS OR "OR EQUAL"

- 4.1 Substitutes may be offered in lieu of the major equipment manufacturers listed in the Technical Specifications. Submittals on "Or Equal" substitutes must be received by the Engineer within 48 hours after the Bid Opening.
- Submittals for each type of equipment proposed shall include illustrative drawings; specifications, descriptive brochures, installation lists, weights, metal thickness of principal components; drive arrangements; torques; power requirements; performance curves; installation requirements; availability of spare parts; local service capability and other items necessary for the Engineers to determine that the intent of these Specifications is to be met.
 - The price bid for substitute equipment shall not be used in the base bid but shall be bid as a deductible or additive alternate and listed on the forms provided in the Proposal.

- c. Unless otherwise waived by the Owner, a five (5) year warranty shall be required on all substitute equipment/materials/systems in the form of a bond or other equivalent surety. Such warranty/surety shall be in the amount of the Contractor's purchase order, including installation and service for the substitute. Should the substitute fail to perform satisfactorily, either in mechanical integrity or in performance, the Owner can require modification or replacement or if the supplier/manufacturer fails to remedy the defects/performance the Owner may use any or all of the bond/surety to modify or replace the system or portions thereof including modifications to another process.
- d. The Contractor shall be responsible for the substitute supplier/manufacturer's action and performance until satisfactory performance is obtained and thereafter during the one (1) year warranty period as specified in the Contract Documents. After this to cover the remaining period of the two (2) years, the Owner can take action on the system supplier's bond/surety. The bond/surety must be tendered prior to approval of the substitute.
- e. The Owner reserves the right to accept or reject any and all substitutes that may be offered.
- f. The contract will be awarded on the basis of the lowest qualified base bid including any substitute selected by the Owner.
- g. The adjustment in price bid for the substitute equipment shall include the cost of all re-design, the cost of structural, mechanical and electrical changes when the considered item will not fit the design, as determined by the Engineer.

5. REPORTS AND DRAWINGS USED BY THE ENGINEER

- 5.1 In the preparation of Drawings and Specifications, ENGINEER has relied upon:
 - a. The following reports of explorations and tests of sub-surface conditions at the site of the Work:
 - (1) NONE
 - b. The following drawings of physical conditions in or relating to existing surface and sub-surface structures (except Underground Facilities) which are contiguous to the site of the Work.
 - (1) NONE

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6. SANITARY CONVENIENCES

- 6.1 The CONTRACTOR shall provide adequate sanitary conveniences for use of those employed on the work and their use shall be strictly enforced. Such conveniences shall be made available when the first employees arrive on the site and shall be removed after the departure of the last employees from the job.

7. UTILITY SERVICE

- 7.1 The CONTRACTOR will arrange for water service and temporary electrical service through the local agencies at his own expense.

8. ENVIRONMENTAL IMPACT

- 8.1 The CONTRACTOR shall conduct all operations so as to minimize, to the greatest extent possible, adverse environmental impact.

- a. Noise: All equipment and machinery shall be provided with exhaust mufflers maintained in good working order so as to reduce operating noise to minimum levels.
- b. Dust/Smoke: All equipment movements shall be accompanied by a minimum of dust. Traveled surfaces and earthwork shall be maintained in a moist condition to avoid the generation of dust or the airborne movement of particulate matter under all prevailing atmospheric conditions.

Burning operations will be conducted only with written permission of the OWNER and/or appropriate regulatory agency. The CONTRACTOR shall be responsible for obtaining all permits and comply with all codes, ordinances and regulations pertaining to the burning.

- c. Traffic: Trucks shall be routed over roads which will result in the least effect on traffic and nuisance to the public. All material shall be loaded in a manner which will preclude the loss of any portion of the load in transit, including covering, if necessary.
- d. Sedimentation: All points of concentrated runoff from rainfall shall be visually monitored to determine that no eroded material from the construction site is being deposited offsite. Measures shall be taken to promptly eliminate such a deposition if occurring, including the installation of detention basins. Soil Erosion and sediment control measures shall

include all temporary and permanent means of protection and trapping soils of the construction site during land disturbing activities. Activity covered in this contract is regulated by the [Georgia] Erosion and Sediment Control Act, and NPDES General Permit for Construction Activity.

9. CONSTRUCTION STAKEOUT

- 9.1 The CONTRACTOR shall be responsible for all construction staking required to complete the work.
- 9.2 From the dimensions and benchmarks shown on the plans the CONTRACTOR shall complete the layout of the work and shall be responsible for all measurements that may be required for the execution of the work prescribed in the specifications or on the Drawings, subject to such modifications as may be required to meet changed conditions or as a result of necessary modifications to the Work.
- 9.3 The CONTRACTOR shall furnish, at his own expense, all such stakes, spikes, steel pins, templates, platforms, equipment, instruments, tools and material and all labor as may be required in laying out any part of the Work from the baselines and benchmarks.
- 9.4 It shall be the responsibility of the CONTRACTOR to maintain and preserve all benchmarks shown on the plans.
- 9.5 All survey data shall be recorded in accordance with standard and approved methods. All field notes, sketches, records and computations made by the CONTRACTOR in laying out the work shall be available at all times during the progress of the work for the ready examination by the ENGINEER or his duly authorized representative.
- 9.6 The CONTRACTOR shall make such surveys and computations as are necessary to determine the quantities of work performed or placed during each period for which a progress payment is to be made.
- 9.7 The ENGINEER may make checks as the work progresses to verify lines and grades established by the CONTRACTOR and to determine the conformance of the completed work as it progresses with the requirements of Contract Documents and Drawings. Such checking by the ENGINEER or his representative shall not relieve the CONTRACTOR of his responsibility to perform all work in accordance with the Contract Documents and Drawings and the lines and grades given therein. In the event that location marks as established by the CONTRACTOR are found to be inaccurate or inadequate, work shall be suspended until corrections have been made.

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- 9.8 No separate payment will be made for the costs involved in the survey work, layout work or staking performed by the CONTRACTOR. All such costs will be considered as incidental to the Work.

10. UTILITIES

- 10.1 Utilities such as sewer, water and electric lines encountered in the work shall be protected from injury and maintained in service until moved or replaced as required under this Contract or by others as the case may be, or abandoned as may be necessary for the proper construction and use of the new work.

11. ADJUSTMENT OF DISCREPANCIES

- 11.1 In all cases of discrepancies between the various dimensions and details shown on drawings, or between the drawings and these specifications, the more expensive construction shall be estimated before construction is started, the matter shall be submitted to the ENGINEER for clarification. Without such a decision, discrepancies shall be adjusted by the CONTRACTOR at his own risk and in settlement of any complications arising from such adjustment, the CONTRACTOR shall bear all of the extra expense involved.

12. RESTORATION

- 12.1 The CONTRACTOR shall conduct his operations so that restoration of roadways, driveways, curb and gutter, ditches and easement progresses along with the pipe laying.
- 12.2 Reasonable care shall be taken during construction to avoid damage to vegetation. Ornamental shrubbery and tree branches shall be temporarily tied back, where appropriate, to minimize damage. Trees which receive damage to branches shall be trimmed to those branches to improve the appearance of the tree. Tree trunks receiving damage from equipment shall be treated with a tree dressing.

13. MAINTENANCE DURING CONSTRUCTION

- 13.1 The CONTRACTOR shall maintain the Work from the beginning of construction operations until final acceptance. This maintenance shall constitute continuous and effective work prosecuted day by day with adequate equipment and forces to the end that the site and structures thereon are kept in satisfactory condition at all times, including satisfactory signing or marking as appropriate and control of traffic where required by use of traffic control devices as required by the State in which this project is located.

- 13.2 Upon completion of the Work, the CONTRACTOR shall remove all construction signs and barriers before final acceptance.
- 13.3 While undergoing improvements, the roads shall be kept open to all traffic by the CONTRACTOR. The CONTRACTOR shall keep the portion of the site being used by public traffic, whether it be through or local traffic, in such condition that traffic will be adequately accommodated. The CONTRACTOR shall bear all cost of signs and markings as required and other maintenance work during construction and before the Work is accepted and of constructing and maintaining such approaches, crossing, intersections, and other features as may be necessary without direct compensation.

14. BARRICADES, DANGER, WARNING & DETOUR SIGNS

- 14.1 The CONTRACTOR shall provide, erect, and maintain all necessary barricades, suitable and sufficient lights, danger signals, signs and other traffic control devices, and shall take all necessary precautions for the protection of the work and safety of the public. Highways and streets closed to traffic shall be protected by effective barricades, and obstructions shall be lighted during hours of darkness. Suitable warning signs shall be provided to properly control and direct traffic.
- 14.2 The CONTRACTOR shall furnish, install, and maintain all necessary barricades, warning signs, and other protection devices in accordance with the State requirements in which the project is located. Temporary signs may be reused, provided they are in good condition and legible. All protective devices shall be kept in a good, legible condition while in use.
- 14.3 As soon as construction advances to the extent that temporary barricades, and signs are no longer needed to inform the traveling public, such signs shall be promptly removed.
- 14.4 The cost of furnishing, erecting, maintaining, and removing protective devices will not be paid for as a separate Bid Item. Where the CONTRACTOR is required to perform any of these functions, the cost thereof shall be included in the overall Bid submitted. Ownership of the temporary warning devices shall remain with the CONTRACTOR.

15. HIGH VOLTAGE ACT

- 15.1 The CONTRACTOR acknowledges the requirement of the High Voltage Act of the General Assembly of Georgia by execution of this Contract.

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16. ACCESS FOR INSPECTION

16.1 Access for inspection shall be provided for representatives of the Georgia Department of Natural Resources Environmental Protection Division and the Georgia Department of Transportation as necessary.

17. INSURANCE

17.1 The limits of liability for the insurance required by paragraph 5.3 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

a. Workers' Compensation, etc. under paragraphs 5.3.1 and 5.3.2 of the General Conditions:

- | | | |
|-----|--|-----------|
| (1) | State: | Statutory |
| (2) | Applicable Federal (e.g. Longshoreman's): | Statutory |
| (3) | Employer's Liability: | \$200,000 |
| (4) | Contractor shall show Owner as additional insured. | |

b. Comprehensive General Liability (under paragraphs 5.3.3 through 5.3.6 of the General Conditions):

- | | | |
|-----|--|------------------|
| (1) | Combined single limit for Bodily Injury and Property Damage: | |
| | \$1,000,000 | Each Occurrence |
| | or combined single limit | \$2,000,000 |
| (2) | Property Damage liability insurance will provide Explosion, Collapse and Underground coverages where applicable. | |
| (3) | Personal Injury, with employment exclusion deleted | |
| | \$1,000,000 | Annual Aggregate |

c. Comprehensive Automobile Liability:

Bodily Injury:

| | |
|-----------|-----------------|
| \$200,000 | Each Person |
| \$500,000 | Each Occurrence |

Property Damage:

| | |
|-----------------------------|-----------------|
| \$100,000 | Each Occurrence |
| or combined single limit of | \$200,000 |

d. Builders Risk Insurance (Fire and Extended Coverage):

100% completed value based on the insurable portion of the project.

e. Contractual Endorsement:

The Contractual Liability required by paragraph 5.4 of the General Conditions shall provide coverage for not less than the following amounts:

(1) Bodily Injury:

| | |
|-----------|-----------------|
| \$500,000 | Each Occurrence |
|-----------|-----------------|

(2) Property Damage:

| | |
|-----------|------------------|
| \$100,000 | Each Occurrence |
| \$N/A | Annual Aggregate |

f. During the installation of any work on railroad right-of-way the contractor, at his sole cost and expense, shall procure and keep in force a Comprehensive General Liability insurance policy, which will include contractual liability coverage and have no exclusive for the "Railroad Operations Exposure" providing a combined single limit of \$2,000,000 for work within the right-of-way of Seaboard Cost Line Railroad and a combined single limit of \$6,000,000 for work within the right-of-way of Norfolk-Southern. Railroad Insurance must be paid by the Contractor.

g. The Contractor shall furnish certificates of insurance evidencing the above coverage shall be subject to the prior approval of the Railroad. Such insurance shall contain a

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contractual liability endorsement which will cover the obligations assumed under this agreement and such other endorsement or endorsements as, in the opinion of counsel for the railroad, may be necessary or advisable to fully protect and indemnify the railroad. In addition, such insurance shall contain notification provisions whereby the insurance company agrees to give 30 days notice to the railroad of any change or cancellation of the policies. All of these endorsements and notice provisions shall be stated on the certificate of insurance which is to be provided to the railroad. Provided, however, that notwithstanding any of the provisions of this agreement with respect to insurance, it is understood and agreed that the liability assumed by the Contractor shall not be limited to the insurance coverage stipulated herein.

18. AS-BUILT INFORMATION

18.1 The CONTRACTOR shall provide the OWNER with one set of red-lined prints indicating as-built information. **Contractor will not receive final payment until as-built have been received and approved by Engineer/Owner.**

19. CERTIFICATES OF INSURANCE

19.1 Certificates acceptable to the Owner shall be attached to the signed Contract Documents when they are transmitted to the Owner for execution. These certificates shall contain the statement that "Coverages afforded under the policies will not be canceled unless at least thirty (30) days prior to cancellation written notice has been given to the Owner, as evidenced by receipts of registered or certified mail".

20. WORK AREA

20.1 The Contractor shall keep the work area secured at all times. The site is adjacent to a commercial airport and every precaution must be made to ensure the area is safe.

21. BUILDER'S RISK

21.1 The Contractor shall procure and shall maintain during the life of the Contract Agreement, Builder's Risk Insurance to protect the interests of the Owner, Contractor, and Sub-Contractors against loss by fire, vandalism, malicious mischief, and all hazards included in a standard Extended Coverage Endorsement. The amount of the insurance shall be at all times equal or exceed the full amount of the Contract. The policies shall be in the name of the Owner and the Contractor.

22. BUY AMERICAN

22.1 By submitting this bid, the Contractor agrees that the Contractor, sub-contractors, material, men and suppliers in the performance of this Contract will give preference to domestic construction material.

23. RETAINAGE OF CONTRACTOR'S PAYMENT

23.1 The retainage shall be an amount equal to 10% of Contractor's partial pay estimate until 50% of the work has been completed. At 50% completion, further partial payments shall be made in full to the Contractor and no additional amounts may be retained unless the Engineer certifies that the job is not proceeding satisfactorily, but amounts previously retained shall not be paid to the Contractor. At 50% completion or any time thereafter when the progress of the Work is not satisfactory, additional amounts may be retained but in no event shall the total retainage be more than 20% of the value of the work completed. Upon substantial completion of the work, any amount retained may be paid to the Contractor. When the Work has been substantially completed except for Work which cannot be completed because of weather conditions, lack of materials or other reasons which in the judgement of the Owner are valid reasons for noncompletion, the Owner may make additional payments, retaining at all times an amount sufficient to cover the estimated cost of the Work still to be completed.

23.2 Partial pay estimates may include stored materials. Contractor must submit invoices and all materials must be located at the site of the work. Retainage will not be held on stored materials.

24. COMMENCEMENT & COMPLETION OF WORK

24.1 The Contractor shall commence work within 5 days after the Notice to Proceed is issued. Work shall be completed within 300 calendar days.

24.2 If the Contractor fails to prosecute the work with such diligence as will ensure the completion of work within the time allowed, plus an extension made in accordance with Article 12 of the General Conditions; and, if the Owner does not exercise his reservations as set forth in Article 13, the Contractor shall continue to work in which event liquidated damages for the delay will be impossible to determine. In lieu thereof, liquidated damages in the amount of \$200.00 per each day of delay of the work until the work is completed.

25. ACCIDENTS

25.1 The Contractor shall provide, at the site, such equipment and medical facilities as are necessary to supply first-aid service to anyone who may be injured in connection with the work. The Contractor must report in writing to the Engineer all accidents whatsoever arising out of, or in connection with, the performance of the work, whether on or adjacent to the site, which causes death, personal injury or property damages, giving full details and statement of witnesses. In addition, if death or serious injuries or serious damages are caused, the accident shall be reported immediately by telephone or messenger to both the Contractor or any subcontractor on account of any accident, the Contractor shall promptly report the facts to the Engineer, giving full details in writing of the claim. The Contractor shall advise his superintendent and foreman, who are on the site of the work, the name of the hospital and phone number and the name and phone number of the doctor he proposes to use in case of an accident.

26. HOLD HARMLESS CLAUSE

26.1 The Contractor agrees to hold harmless, indemnify, and defend the Owner and his agents, architects, engineers and employees from and against any and all claims, losses, damages, demands, causes of action and any and all related costs and expenses, of every kind and character, growing out of, incidental to, or resulting directly or indirectly from the Contractor's performance of the work described herein, whether such loss, damage, injury, or liability is contributed to by the negligence of the Owner, its agents, architects, engineers, or employees, except that the Contractor shall have no liability for damages or the costs incidental thereto caused by the sole negligence of the Owner, his agents, architects, engineers, or employees. The Contractor will require any and all subcontractors to conform with the provisions of this clause prior to commencing any work and agrees to ensure that this clause is in conformity with the insurance provisions of the contract.

27. CONTRACTOR'S STATUS

27.1 It is agreed that the Contractor shall occupy the status of an Independent Contractor and the Contractor's employees are not employees of the Owner.

28. CONTRACTOR'S AFFIDAVIT

28.1 Upon completion of the work and prior to final payment and settlement of all sums due hereunder, Contractor will furnish to Owner, a Contractor's Affidavit in the usual form submitted by Contractor under the laws of the State of Georgia to the

effect that all bills for labor, materials and services in connection with said contract have been paid in full, acknowledging receipt of the contract price and averring that there are not outstanding claims under said contract which could become a lien on the real estate arising out of said contract.

29. RESIDENT PROJECT ENGINEER

29.1 The Owner reserves the right to furnish a Resident Project Engineer as deemed necessary to ensure the Project quality control and conformance to Plans and Specifications, who will act as the Owner's Representative on the Project and will have the authority of the Engineer as set forth in the Contract Documents.

30. MEASUREMENT & PAYMENT

30.1 Measurement and payment shall be made for the units and at the lump sum contract prices shown on the Bid Schedule. Direct payment shall only be made for those items or work specifically listed in the proposal and the cost of any other work must be included in the contract price for the applicable items to which it relates.

31. MODIFICATION OF QUANTITIES

31.1 The itemized quantities shall be considered by the Contractor as the quantities required to complete the work for the purpose of bidding. Should actual quantities required in the construction of the work be greater or less than the quantities shown on the items, an amount equal to the difference in quantities at the unit prices for the item will be added to or deducted from the contract price.

31.2 When itemized quantities are not given in the Proposal, the work shown on the plans or specified shall be considered by the Contractor to be included in his contract for the lump sum price bid.

32. SAFETY & HEALTH REGULATIONS

32.1 The Contractor shall comply with the Department of labor Safety and Health Regulations for Construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91-596) and under Section 107 of the contract Work and Safety Standards Act (PL 91-54). The regulations are administered by the Department of Labor and the Contractor shall allow access to the project to personnel from that Department.

33. EQUIPMENT ADJUSTMENT & CALIBRATION

33.1 All mechanical and electrical equipment, including related control systems, shall be

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subjected to preliminary operation and testing by the CONTRACTOR before the individual facilities and systems are put into operation. Tests shall be made to determine whether the equipment has been properly assembled, aligned, adjusted, wired and connected. Any changes, adjustments, or replacement or equipment which are due to errors or omissions on the part of the CONTRACTOR or which may be otherwise necessary to comply with the requirements of this Contract, shall be done without additional cost to the OWNER. Upon completion of the checking and adjustment, the CONTRACTOR shall demonstrate that each separate piece of equipment in each system of related items of mechanical equipment and the related instrumentation and control equipment operate in accordance with the requirements of the Contract Documents. Where no specific performance requirements are stated, the test shall show that the equipment operates in accordance with normal application practice of the equipment. The demonstration test shall show that the equipment operates smoothly and without excessive noise or vibration, that the equipment is responsive to manual and automatic controls, that control and protective devices are properly set, that the equipment will run continuously when continuous operation is intended, and that the equipment will run on a controlled or intermittent basis when this operation is intended. The demonstration test for each piece or equipment shall include check out from each remote-control point. All alarm systems and safety lockout systems shall also be demonstrated for proper function along with all process instrumentation and controls.

- 33.2 The demonstration test shall be arranged by the CONTRACTOR who shall notify the ENGINEER not less than 3 days in advance of the date of the test. The CONTRACTOR shall provide personnel from the various trades involved to operate and demonstrate the equipment.

34. SYSTEM START-UP

- 34.1 The CONTRACTOR shall place the various items of equipment into operation, along with the related piping and metering systems, and shall notify the ENGINEER at least 3 days in advance of the date of start-up.
- 34.2 Schedule for such start-up of the majority of the equipment and pumping systems will occur during the duration of the Contract Time and prior to final completion and acceptance of the overall project. After satisfactory start-up of these individual systems, including all of the related equipment, they will remain in continuous or intermittent operation as required.
- 34.3 All equipment and accessories shall be adjusted and calibrated prior to any start-up as specified under these Supplementary General Conditions. Any equipment placed into temporary operation prior to final completion of the total project shall be re-

adjusted and/or calibrated.

- 34.4 The CONTRACTOR shall supervise, control, and be responsible for the operation and maintenance of the new equipment and/or system during a period of at least 10 days after each individual item is placed into operation. The CONTRACTOR shall furnish an adequate number of competent start-up personnel to provide supervision during these phases. The CONTRACTOR shall remain responsible for making any required changes, repairs or replacements to the new installation during this period.

35. INSTRUCTION OF OWNER'S EMPLOYEES

- 35.1 The CONTRACTOR shall provide competent personnel who fully understand the operation of the equipment to instruct the OWNER's employees in the operation and maintenance of each item and system. Such instruction shall take place prior to acceptance of the installation by the OWNER at such a time or times that are acceptable to the OWNER. The CONTRACTOR shall include the cost of this training in the bid price for this Contract. Training shall be of the on-the-job type, and shall cover all areas of operation and equipment maintenance.

- 35.2 Scheduling of instruction of the OWNER's employees will be mutually agreed upon between the OWNER, CONTRACTOR and the ENGINEER.

36. OPERATION & MAINTENANCE INSTRUCTION MANUALS

See Section 01780 – Operation and Maintenance Data

37. Wage Rates for this project are included after this section.

END SECTION

PART 1 GENERAL

1.01 PARTIAL OCCUPANCY BY OWNER

Whenever, in the opinion of the Engineer, any section or portion of the Work or any structure is in suitable condition, it may be put into use upon the written order of the Engineer and such usage will not be held in any way as an acceptance of said Work or structure, or any part thereof, or as a waiver of any of the provisions of these Specifications and the Contract. Pending final completion and acceptance of the Work, all necessary repairs, and replacements, due to defective materials or workmanship or Operations of the Contractor, for any section of the Work so put into use shall be performed by the Contractor at Contractor's own expense.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE

- A. This Section describes the methods by which measurement will be made of the quantities for which payment will be made for the Project.
- B. The Bid lists each item of the Project for which payment will be made. No payment will be made for any items other than those listed in the Bid.
- C. Required items of work and incidentals necessary for the satisfactory completion of the work which are not specifically listed in the Bid, and which are not specified in this Section to be measured or to be included in one of the items listed in the Bid, shall be considered as incidental to the work. All costs thereof, including Contractor's overhead costs and profit, shall be considered as included in the lump sum or unit prices bid for the various Bid items. The Contractor shall prepare the Bid accordingly.
- D. Work includes furnishing all plant, labor, equipment, tools and materials, which are not furnished by the Owner and performing all operations required to complete the work satisfactorily, in place, as specified and as indicated on the Drawings.

1.2 MEASUREMENT OF WORK

- A. Measurement of an item of work will be by the unit indicated in the Bid Form.
- B. Final payment quantities shall be determined from the record drawings. The record drawing lengths, dimensions, quantities, etc. shall be determined by a survey after the completion of all required work. The precision of final payment quantities shall match the precision shown for that item in the Bid Form.
- C. Payment will include all necessary and incidental related work not specified to be included in any other item of work listed in the Bid Form.
- D. Unless otherwise stated in individual sections of the Specifications or in the bid, no separate payment will be made for any item of work, materials, parts, equipment, supplies or related items required to perform and complete the work. The costs for all such items required shall be included in the price bid for item of which it is a part.
- E. Payment will be made by extending unit prices multiplied by quantities provided and then summing the extended prices to reflect actual work. Such price and payment shall constitute full compensation to the Contractor for furnishing all

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- plant, labor, equipment, tools and materials not furnished by the Owner and for performing all operations required to provide to the Owner the entire Project, complete in place, as specified and as indicated on the Drawings.
- F. “Products” shall mean materials or equipment permanently incorporated into the work.
 - G. “Provide” shall mean furnish and install.
 - H. Measurement methods delineated in the individual specification sections complement the criteria of this section. In the event of conflict, the requirements of the individual specification section govern.
 - I. Work shall be measured by the Engineer or his representative with assistance from the Contractor prior to preparation of a payment request by the Contractor.
 - J. Unit quantities that are measured in place shall be measured monthly. The Contractor shall give the Engineer a minimum of two days notice for making all required measurements.
 - K. Materials that must be measured as delivered shall be measured at the time of delivery by the Engineer or his representative; the Contractor shall provide sufficient advance notice so that such measurements can be made.
 - L. Work completed shall be measured for completion against the schedule of values provided by the Contractor in accordance with the General Conditions. Related work necessary for a complete and operational job, such as relocation of mail boxes removal of trees, relocation of utilities, field engineering, clearing and grubbing, traffic control, etc., not specifically identified as a pay item shall be included in the unit price bid. No additional payments will be made for such activities.

1.3 ESTIMATED QUANTITIES

- A. All estimated quantities for unit price items, stipulated in the BID FORM, or other Contract Documents, are approximate and are to be used as a basis for comparing the bids submitted for the Project. The actual amounts of work done and materials furnished under unit price items may differ from the estimated quantities. The basis of payment for work and materials will be the actual amount of work done and materials furnished. The Contractor agrees to make no claim for damages, anticipated profits or otherwise on account of any difference between the amounts of work actually furnished and the estimated amounts included in the BID FORM. The Contractor will not be paid for any work which exceeds the quantity set forth in the BID FORM without a change order issued before the work is performed unless specifically ordered in writing by the Engineer. The Contractor will provide assistance to the Engineer to check quantities and elevations when so requested.

1.4 MEASUREMENT OF QUANTITIES

- A. Measurement by Weight – Concrete reinforcing steel, rolled or formed steel or other metal shapes will be measured by handbook weights. Welded assemblies will be measured by handbook or scale weight.
- B. Measurement by Volume – Measured by cubic dimension using mean length, width and height or thickness.
- C. Measurement by Area – Measured by square dimension using mean length and width or radius.
- D. Linear Measurement – Measured by linear dimension, at the item centerline or mean chord.
- E. Stipulated Sum/Price Measurement – Items measured by weight, volume, area, or linear means or combination, as appropriate, as a completed item or unit of the Work.

1.5 PROGRESS PAYMENTS

- A. Progress payments shall be based on the quantity of units installed.
- B. All items of Work not specifically listed in the Bid Schedule shall be considered incidental to the construction, and the cost of all such work and material shall be included in the prices bid for various items listed.
- C. All items listed for measurement and payment shall include all machinery, plant, materials and labor, etc., to successfully and satisfactorily complete Work specified.
- D. Payment – The Contractor will receive payment only for the items listed in the Bid Schedule of his contract, and no separate payments will be made for the work under any section of the Contract Documents except as provided for in the Bid Form. Where measurements are required to be made by the Engineer, for the payment of a pay item, the failure of the Contractor to give the adequate notification or failure of the Contractor to give the engineer assistance for the measurement shall result in the forfeiture of payment for the work or item, which was not measured.
- E. Work to be paid for as a “Lump Sum” shall be measured for completion against the “Schedule of Values” provided by the Contractor. The “Schedule of Values” shall be submitted at the Preconstruction conference and shall include quantities and prices of items aggregating the total “Lump Sum” and will subdivide the work into component parts in sufficient detail to serve as the basis for progress payments during construction.

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PART 2 – PRODUCTS

2.1 STORED MATERIALS

- A. Partial payment shall be made for approved materials stored at the project site, provided invoices for said materials are furnished in accordance with payment request submittal and shop drawings for said materials have been approved.

PART 3 – EXECUTION

3.1 CLEARING AND GRUBBING

- A. Measurements for clearing and grubbing shall be on the basis of acreage cleared for installation and construction as shown on the plans.
- B. Payment for clearing and grubbing shall be based on the unit price bid in the Bid Form. Payment shall include all labor, material, and equipment necessary to remove trees, stumps, vegetation, topsoil, etc. as required in the plans and specifications.
- C. A line item has been added to pay for the clearing and grubbing of the elevated tank site. The site is on the corner of Lite-n-Tie Road and Overland Way. The site is 0.69 acres.

All trees and their stumps shall be removed. All debris shall be removed from this site. Once complete, the site shall be graded smooth. The site must be compacted enough to allow a ten-wheel drilling rig to access this site for soil borings.

This item shall be paid for at the cost per acre shown in the bid form.

3.2 TRENCH EXCAVATION AND BACKFILL

- A. No separate or additional payment shall be made for any special or unique method, means, techniques, or equipment necessary for the Contractor's compliance with these Specifications, regulatory requirements, permits, laws or regulations which govern this Project.
- B. Trench Excavation: No separate payment shall be made for trench excavation. All costs shall be included in the unit price bid for the item to which it pertains at the appropriate depth.
- C. Sheeting, Bracing and Shoring

1. No separate payment will be made for providing sheeting, bracing and timbering which are specified, shown on the Drawings or necessary due to Contractor's means of construction.
2. No payment will be made for sheeting removed or for sheeting left in place for the Contractor's convenience.

D. Rock Excavation

1. Measurement of classified excavation shall be on the basis of the amount of cubic yards of rock excavated. Cubic yards of classified excavation shall be determined by multiplying the total length of rock excavated by a 3-foot trench width and by the total depth of rock excavated. Then dividing by 27 to convert to cubic yards
2. Payment for classified excavation shall be on the basis of the BID FORM. Payment shall include excavation, removal and replacement of fill as specified in Rock Excavation Section 02320.

E. Dewatering Excavations: All costs of equipment, labor and materials required for dewatering shall be included in the price bid for the item to which it pertains.

F. Bedding and Haunching

1. No additional payment will be made for improved bedding required to compensate for over excavation of the trench.
2. No payment will be made for additional trench depth.

G. Initial Backfill

1. No separate payment shall be made for initial backfill.
2. No separate payment shall be made for drying out the initial backfill material in order to meet the compaction requirements.
3. No separate payment shall be made for the adding of moisture to the initial backfill materials in order to meet the compaction requirements.
4. No separate payment shall be made for providing select material if the insitu material cannot meet the compaction requirements.

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- H. Final Backfilling
 - 1. No additional payment will be made for additional material when excavated materials are used.
 - 2. No separate payment shall be made for drying out the final backfill material in order to meet the compaction requirements.
 - 3. No separate payment shall be made for the adding of moisture to the initial backfill materials in order to meet the compaction requirements.
 - 4. No additional payment will be made for providing select material if the insitu material cannot meet the compaction requirements.
- I. Additional Material: No separate payment will be made for additional earth or fill materials imported to the Project site.
- J. Excavation and Bedding for Storm Drain: No additional payment will be made for additional trench depth.

3.3 EARTHWORK

- A. Unclassified Excavation
 - 1. Unclassified Excavation shall be on a cubic yard basis and shall include all labor, materials and equipment needed to remove, relocate and compact earth materials as indicated on the construction plans.
 - 2. Payment for Unclassified Excavation for the Pump Station shall be included in the cost of the item to which it pertains. The unit quantity was based on the prizmortal method of volume calculation with a compaction factor included. Cross Sections are shown in the construction plans for contract verification. In the event the contractor's calculations are drastically different from the Engineer's Calculations, attention to this matter shall occur prior to any material excavated or risk no additional compensation.
- B. Unsuitable Material
 - 1. Costs for undercutting, foundation preparation, and removal and replacement of unsuitable material, where shown on the Drawings or specified, shall be included in the price bid for the pump station.

2. Payment for removal and replacement of unsuitable material which is ordered by the Engineer which is not shown on the Drawings or specified, shall be included in the lump sum price bid for the pump station.
 3. No separate payment will be made for concrete backfill of trenches beneath structures. The cost of this work and all costs incidental thereto shall be included in the price bid for the item to which the work pertains.
 4. Additional costs of corrective work, made necessary by unauthorized excavation of earth or rock, shall be borne by the Contractor.
- C. Dewatering: No separate payment will be made for dewatering required to accomplish the work.
- D. Backfilling: No separate payment will be made for backfilling or excavation, hauling and placement of borrow material. The cost of all such work and all costs incidental thereto shall be included in the unit price bid for Unclassified Excavation.

3.4 CONCRETE REPLACEMENT

- A. Measurement: Measurement of the Concrete Pavement Replacement shall be on the basis of the linear foot of asphalt or concrete replaced, at the thickness as specified.
- B. Payment: Payment of Concrete Replacement shall be on the basis of the unit price in the Bid Form. Payment shall include cleaning existing pavement, placing concrete base course, placing tack coat, and placing asphalt surface course.

3.5 EROSION AND SEDIMENTATION CONTROL

- A. General
1. Payment shall be made for temporary and/or permanent erosion and sedimentation controls, except as noted below. All other temporary and/or permanent erosion and sedimentation control costs shall be included in the unit price bid for the item to which it pertains.
 2. No payment will be made for any portion of the Project for which temporary erosion and sedimentation controls are not properly maintained.
 3. Quantities for payment shall be based upon actual quantity constructed and authorized by the Engineer.

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- B. Temporary Construction Exits, Co: All costs for construction exits, including installation, maintenance, repair and removal shall be included in the unit price bid.
- C. Temporary Sediment Barriers, Sd1: All costs for sediment barriers, whether specifically hay bales, specifically silt fences, or Contractor's choice of bales or silt fence, including installation, maintenance, repair, replacement, and removal shall be included in the unit price bid for Sediment Barriers.
- D. Temporary Ditch Checks, Cd: All costs for Temporary Ditch Checks, including stone, necessary earthwork, periodic maintenance and repair, and removal of sediment and stone following establishment of permanent erosion control measures shall be included in the unit price bid for temporary pitch checks.
- E. Temporary Mulch and Temporary Grassing
 - 1. Measurement and Payment for Temporary Mulch and Temporary Grassing shall be on a per acre basis and shall include all labor, materials and equipment needed to Temporary Mulch and the Temporary Grass distributed area.
- F. Grassing Complete, Permanent
 - 1. The unit price bid for Grassing shall be for clean up, dressing, and grassing of the disturbed area. Any other costs for labor, materials, and equipment for clean-up and grassing of the disturbed area shall be included in the price bid for the item to which it pertains.
 - 2. No additional payment will be made for grassing of the disturbed area where the Contractor must reseed due to inadequate watering and maintenance; loss of seeds caused by site erosion, e.g., wind and rain; inadequate germination of the seeds; inadequate coverage/density; providing permanent species at the appropriate season after temporary grassing has been performed.
 - 3. No additional payment will be made for providing a temporary species of grass where the seasonal limitations do not allow for the proper germination of a permanent species of grass. Any additional cost anticipated for sowing a temporary species shall be included in the price bid for the item to which it pertains.
 - 4. Measurement for payment for Grassing shall be the acreage of area disturbed, excluding the paved area.

3.6 WATER DISTRIBUTION

A. Measurement:

1. Water Mains: Each size of water mains and 6” fire hydrant leads will be measured along the pipe from center of fitting to center of fitting or end of pipe in place, without deduction for the length of intermediate fittings or valves.
2. Fittings: Measurement of fittings will be on the basis of each installed
3. Fire Hydrants: Measurement of fire hydrants will be on the basis of each installed.
4. Valves: Measurement of valves will be on the basis of each installed.
5. Service Connections: The quantity of new service connections complete will be the actual number installed. Short side and long side will be paid separately.

B. Payment:

1. Water Mains: Water mains measured as described above will be paid for at the unit price bid per linear foot for the various sizes shown in the Bid Form. Payment shall include all labor, equipment, and materials necessary to complete the work as specified, including thrust blocking.
2. Fittings: Fittings for iron and plastic pipe in the distribution system will be paid for on the basis of the unit price per pound of ductile iron fittings at the weights listed in A.W.W.A. Specification C 153 for mechanical joint compact fittings. No distinction will be made between the weight of compact ductile iron, cast iron or ductile iron fittings, unless the fittings used are not manufactured as compact fittings. Fittings not manufactured as compact fittings will be paid for on the basis of the unit price per pound of ductile iron fittings at the weights listed in A.W.W.A. C-153. PVC fittings used for P.V.C. Pipe, at the Contractor’s option, will be considered a subsidiary obligation to the pipe and will not be measured for separate payment. Payment for P.V.C. fittings shall be included in the unit price per foot for P.V.C. pipe. No separate payment will be made for galvanized fittings in galvanized iron pipe. The adapters necessary to connect to valves shall be considered a part of the line in which they are installed.
3. Fire Hydrants: Fire hydrants shall be paid for at the unit price per each shown in the Bid Form. The price shall include all labor, equipment, materials and incidentals necessary for a complete installation. No

Measurement and Payment

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separate payment will be made for gravel, retainer glands, strapping, blocking or other incidentals normally provided for a hydrant installation. Any additional fittings required to install a hydrant will be paid for at the unit price bid for each fitting.

4. Valves: Gate valves will be paid for at the unit price per each shown in the Bid Form for various sized valves. The price shall include all materials, labor, equipment, valve box, concrete blocking, concrete pad and all other incidentals required for a complete installation.
5. Cleaning and Disinfecting: No separate payment will be made for cleaning and disinfecting. Cleaning and disinfecting piping in the distribution system will be included in the lump sum and unit prices for the appropriate items.
6. Grassing: There will be no separate measurement or payment. Grassing shall be considered as a subsidiary obligation of the Contractor in the restoration of disturbed areas.
7. Metal Detector Tape and Tracer Wire: No separate payment will be made for tape. The cost of furnishing and placing Metal Detector Tape and tracer wire shall be included in the contract unit price for installing non-metallic pipe.

3.7 METERED SERVICES AND TRANSFER OF SERVICES

1. Measurement:
 - a. Service Pipe: 1" service pipe will be measured along the pipe from center of the main to center of meter box, without deduction from the length of intermediate fittings or valves.
 - b. Relocation of Meter and Box: Measurement of meter and box will be on the basis of each relocated
 - c. Transfer of Service: Measurement of transfer of service will be on the basis of each transferred to the new main
 - d. Long Side Service: Long Side service shall be on the basis of each installed. Long Side Service shall include tapping saddle, corp stop, curb stop, nipples, bore with 2" carrier pipe, meter box fittings and any miscellaneous appurtenances for a complete service.
 - e. Short Side Service: Short Side Service shall be on the basis of each installed. Short Side Service shall include tapping saddle, corp stop,

curb stop, nipples, fittings, meter box and any miscellaneous appurtenances for a complete service. **Service shall be ready for Jones County to install the water meter.**

2. Payment:
 - a. Service Pipe: Service pipe measured as described above will be paid for at the unit price bid per linear foot as shown on the BID FORM. Payment shall include all labor, equipment, and materials necessary to complete the work as specified.
 - b. Relocation of Meter and Box: Meter and box shall be paid for at the unit price per each as shown in the BID FORM. The price shall include all labor, materials, equipment, and other items as shown on the plans.
 - c. Transfer of Service: Transfer of Service shall be paid for at the unit price per each as shown in the BID FORM.
 - d. Long Side Service: Long Side services shall be paid at the unit price per each as shown in the BID FORM. The price shall include all labor, material, and necessary items to install the service complete with meter, meter box, corporation stop, curb stop, and tunneling for service tubing, 3/4" service tubing to be paid separately.
 - e. Short Side Service: Short side service shall be paid at the unit price per each as shown in the BID FORM. The price shall include all labor, materials, and necessary items to install the service complete with meter, meter box, corporation stop, and curb stop as shown in the plans. 3/4" service tubing to be paid separately

3.8 JACK AND BORE/OPEN CUT

- A. Measurement: Measurement of jack and bore or open cut shall be on the basis of linear footage steel casing jacked and bored or open cut.
- B. Payment:
 1. Payment for jack and bore or open cut of steel casing shall be on the basis of the unit price for linear foot of the casing size as provided in the Bid Form Payment shall include all materials, labor and necessary extras to jack and bore or open cut the required size steel casing. Payment for carrier pipe installed shall be made separately.

Measurement and Payment

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2. Unit price bid shall also include cost of any additional insurance required by Department of Transportation for individual crossing(s).
3. Unit price bid shall include cost of any warning signs and/or flagmen that may be required by highway departments. Contractor is to determine need for such prior to submitting bid price.
5. Payment for pipeline construction in state highway or railroad rights-of-way shall be contingent upon approval and acceptance by highway department or railroad.
6. No payment shall be made for incomplete or unacceptable borings, for realignment, or for increased length for the convenience of the Contractor.

END OF SECTION

Division 2

Site Work



PART 1 GENERAL

1.01 SCOPE

- A. Construction staking shall include all of the surveying work required to layout the Work and control the location of the finished Project. The contractor shall have the full responsibility for constructing the Project to the correct horizontal and vertical alignment, as shown on the Drawings, as specified, or as ordered by the Engineer. The Contractor shall assume all costs associated with rectifying work constructed in the wrong location.

- B. From the information shown on the Drawings and the information to be provided as indicated under Project Conditions below, the Contractor shall:
 - 1. Be responsible for setting reference points and/or offsets, establishment of baselines, and all other layout, staking, and all other surveying required for the construction of the Project.
 - 2. Safeguard all reference points, stakes, grade marks, horizontal and vertical control points, and shall bear the cost of re-establishing same if disturbed.
 - 3. Stake out the permanent and temporary easements or the limits of construction to ensure that the Work is not deviating from the indicated limits.
 - 4. Be responsible for all damage done to reference points, baselines, center lines and temporary bench marks, and shall be responsible for the cost of re-establishment of reference points, baselines, center lines and temporary bench marks as a result of the operations.

- C. Baselines shall be defined as the line to which the location of the Work is referenced, i.e., edge of pavement, road centerline, property line, right-of-way or survey line.

- D. Record Drawing surveys shall be performed in accordance with Section 001720 of these Specifications.

1.02 PROJECT CONDITIONS

- A. The Drawings provide the location and/or coordinates of principal components of the Project. The alignment of some components of the Project may be indicated in the Specifications. The Engineer may order changes to the location of some of the components of the Project or provide clarification to questions regarding the correct alignment.

Construction Staking

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- B. The survey points, control points, and baseline to be provided to the Contractor shall be limited to only that information which can be found on the Project site by the Contractor.

1.03 QUALITY ASSURANCE

- A. The Contractor shall furnish documentation, prepared by a surveyor currently registered in the State in which the Project is located, confirming that staking is being done to the horizontal and vertical alignment shown in the Contract Documents. This requires that the Contractor hire, at the Contractor's own expense, a currently registered surveyor, acceptable to the Owner, to provide ongoing construction staking or confirmation of such.
- B. Any deviations from the Drawings shall be confirmed by the Engineer prior to Construction of that portion of the Project.

1.04 WATER SYSTEM IMPROVEMENTS

- A. **Staking Precision:** The precision of construction staking required shall be that which the correct location of the Watermains, Valves, and Hydrants can be established for construction and verified by the Engineer. Where the location of components of the above listed elements, e.g. fittings, valves, road crossings, manholes, etc. and are not dimensioned, the establishment of the location of these components shall be based upon scaling these locations from the Drawings with relation to readily identifiable land marks, e.g., survey reference points, power poles, manholes, etc.
- B. **Reference Points**
 - 1. Reference points shall be placed, at or no more than three feet, from the outside of the construction easement or right-of-way. The location of the reference points shall be recorded in a log with a copy provided to the Engineer for use, prior to verifying reference point locations. Distances shall be accurately measured to 0.01 foot.
 - 2. The Contractor shall give the Engineer reasonable notice that reference
 - 3. Points are set. The reference point locations must be verified by the Engineer prior to commencing clearing and grubbing operations.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

- A. Permits and Responsibilities: The Contractor shall, without additional expense to the Owner, be responsible for obtaining all necessary licenses and permits and for complying with any applicable federal, state, county, and municipal laws, codes and regulations, in connection with the prosecution of the Work. No building permits will be required as a result of this Project, but the Contractor is responsible for inspection fees.
- B. The Contractor shall take proper safety and health precautions to protect the Work, the workers, the public and the property of others.
- C. The Contractor shall also be responsible for all materials delivered and work performed until completion and acceptance of the Work, except for any completed unit of construction there of which may heretofore have been accepted.

END OF SECTION

PART 1 GENERAL

1.01 DESCRIPTION

- A. Whenever reference is made to conforming to the standards of any technical society, organization, body, code or standard, it shall be construed to mean the latest standard code, specification or tentative specification adopted and published at the time of advertisement for Bids. This shall include the furnishing of materials, testing of materials, fabrication and installation practices. In those cases where the Contractor’s quality standards establish more stringent quality requirements, the more stringent requirement shall prevail. Such standards are made a part hereof to the extent which is indicated or intended.
- B. The inclusion of an organization under one category does not preclude those organizations’ standards from applying to another category.
- C. In addition, all work shall comply with the applicable requirements of local codes, utilities and other authorities having jurisdiction.
- D. All material and equipment, for which a UL Standard, an AGA or NSF approval or an ASME requirement is established, shall be so approved and labeled or stamped. The label or stamp shall be conspicuous and not covered, painted, or otherwise obscured from visual inspection.
- E. The standards which apply to this Project are not necessarily restricted to those organizations which are listed in Article 1.02.

1.02 STANDARD ORGANIZATIONS

A. Piping and Valves

| | |
|-------|--|
| ACPA | American Concrete Pipe Association |
| ANSI | American National Standards Institute |
| API | American Petroleum Institute |
| ASME | American Society of Mechanical Engineers |
| AWWA | American Water Works Association |
| CISPI | Cast Iron Soil Pipe Institute |
| DIPRA | Ductile Iron Pipe Research Association |
| FCI | Fluid Controls Institute |
| MSS | Manufacturers Standardization Society |
| NCPI | National Clay Pipe Institute |
| NSF | National Sanitation Foundation |
| PPI | Uni-Bell PVC Pipe Association |

Codes and Standards

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B. Materials

| | |
|--------|--|
| AASHTO | American Association of State Highway and Transportation Officials |
| ANSI | American National Standards Institute |
| ASTM | American Society for Testing and Materials |

C. Painting and Surface Preparation

| | |
|------|---|
| NACE | National Association of Corrosion Engineers |
| SSPC | Steel Structures Painting Council |

D. Electrical and Instrumentation

| | |
|-------|--|
| AEIC | Association of Edison Illuminating Companies |
| AIEE | American Institute of Electrical Engineers |
| EIA | Electronic Industries Association |
| ICEA | Insulated Cable Engineers Association |
| IEEE | Institute of Electrical and Electronic Engineers |
| IES | Illuminating Engineering Society |
| IPC | Institute of Printed Circuits |
| IPCEA | Insulated Power Cable Engineers Association |
| ISA | Instrument Society of America |
| NEC | National Electric Code |
| NEMA | National Electrical Manufacturers Association |
| NFPA | National Fire Protection Association |
| TIA | Telecommunications Industries Association |
| UL | Underwriter's Laboratories |
| VRCI | Variable Resistive Components Institute |

E. Aluminum

| | |
|------|--|
| AA | Aluminum Association |
| AAMA | American Architectural Manufacturers Association |

F. Steel and Concrete

| | |
|------|--|
| ACI | American Concrete Institute |
| AISC | American Institute of Steel Construction, Inc. |
| AISI | American Iron and Steel Institute |
| CRSI | Concrete Reinforcing Steel Institute |
| NRMA | National Ready-Mix Association |
| PCA | Portland Cement Association |

PCI Prestressed Concrete Institute

G. Welding

ASME American Society of Mechanical Engineers
AWS American Welding Society

H. Government and Technical Organizations

AIA American Institute of Architects
APHA American Public Health Association
APWA American Public Works Association
ASA American Standards Association
ASAE American Society of Agricultural Engineers
ASCE American Society of Civil Engineers
ASQC American Society of Quality Control
ASSE American Society of Sanitary Engineers
CFR Code of Federal Regulations
CSI Construction Specifications Institute
EDA Economic Development Administration
EPA Environmental Protection Agency
FCC Federal Communications Commission
FmHA Farmers Home Administration
FS Federal Specifications
IAI International Association of Identification
ISEA Industrial Safety Equipment Association
ISO International Organization for Standardization
ITE Institute of Traffic Engineers
NBFU National Board of Fire Underwriters
(NFPA) National Fluid Power Association
NBS National Bureau of Standards
NISO National Information Standards Organization
OSHA Occupational Safety and Health Administration
SI Salt Institute
SPI The Society of the Plastics Industry, Inc.
USDC United States Department of Commerce
WEF Water Environment Federation

I. General Building Construction

AHA American Hardboard Association
AHAM Association of Home Appliance Manufacturers
AITC American Institute of Timber Construction

Codes and Standards

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| | |
|--------|---|
| APA | American Plywood Association |
| BHMA | Builders Hardware Manufacturers Association |
| BIFMA | Builders and Institutional Furniture Manufacturers Association |
| DHI | Door and Hardware Institute |
| FM | Factory Mutual Fire Insurance Company |
| HPMA | Hardwood Plywood Manufacturers Association |
| HTI | Hand Tools Institute |
| IME | Institute of Makers of Explosives |
| ISANTA | International Staple, Nail and Tool Association |
| ISDSI | Insulated Steel Door Systems Institute |
| IWS | Insect Screening Weavers Association |
| MBMA | Metal Building Manufacturers Association |
| NAAMM | National Association of Architectural Metal Manufacturers |
| NAGDM | National Association of Garage Door Manufacturers |
| NCCLS | National Committee for Clinical Laboratory Standards |
| NFPA | National Fire Protection Association |
| NFSA | National Fertilizer Solutions Association |
| NKCA | National Kitchen Cabinet Association |
| NWMA | National Woodwork Manufacturers Association |
| NWWDA | National Wood Window and Door Association |
| RMA | Rubber Manufacturers Association |
| SBC | SBCC Standard Building Code |
| SDI | Steel Door Institute |
| SIA | Scaffold Industry Association |
| SMA | Screen Manufacturers Association |
| SPRI | Single-Ply Roofing Institute |
| TCA | Tile Council of America |
| UBC | Uniform Building Code |
| | |
| J. | Roadways |
| | |
| AREA | American Railway Engineering Association |
| DOT | Department of Transportation |
| SSRBC | Standard Specifications for Road and Bridge Construction, Georgia Department of Transportation |
| | |
| K. | Plumbing |
| | |
| AGA | American Gas Association |
| NSF | National Sanitation Foundation |
| PDI | Plumbing Drainage Institute |
| SPC | SBCC Standard Plumbing Code |

L. Refrigeration, Heating, and Air Conditioning

| | |
|--------|--|
| AMCA | Air Movement and Control Association |
| ARI | American Refrigeration Institute |
| ASHRAE | American Society of Heating, Refrigeration, and Air Conditioning Engineers |
| ASME | American Society of Mechanical Engineers |
| CGA | Compressed Gas Association |
| CTI | Cooling Tower Institute |
| HEI | Heat Exchange Institute |
| IIAR | International Institute of Ammonia Refrigeration |
| NB | National Board of Boilers and Pressure Vessel Inspectors |
| PFMA | Power Fan Manufacturers Association |
| SAE | Society of Automotive Engineers |
| SMACNA | Sheet Metal and Air Conditioning Contractors National Association |
| SMC | SBCC Standard Mechanical Code |
| TEMA | Tubular Exchangers Manufacturers Association |

M. Equipment

| | |
|-------|---|
| AFBMA | Anti-Friction Bearing Manufacturers Association, Inc. |
| AGMA | American Gear Manufacturers Association |
| ALI | Automotive Lift Institute |
| CEMA | Conveyor Equipment Manufacturers Association |
| CMAA | Crane Manufacturers Association of America |
| DEMA | Diesel Engine Manufacturers Association |
| MMA | Monorail Manufacturers Association |
| OPEI | Outdoor Power Equipment Institute, Inc. |
| PTI | Power Tool Institute, Inc. |
| RIA | Robotic Industries Association |
| SAMA | Scientific Apparatus Makers Association |

1.03 SYMBOLS

Symbols and material legends shall be as scheduled on the Drawings.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

- A. Work under this Section includes all scheduling and administering of any pre-construction and/or progress meetings as herein specified and necessary for the proper and complete performance of this Work.
- B. Scheduling and Administration by Engineer:
 - 1. Prepare agenda
 - 2. Make physical arrangement for the meetings
 - 3. Preside at meetings
 - 4. Record minutes and include significant proceedings
 - 5. Distribute copies of the minutes to participants

1.02 PROJECT COORDINATION MEETING

- A. Hold called meetings as the progress of the Work dictates
- B. The meetings shall be held at the location indicated by the Engineer
- C. Representatives of the following parties are to be in attendance at the meetings:
 - 1. Engineer
 - 2. Contractor and superintendent
 - 3. Major subcontractors as pertinent to the agenda
 - 4. Representatives of governmental or other regulatory agencies as appropriate
- E. The minimum agenda for progress meetings shall consist of the following:
 - 1. Review and approve minutes of previous meetings
 - 2. Review work progress since last meeting

Project Meetings

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3. Note field observations, problems, and decisions
4. Identify problems, which impede planned progress
5. Review Contractor's corrective measures and procedures to regain plan schedule
6. Review Contractor's revision to the construction schedule
7. Review submittal schedule; expedite as required to maintain schedule
8. Maintenance of quality and work standards
9. Review changes proposed by Owner for their effect on the construction schedule and completion date
10. Complete other current business

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

- A. The work under this Section includes preparing, furnishing, distributing, and periodic updating of the construction schedules as specified herein.
- B. The purpose of the schedule is to demonstrate that the Contractor can complete the overall Project within the Contract time and meet all required interim milestones.

1.02 SUBMITTALS

- A. Overall Project Schedule (OPS)
 - 1. Submit the Schedule within 10 days after date of the Notice to Proceed.
 - 2. The Engineer will review the schedule and return it within 10 days after receipt.
 - 3. If required, resubmit within 10 days after receipt of a returned copy.
- B. Near Term Schedule (NTS)
 - 1. Submit the first Near Term Schedule within 10 days of the Notice to Proceed.
 - 2. The Engineer will review the schedule and return it within 10 days after receipt.
- C. Submit an update of the OPS and NTS with each progress payment request.
- D. Submit the number of copies required by the Contractor, plus two copies to be retained by the Engineer.

1.03 APPROVAL

Approval of the Contractor’s detailed construction program and revisions thereto shall in no way relieve the Contractor of any of Contractor’s duties and obligations under the Contract. Approval is limited to the format of the schedule and does not in any way indicate approval of, or concurrence with, the Contractor’s means, methods and ability to carry out the Work.

Construction Schedules

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1.04 OVERALL PROJECT SCHEDULE (OPS)

- A. The Contractor shall submit to the Owner for approval a detailed Overall Project Schedule of the Contractor's proposed operations for the duration of the Project. The OPS shall be in the form of a Gantt/bar chart.
- B. Gantt/Bar Chart Schedule
 - 1. Each activity with duration of five or more days shall be identified by a separate bar. Activities with duration of more than 20 days shall be subdivided into separate activities.
 - 2. The schedule shall include activities for shop drawing preparation and review, fabrication, delivery, and installation of major or critical path materials and equipment items.
 - 3. The schedule shall show the proposed start and completion date for each activity. A separate listing of activity start and stop dates and working day requirements shall be provided unless the information is shown in text form on the Gantt/bar chart.
 - 4. The schedule shall identify the Notice to Proceed date, the Contract Completion date, major milestone dates, and a critical path.
 - 5. The schedule shall be printed on a maximum 11 X 17- inch sized paper. If the OPS needs to be shown on multiple sheets, a simplified, one page, summary bar chart showing the entire Project shall be provided.
 - 6. The schedule shall have a horizontal time scale based on calendar days and shall identify the Monday of each week.
 - 7. The schedule shall show the precedence relationship for each activity.

1.05 NEAR TERM SCHEDULE (NTS)

- A. The Contractor shall develop and refine a detailed Near Term schedule showing the day-to-day activities with committed completion dates which must be performed during the upcoming 30-day period. The detailed schedule shall represent the Contractor's best approach to the Work which must be accomplished to maintain progress consistent with the Overall Project Schedule.
- B. The Near Term Schedule shall be in the form of Gantt/bar chart and shall include a written narrative description of all activities to be performed and describe

corrective action to be taken for items that are behind schedule.

1.06 UPDATING

- A. Show all changes occurring since previous submission of the updated schedule.
- B. Indicate progress of each activity and show actual completion dates.
- C. The Contractor shall be prepared to provide a narrative report at the Project Coordination Meetings. The report shall include the following:
 - 1. A description of the overall Project status and comparison to the OPS.
 - 2. Identify activities which are behind schedule and describe corrective action to be taken.
 - 3. A description of changes or revisions to the Project and their effect on the OPS.
 - 4. A description of the Near Term Schedule of the activities to be completed during the next 30 days. The report shall include a description of all activities requiring participation by the Engineer and/or Owner.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

- A. The Contractor shall furnish all equipment and labor materials required to provide the Owner with construction photographs of the Project.
- B. Negatives shall become the property of the Owner and none of the photographs herein shall be published without express permission of the Owner.

1.02 PRE AND POST CONSTRUCTION PHOTOGRAPHS

- A. Prior to the beginning of any work, the Contractor shall take project photographs of the work area to record existing conditions.
- B. Following completion of the work, another recording shall be made showing the same areas and features as in the pre-construction photographs.
- C. All conditions, which might later be subject to disagreement, shall be shown in sufficient detail to provide a basis for decisions.
- D. The pre-construction photographs shall be submitted to the engineer within 25 calendar days after the date of receipt by the Contractor of Notice to Proceed. Post-construction photographs shall be provided prior to final acceptance of the project.

1.03 PROGRESS PHOTOGRAPHS

- A. Photographs shall be taken to record the general progress of the Project during each pay periods. Photographs shall be representative of the primary work being performed at that time.
- B. The photographs shall include the date and time marking of the recording. All photographs shall be labeled on a tab connected to the bottom of the photo to indicate date and description of work shown.
- C. A minimum of 10 photographs shall be submitted with each request for payment. The view selection will be as agreed to with the Engineer. Two prints of each photograph shall be submitted.

Construction Photographs

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1.04 SUBMITTALS

- A. Photographs shall be submitted in plastic sleeves pre-punched for a 3-ring binder. Negatives shall be submitted in polyethylene preservers, 8-1/2 X 11-inches in size, equal to Print File Archival Preservers, Style No. 35-7B.
- B. Construction photographs shall be submitted with each payment request.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

- A. The work under this Section includes submittal to the Engineer of shop drawings, product data and samples required by the various sections of these Specifications.
- B. Submittal Contents: The submittal contents required are specified in each section.
- C. Definitions: Submittals are categorized as follows:
 - 1. Shop Drawings
 - a. Shop drawings shall include technical data, drawings, diagrams, procedure and methodology, performance surveys, schedules, templates, patterns, test reports, calculations, instructions, measurements and similar information as applicable to the specific item for which the shop drawings is prepared.
 - b. Provide newly prepared information, on reproducible sheets, with graphic information at accurate scale (except as otherwise indicated) or appropriate number of prints hereof, with name or preparer (firm name) indicated. The Contract Drawings shall not be traced or reproduced by any method for use as or in lieu of detail shop drawings. Show dimensions and note which are based on field measurement. Identify materials and products in the work shown. Indicate compliance with standards and special coordination requirement. Do not allow shop-drawing copies without appropriate final "Action" markings by the Engineer to be used in connection with the Work.
 - c. Drawings shall be presented in a clear and thorough manner. Details shall be identified by reference to sheet and detail, specification section, schedule or room numbers shown on the Contract Drawings.
 - d. Minimum assembly drawings sheet size shall be 24 x 36-inches
 - e. Minimum detail sheet size shall be 8-1/2 x 11-inches
 - f. Minimum Scale:
 - (1) Assembly Drawings Sheet, Scale: 1-inch = 30 feet
 - (2) Detail Sheet, Scale: 1/4-inch = 1 foot

Shop Drawings, Product Data, and Samples

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2. Product Data
 - a. Product data includes standard printed information on materials, products and systems, not specially prepared for this Project, other than the designation of selections from among available choices printed therein.
 - b. Collect required data into one submittal for each unit of work or system, and mark each copy to show which choices and options are applicable to the Project. Included manufacturer's standard printed recommendations for application and use, compliance with standards, application of labels and seals, notation of field measurements which have been checked and special coordination requirements.
3. Samples
 - a. Samples include both fabricated and un-fabricated physical examples of materials, products and units of work, both as complete units and as smaller portions of units of work, either for limited visual inspection or, where indicated, for more detailed testing and analysis.
 - b. Provide units identical with final condition of proposed materials or products for the work. Include "range" samples, not less than three units, where unavoidable variations must be expected, and describe or identify variations between units of each set. Provide full set of optional samples where the Engineer's selection is required. Prepare samples to match the Engineer's sample where indicated. Include information with each sample to show generic description, source or product name and manufacturer, limitations and compliance with standards. Samples are submitted for review and confirmation of color, pattern, texture and "kind" by the Engineer. Engineer will note "test" samples, except as otherwise indicated, for other requirements, which are the exclusive responsibility of the Contractor.
4. Miscellaneous submittals related directly to the Work (non-administrative) include warranties, maintenance agreements, workmanship bonds, project photographs, survey data and reports, physical work records, statements of applicability, quality testing and certifying reports, copies of industry standards, records drawings, field measurement data, operating and maintenance materials, overrun stock, security/protection/safety keys and similar information, devices and materials applicable to the Work but not processed as shop drawings, product data or samples.

1.02 SPECIFIC CATEGORY REQUIREMENTS

- A. General: Except as otherwise indicated in the individual work sections, comply with general requirements specified herein for each indicated category of submittal.
1. Submittals shall contain:
 - a. The date of submittal and the dates of any previous submittals.
 - b. The Project title
 - c. Numerical submittal numbers, starting with 1.0, 2.0, etc. Revisions to be numbered 1.1, 1.2, etc.
 - d. The Names of:
 - (1) Contractor
 - (2) Supplier
 - (3) Manufacturer
 - e. Identification of the product, with the Specification section number, permanent equipment tag numbers and applicable Drawing No.
 - f. Field dimensions, clearly identified as such
 - g. Relation to adjacent or critical features of the Work or materials
 - h. Applicable standards, such as ASTM or Federal Specification numbers
 - i. Notification to the Engineer in writing, at time of submissions, of any deviations on the submittals from requirements of the Contract Documents.
 - j. Identification of revisions on re-submittals
 - k. An 8 x 3-inch blank space for Contractor and Engineer stamps
 - l. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of products, field measurements and field construction criteria and coordination of the information within the

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submittal with requirements of the Work and of Contract Documents.

- m. Submittal sheets or drawings showing more than the particular item under consideration shall have all but the pertinent description of the item for which review is requested crossed out.

1.03 ROUTING OF SUBMITTALS

A. Submittals and routine correspondence shall be routed as follows:

- 1. Supplier to Contractor (through representative if applicable)
- 2. Contractor to Engineer
- 3. Engineer to Contractor
- 4. Contractor to Supplier

1.04 ADDRESS FOR COMMUNICATIONS

Engineer: Ingram & Associates, L.L.C.
332 New Street
Macon, Georgia 31201

Attn: Tim Ingram, P.E.
e-mail: tim@ingrameng.com
Phone: (478) 745-3996 Fax: (478) 742-4690

PART 2 PRODUCTS

2.01 SHOP DRAWINGS

- A. Unless otherwise specifically directed by the Engineer, make all shop drawings accurately to a scale sufficiently large to show all pertinent features of the item and its method of connection to the Work.
- B. Submit all shop assembly drawings, larger than 11 x 17-inches, in the form of one reproducible transparency with two opaque prints or bluelines.
- C. Submit all shop drawings, 11 x 17-inches and smaller, in the form of six opaque prints or bluelines.

- D. One reproducible for all submittals larger than 11 x 17-inches and no more than three prints of other submittals will be returned to the Contractor

2.02 MANUFACTURER'S LITERATURE

- A. Where content of submitted literature from manufacturers includes data not pertinent to this submittal, clearly indicate which portion of the contents is being submitted for the Engineer's review.
- B. Submit the number of copies which are required to be returned (not to exceed three) plus three copies which will be retained by the Engineer.

2.03 SAMPLES

- A. Samples shall illustrate materials, equipment or workmanship and established standards by which completed work is judged.
- B. Unless otherwise specifically directed by the Engineer, all samples shall be of the precise article proposed to be furnished.
- C. Submit all samples in the quantity which is required to be returned plus one sample which will be retained by the Engineer.

2.04 COLORS

- A. Unless the precise color and pattern is specifically described in the Contract Documents, wherever a choice of color or pattern is available in a specified product, submit accurate color charts and pattern charts to the Engineer for review and selection.
- B. Unless all available colors and patterns have identical costs and identical wearing capabilities, and are identically suited to the installation, completely describe the relative costs and capabilities of each.

PART 3 EXECUTION

3.01 CONTRACTOR'S COORDINATION OF SUBMITTALS

- A. Prior to submittal for the Engineer's review, the Contractor shall use all means necessary to fully coordinate all material, including the following procedures:
 - 1. Determine and verify all field dimensions and conditions, catalog numbers and similar data.

Shop Drawings, Product Data, and Samples

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2. Coordinate as required with all trades and all public agencies involved.
 3. Submit a written statement of review and compliance with the requirements of all applicable technical Specifications as well as the requirements of this Section.
 4. Clearly indicate in a letter or memorandum on the manufacturer or fabricator's letterhead, all deviations from the Contract Documents.
- B. Each and every copy of the shop drawings and data shall bear the Contractor's stamp showing that they have been so checked. Shop drawings submitted to the Engineer without the Contractor's stamp will be returned to the contractor for conformance with this requirement.
- C. The Owner may back charge the Contractor for costs associated with having to review a particular shop drawing, product data or sample more than two times to receive a "No Exceptions Taken" mark.
- D. Grouping of Submittals
1. Unless otherwise specifically permitted by the Engineer, make all submittals in groups containing all associated items.
 2. No review will be given to partial submittals of shop drawings for items which interconnect and/or are interdependent. It is the Contractor's responsibility to assemble the shop drawings for all such interconnecting and/or interdependent items, check them and then make one submittal to the Engineer along with Contractor's comments as to compliance, non-compliance or features requiring special attention.
- E. Schedule of Submittals: Within 30 days of Contract award and prior to any shop drawing submittal, the Contractor shall submit a schedule showing the estimated date of submittal and the desired approval date for each shop drawing anticipated. A reasonable period shall be scheduled for review and comments. Time lost due to unacceptable submittals shall be the Contractor's responsibility and some time allowance for resubmittal shall be provided. The schedule shall provide for submittal of items which relate to one another to be submitted concurrently.

3.02 TIMING OF SUBMITTALS

- A. Make all submittals far enough in advance of scheduled dates for installation to provide all required time for review, for securing necessary approvals, for possible revision and resubmittal, and for placing orders and securing delivery.

- B. In scheduling, allow sufficient time for the Engineer’s review following the receipt of the submittal

3.03 REVIEWED SHOP DRAWINGS

A. Engineer Review

1. Allow a minimum of 30 days for the Engineer’s initial processing of each submittal requiring review and response, except allow longer periods where processing must be delayed for coordination with subsequent submittals. The Engineer will advise the Contractor promptly when it is determined that a submittal being processed must be delayed for coordination. Allow a minimum of two weeks for reprocessing each submittal. Advise the Engineer on each submittal as to whether processing time is critical to progress of the Work, and therefore the Work would be expedited if processing time could be foreshortened.
 2. Acceptable submittals will be marked “No Exceptions Taken”. A minimum of three copies will be retained by the Engineer for Engineer’s and the Owner’s use and the remaining copies will be returned to the Contractor.
 3. Submittals requiring minor corrections before the product is acceptable will be marked “Make Corrections Noted”. The Contractor may order, fabricate and ship the items included in the submittals provided the indicated corrections are made. Drawings must be resubmitted for review and marked “No Exceptions Taken” prior to installation or use of products.
 4. Submittals marked “Amend and Resubmit” must be revised to reflect required changes and the initial review procedure repeated.
 5. The “Rejected - See Remarks” notation is used to indicate products which are not acceptable. Upon return of a submittal so marked, the Contractor shall repeat the initial review procedure utilizing acceptable products.
 6. Only two copies of items marked “Amend and Resubmit” and “Rejected - See Remarks” will be reviewed and marked. One copy will be retained by the Engineer and the other copy with all remaining unmarked copies will be returned to the Contractor for resubmittal.
- B. No work or products shall be installed without a drawing or submittal bearing the “No Exceptions Taken” notation. The Contractor shall maintain at the job site a complete set of shop drawings bearing the Engineer’s stamp.

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- C. Substitutions: In the event the Contractor obtains the Engineer’s approval for the use of products other than those which are listed first in the Contract Documents, the Contractor shall, at the Contractor’s own expense and using methods approved by the Engineer, make any changes to structures, piping and electrical work that may be necessary to accommodate these products.

- D. Use of the “No exceptions Taken” notation on shop drawings or other submittals is general and shall not relieve the Contractor of the responsibility of furnishing products of the proper dimension, size, quality, quantity, materials and all performance characteristics, to efficiently perform the requirements and intent of the Contract Documents. The Engineer’s review shall not relieve the Contractor of responsibility for error of any kind on the shop drawings. Review is intended only to assure conformance with the design concept of the Project and compliance with the information given in the Contract Documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site. The Contractor is also responsible for information that pertains solely to the fabrication processes or to the technique of construction and for the coordination of the work of all trades.

3.04 RESUBMISSION REQUIREMENTS

- A. Shop Drawings
 - 1. Revise initial drawings as required and resubmit as specified for initial submittal, with the resubmittal number shown.
 - 2. Indicate on drawings all changes which have been made other than those requested by the Engineer.

- B. Project Data and Samples: Resubmit new data and samples as specified for initial submittal, with the resubmittal number shown.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE

- A. This Section includes testing which the Owner/Engineer may require, beyond that testing required of the manufacturer, to determine if materials provided for the Project meet the requirements of these Specifications.
- B. This work also includes all testing required by the Owner/Engineer to verify work performed by the Contractor is in accordance with the requirements of these Specifications, i.e., concrete strength and slump testing, soil compaction, etc.
- C. This work does not include materials testing required in various sections of these Specifications to be performed by the manufacturer, e.g., testing of pipe.

1.2 REFERENCES

- A. ASTM C 802-87 – Practice for Conducting an Interlaboratory Test Program to Determine the Precision of Test Methods for Construction.
- B. ASTM C 1077-92 – Practice for Laboratories Testing concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.
- C. ASTM C 1093-88 – Practice for Accreditation of Testing Agencies for Unit Masonry.
- D. ASTM D 290-85 – Recommended Practice for Bituminous Mixing Plant Inspection.
- E. ASTM D 3740-92 – Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
- F. ASTM D 4561-86 – Practice for Quality Control Systems for an Inspection and Testing Agency for Bituminous Paving Materials.
- G. ASTM E 329-93 – Practice for Use in the Evaluation of Inspection and Testing Agencies as Used in Construction.
- H. ASTM E 543-93 – Practice for Determining the Qualification of Nondestructive Testing Agencies.
- I. ASTM E 548-93 – Practice for Preparation of criteria for Use in the Evaluation of Testing Laboratories and Inspection Bodies.

Testing Laboratory Services

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- J. ASTM E 699-79 – (Reapproved 1991)– Practice for Criteria for Evaluation of Agencies Involved in Testing, Quality Assurance, and Evaluating Building Components in Accordance with Test Methods Promulgated by ASTM Committee E6.

1.3 PAYMENT FOR TESTING SERVICES

- A. Employment and payment by Contractor for services of an independent testing agency or laboratory to perform specified testing.
- B. Employment of testing agency or laboratory in no way relieves contractor of obligation to perform work in accordance with requirements of Contract Documents.
- C. The cost of material testing described in various sections of these Specifications or as required in referenced standards to be provided by a material manufacturer, shall be included in the price bid for that item and shall not be paid by the Owner.

1.4 QUALITY ASSURANCE

- A. Comply with requirement of practices listed in paragraph 1.2.
- B. Laboratory – Authorized to operate in State in which Project is located.
- C. Laboratory Staff – Maintain a full-time registered Engineer on staff to review services.
- D. Testing Equipment – Calibrated at reasonable intervals with devices of accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.

1.5 CONTRACTOR SUBMITTALS

- A. Prior to start of Work, submit testing laboratory name, address, and telephone number, and names of full-time registered Engineer and responsible officer.
- B. Submit copy of report of laboratory facilities inspection made by Material Reference Laboratory of National Bureau of Standards during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.

1.6 LABORATORY DUTIES

- A. Cooperate with the Owner, Engineer, and Contractor
- B. Provide qualified personnel promptly on notice at construction site.
- C. Perform specified inspections, sampling, and testing of materials.
 - 1. Comply with specified standards, ASTM, other recognized authorities, and as specified.
 - 2. Ascertain compliance with requirements of the Contract Documents
- D. Promptly notify the Engineer and Contractor of irregularity or deficiency of work, which are observed during performance of service.
- E. Promptly submit three (3) copies (two (2) copies to the Engineer and one (1) copy to the Contractor of report of inspections and tests in addition to those additional copies required by the contractor with the following information included:
 - 1. Date issued
 - 2. Project title and number
 - 3. Testing laboratory name and address
 - 4. Name and signature of inspector
 - 5. Date of inspection or sampling
 - 6. Record of temperature and weather
 - 7. Date of test
 - 8. Identification of product and Specification section
 - 9. Location of Project
 - 10. Type of inspection or test
 - 11. Results of test
 - 12. Observations regarding compliance with the Contract Documents

Testing Laboratory Services

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- F. Perform additional services as required.
- G. The laboratory is not authorized to release, revoke, alter or enlarge on requirements of the Contract Documents, or approve or accept any portion of the Work.

1.7 CONTRACTOR RESPONSIBILITIES

- A. Cooperate with laboratory personnel and provide access to Work and/or manufacturer's requirements.
- B. Provide to the laboratory, representative samples, in required quantities, of materials to be tested.
- C. Furnish copies of mill test reports.
- D. Furnish required labor and facilities to:
 - 1. Provide access to Work to be tested;
 - 2. Obtain and handle samples at the site;
 - 3. Facilitate inspections and tests;
 - 4. Build or furnish a holding box for concrete cylinders or other samples as required by the laboratory.
- E. Notify the laboratory sufficiently in advance of operation to allow for the assignment of personnel and schedules of tests.
- F. Laboratory Tests: Where such inspection and testing are to be conducted by an independent laboratory agency, the sample(s) shall be selected by such laboratory or agency, or the Engineer, and shipped to the laboratory by the Contractor at Contractor's expense.
- G. Copies of all correspondence between the Contractor and testing agencies shall be provided to the Engineer.

1.8 PRODUCT HANDLING

- A. Promptly process and distribute all required copies of test reports and related instructions to insure all necessary retesting or replacement of materials with the least possible delay in the progress of the Work.

1.9 FURNISHING MATERIALS

- A. The Contractor shall be responsible for furnishing all materials necessary for testing.

1.10 CODE COMPLIANCE TESTING

- A. Inspection or testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor

1.11 CONTRACTOR'S CONVENIENCE TESTING

- A. Inspection or testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

1.12 SCHEDULES FOR TESTING

- A. Establishing Schedule
 - 1. The Contractor shall, by advance discussion with the testing laboratory selected by the Owner, determine the time required for the laboratory to perform its tests and to issue each of its findings, and make all arrangements for the testing laboratory to be on site to provide the required testing.
 - 2. Provide all required time within the construction schedule.
- B. When changes of construction schedule are necessary during construction, coordinate all such changes of schedule with the testing laboratory as required.
- C. When the testing laboratory is ready to test according to the determined schedule, but is prevented from testing or taking specimens due to incompleteness of the Work, all extra costs for testing attributable to the delay will be back-charged to the Contractor and shall not be borne by the Owner.

1.13 TAKING SPECIMENS

- A. Unless otherwise provided in the Contract Documents, all specimens and samples for tests will be taken by the testing laboratory or the Engineer.

Testing Laboratory Services

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1.14 TRANSPORTING SAMPLES

- A. The Contractor shall be responsible for transporting all samples, except those taken by testing laboratory personnel, to the testing laboratory.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTIONS

Not Used.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

- A. Temporary facilities required for this work include, but are not necessarily limited to:
 - 1. Temporary utilities such as electricity
 - 2. First aid facilities
 - 3. Sanitary facilities
 - 4. Potable water

1.02 GENERAL

- A. First aid facilities, sanitary facilities, and potable water shall be available on the Project site on the first day that any activities are conducted on site. The other facilities shall be provided as the schedule of the Project warrants.
- B. Maintenance: Use all means necessary to maintain temporary facilities in proper and safe condition throughout progress of the Work. In the event of loss or damage, immediately make all repairs and replacements necessary, at no additional cost to the Owner.
- C. Removal: Remove all such temporary facilities and controls as rapidly as progress of the Work will permit.

1.03 TEMPORARY UTILITIES

- A. General
 - 1. Provide and pay all costs for all water, electricity and other utilities required for the performance of the Work.
 - 2. Pay all costs for temporary utilities until Project completion.
 - 3. Costs for temporary utilities shall include all power, water and the like necessary for testing equipment as required by the Contract Documents.
- B. Temporary Water: Provide all necessary temporary piping, and upon completion of the Work, remove all such temporary piping. Provide and remove water meters.

Temporary Facilities

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C. Temporary Electricity

1. Provide all necessary wiring for the Contractor's use.
2. Furnish, locate, and install area distribution boxes such that the individual trades may use, their own construction type extension cords to obtain adequate power, and artificial lighting at all points where required by inspectors and for safety.

1.04 FIRST AID FACILITIES

The Contractor shall provide a suitable first aid station, equipped with all facilities and medical supplies necessary to administer emergency first aid treatment. The Contractor shall have standing arrangements for the removal and hospital treatment of any injured person. All first aid facilities and emergency ambulance service shall be made available by the Contractor to the Owner and the Engineer's personnel.

1.05 SANITARY FACILITIES

Prior to starting the Work, the Contractor shall furnish, for use of Contractor's personnel on the job, all necessary toilet facilities which shall be secluded from public observation. These facilities shall be either chemical toilets or shall be connected to the Owner's sanitary sewer system. All facilities, regardless of type, shall be kept in a clean and sanitary condition and shall comply with the requirements and regulations of the area in which the Work is performed. Adequacy of these facilities will be subject to the Engineer's review and maintenance of same must be satisfactory to the Engineer at all time.

1.06 POTABLE WATER

The Contractor shall be responsible for furnishing a supply of potable drinking water for employees, subcontractors, inspectors, engineers, and the Owner who are associated with the Work.

END OF SECTION

PART 1 GENERAL

1.01 BARRICADES, LIGHTS, AND SIGNALS

- A. The Contractor shall furnish and erect such barricades, fences, lights, and danger signals and shall provide such other precautionary measures for the protection of persons or property and of the Work as necessary. Barricades shall be painted in a color that will be visible at night. From sunset to sunrise, the Contractor shall furnish and maintain at least one light at each barricade and sufficient numbers of barricades shall be erected to keep vehicles from being driven on or into any work under construction.

- B. The Contractor will be held responsible for all damage to the work due to failure of barricades, signs, and lights and whenever evidence is found of such damage, the Contractor shall immediately remove the damaged portion and replace it at Contractor's cost and expense. The Contractor's responsibility for the maintenance of barricades, signs, and lights shall not cease until the Project has been accepted by the Owner.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

Work covered by this section consists of furnishing all labor, equipment, appliances and materials, and performing all operations in connection with the installation and maintenance of traffic control devices in strict accordance with this section of the specifications and the applicable drawings and subject to terms and conditions of the contract.

PART 3 EXECUTION

Execution shall be in accordance with Section 150 of the “Standard Specifications,” State Highway Department of Georgia, latest edition, and in accordance with the “Manual on Uniform Traffic Control Devices,” latest edition.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

- A. The Contractor shall provide transportation of all equipment, materials, and products furnished under these Contract Documents to the Work site. In addition, the Contractor shall provide preparation for shipment, loading, unloading, handling and preparation for installation and all other work and incidental items necessary or convenient to the Contractor for the satisfactory prosecution and completion of the Work.

- B. All equipment, materials, and products damaged during transportation or handling shall be repaired or replaced by the Contractor at no additional cost to the Owner prior to being incorporated into the Work.

1.02 TRANSPORTATION

- A. All equipment shall be suitably boxed, crated, or otherwise protected during transportation.

- B. Where equipment will be installed using existing cranes or hoisting equipment, the Contractor shall ensure that the weights of the assembled sections do not exceed the capacity of the cranes or hoisting equipment.

- C. Small items and appurtenances such as gauges, valves, switches, instruments, and probes which could be damaged during shipment shall be removed from the equipment prior to shipment, packaged, and shipped separately. All openings shall be plugged or sealed to prevent the entrance of water or dirt.

1.03 HANDLING

- A. All equipment, material, and products shall be carefully handled to prevent damage or excessive deflections during unloading or transportation.

- B. Lifting and handling drawings and instructions furnished by the manufacturer or supplier shall be strictly followed. Eyebolts or lifting lugs furnished on the equipment shall be used in handling the equipment. Shafts and operating mechanisms shall not be used as lifting points. Spreader bars or lifting beams shall be used when the distance between lifting points exceeds that permitted by standard industry practice.

Transportation and Handling

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- C. Under no circumstances shall equipment or products such as pipe, structural steel, castings, reinforcement, lumber, piles, poles, etc., be thrown or rolled off of trucks onto the ground.
- D. Slings and chains shall be padded as required to prevent damage to protective coatings and finishes.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

The work under this Section includes, but is not necessarily limited to, the furnishing of all labor, tools and materials necessary to properly store and protect all materials, equipment, products and the like, as necessary for the proper and complete performance of the Work.

1.02 STORAGE AND PROTECTION

A. Storage

1. Maintain ample way for foot traffic at all times, except as otherwise approved by the Engineer.
2. All property damaged by reason of storing of material shall be properly replaced at no additional cost to the Owner.
3. Packaged materials shall be delivered in original unopened containers and so stored until ready for use.
4. All materials shall meet the requirements of these Specifications at the time that they are used in the Work.
5. Store products in accordance with manufacturer's instructions.

B. Protection

1. Use all means necessary to protect the materials, equipment, and products of every section before, during and after installation and to protect the installed work and materials of all other trades.
2. All materials shall be delivered, stored, and handled to prevent the inclusion of foreign materials and damage by water, breakage, vandalism or other causes.
3. Substantially constructed weather tight storage sheds, with raised floors, shall be provided and maintained as may be required to adequately protect those materials and products stored on the site which may require protection from damage by the elements.

Storage and Protection

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- C. Replacement: In the event of damage, immediately make all repairs and replacements necessary for the approval of the Engineer and at no additional cost to the Owner.
- D. Equipment and products stored outdoors shall be supported above the ground on suitable wooden blocks or braces arranged to prevent excessive deflection or bending between supports. Items such as pipe, structural steel and sheet construction products shall be stored with one end elevated to facilitate drainage.
- E. Unless otherwise permitted in writing by the Engineer, building products and materials such as cement, grout, plaster, gypsum board, particleboard, resilient flooring, acoustical tile, paneling, finish lumber, insulation, wiring, etc., shall be stored indoors in a dry location. Building products such as rough lumber, plywood, concrete block, and structural tile may be stored outdoors under a properly secured waterproof covering.
- F. Tarps and other coverings shall be supported above the stored equipment or materials on wooden strips to provide ventilation under the cover and minimize condensation. Tarps and covers shall be arranged to prevent ponding of water.

1.03 EXTENDED STORAGE

In the event that certain items of major equipment such as air compressors, pumps, and mechanical aerators have to be stored for an extended period of time, the Contractor shall provide satisfactory long-term storage facilities which are acceptable to the Engineer. The Contractor shall provide all special packaging, protective coverings, protective coatings, power, nitrogen purge, desiccants, lubricants, and exercising necessary or recommended by the manufacturer to properly maintain and protect the equipment during the period of extended storage.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

This Section covers the general cleaning which the Contractor shall be required to perform both during construction and before final acceptance of the Project unless otherwise shown on the Drawings or specified elsewhere in these Specifications.

1.02 QUALITY ASSURANCE

- A. Daily, and more often if necessary, conduct inspections verifying that requirements of cleanliness are being met.
- B. In addition to the standards described in this Section, comply with all pertinent requirements of governmental agencies having jurisdiction.

1.03 HAZARDOUS MATERIAL AND WASTE

- A. The Contractor shall handle hazardous waste and materials in accordance with applicable local, state, and federal regulations. Waste shall also be disposed of in approved landfills as applicable.
- B. The Contractor shall prevent accumulation of wastes that create hazardous conditions.
- C. Burning or burying rubbish and waste materials on the site shall not be allowed.
- D. Disposal of hazardous wastes or materials into sanitary or storm sewers shall not be allowed.

1.04 DISPOSAL OF SURPLUS MATERIALS

Unless otherwise shown on the Drawings, specified or directed, the Contractor shall legally dispose off the site all surplus materials and equipment from demolition and shall provide suitable off-site disposal site, or utilize a site designated by the Owner.

PART 2 PRODUCTS

2.01 CLEANING MATERIALS AND EQUIPMENT

Provide all required personnel, equipment and materials needed to maintain the specified standard of cleanliness.

2.02 COMPATIBILITY

Use only the cleaning materials, methods and equipment, which are compatible with the surface being cleaned, as recommended by the manufacturer of the material or as approved by the Engineer.

PART 3 EXECUTION

3.01 PROGRESS CLEANING

A. General

1. Do not allow the accumulation of scrap, debris, waste material, and other items not required for construction of this Work.
2. At least each week, and more often if necessary, completely remove all scrap, debris and waste material from the job site.
3. Provide adequate storage for all items awaiting removal from the job site, observing all requirements for fire protection and protection of the environment.

B. Site

1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris and waste material. Remove all such items to the place designated for their storage.
2. Restock materials stored on site weekly.
3. At all times maintain the site in a neat and orderly condition that meets the approval of the Engineer.

3.02 FINAL CLEANING

A. Definitions: Unless otherwise specifically specified, “clean” for the purpose of this Article shall be interpreted as the level of cleanliness generally provided by commercial building maintenance subcontractors using commercial quality building maintenance equipment and materials.

B. General: Prior to completion of the Work, remove from the job site all tools,

surplus materials, equipment, scrap, debris and waste. Conduct final progress cleaning as described in 3.01 above.

- C. Site: Unless otherwise specifically directed by the Engineer, hose down all paved areas on the site and all public sidewalks directly adjacent to the site; rake clean other surfaces of the grounds. Completely remove all resultant debris.
- D. Post-Construction Cleanup: All evidence of temporary construction facilities, haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess or waste materials, or any other evidence of construction, as directed by the Engineer.
- E. Restoration of Landscape Damage: Any landscape feature damaged by the Contractor shall be restored as nearly as possible to its original condition at the Contractor's expense. The Engineer will decide what method of restoration shall be used.
- F. Timing: Schedule final cleaning as approved by the Engineer to enable the Owner to accept the Project.

3.03 CLEANING DURING OWNER'S OCCUPANCY

Should the Owner occupy the Work or any portion thereof prior to its completion by the Contractor and acceptance by the Owner, responsibilities for interim and final cleaning of the occupied spaces shall be as determined by the Engineer in accordance with the Supplementary Conditions of the Contract Documents.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

- A. The work under this Section includes, but is not necessarily limited to, the compiling, maintaining, recording, and submitting of project record documents as herein specified.

- B. Record documents include, but are not limited to:
 - 1. Drawings;
 - 2. Specifications;
 - 3. Change orders and other modifications to the Contract;
 - 4. Engineer field orders or written instructions, including Requests for Information (RFI) and Clarification Memorandums;
 - 5. Reviewed shop drawings, product data and samples;
 - 6. Test records;

- B. The Contractor shall maintain on the Project site throughout the Contract Time an up to date set of Record Drawings.

1.02 MAINTENANCE OF DOCUMENTS AND SAMPLES

- A. Storage
 - 1. Store documents and samples in the Contractor’s field office, apart from documents used for construction.
 - 2. Provide files and racks for storage of documents.
 - 3. Provide locked cabinet or secure storage space for storage of samples.

- B. File documents and samples in accordance with format of these Specifications.

- C. Maintenance
 - 1. Maintain documents in a clean, dry, legible condition and in good order.
 - 2. Do not use record documents for construction purposes.

Record Documents

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3. Maintain at the site for the Owner one copy of all record documents.
- D. Make documents and samples available at all times for inspection by Engineer.
- E. Failure to maintain the Record Documents in a satisfactory manner may be caused for withholding of a certificate for payment.

1.03 QUALITY ASSURANCE

Unless noted otherwise, Record Drawings shall provide dimensions, distances and coordinates to the nearest 0.1 foot.

1.04 RECORDING

- A. Label each document "PROJECT RECORD" in neat, large printed letters.
- B. Recording
 1. Record information concurrently with construction progress.
 2. Do not conceal any work until required information is recorded.

1.05 RECORD DRAWINGS

- A. Record Drawings shall be reproducible, shall have a title block indicating that the drawings are Record Drawings, the name of the company preparing the Record Drawings, and the date the Record Drawings were prepared. The Contractor will be provided paper sepias of the Drawings, or it may elect to provide reproducible drawings via another method. Reproducible shall be defined as being translucent so as to allow a blueline print to be produced.
- B. Legibly mark drawings to record actual construction, including:
 1. All Construction
 - a. Changes of dimension and detail.
 - b. Changes made by Requests for Information (RFI), field order, clarification memorandums or by change order.
 - c. Details not on original Drawings.
 2. Site Improvements, Including Underground Utilities

- a. Horizontal and vertical locations of all exposed and underground utilities and appurtenances, both new facilities constructed and those utilities encountered, referenced to permanent surface improvements.
- b. Location of and dimensions of roadways and parking areas, providing dimensions to back of curb when present.
- c. The locations shall be referenced to a least two easily identifiable, permanent landmarks, (e.g., power poles, valve markers, etc.) or benchmarks.

1.06 SPECIFICATIONS

- A. Legibly mark each section to record:
 - 1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.
 - 2. Changes made by Requests for Information (RFI), field order, clarification memorandums, or by change order.

1.07 SUBMITTAL

- A. At contract closeout, deliver Record Documents to the Engineer for the Owner.
- B. Accompany submittal with transmittal letter, in duplicate, containing:
 - 1. Date
 - 2. Project title and number
 - 3. Contractor's name and address
 - 4. Title and number of each record document
 - 5. Signature of Contractor or Contractor's authorized representative

END OF SECTION

PART 1 GENERAL

1.01 PROJECT MAINTENANCE AND WARRANTY

- A. Maintain and keep in good repair the Work covered by these Drawings and Specifications until acceptance by the Owner.

- B. The Contractor shall warrant for a period of one year from the date of Owner's written acceptance of certain segments of the Work and/or Owner's written final acceptance of the Project, as defined in the Contract Documents, that the completed Work is free from all defects due to faulty products or workmanship and the Contractor shall promptly make such corrections as may be necessary by reason of such defects. The Owner will give notice of observed defects with reasonable promptness. In the event that the Contractor should fail to make such repairs, may do so and charge the Contractor the cost thereby incurred. The Performance Bond shall remain in full force and effect throughout the warranty period.

- C. The Contractor shall not be obligated to make replacements which become necessary because of ordinary wear and tear, or as a result of improper operation or maintenance, or as a result of improper work or damage by another Contractor or the Owner, or to perform any work which is normally performed by a maintenance crew during operation.

- D. In the event of multiple failures of major consequences prior to the expiration of the One-year warranty described above, the affected unit shall be disassembled, inspected and modified or replaced as necessary to prevent further occurrences. All related components which may have been damaged or rendered non-serviceable as a consequence of the failure shall be replaced. A new 12-month warranty against defective or deficient design, workmanship, and materials shall commence on the day that the item is reassembled and placed back into operation. As used herein, multiple failure shall be interpreted to mean two or more successive failures of the same kind in the same item or failures of the same kind in two or more items. Major failures may include, but are not limited to, cracked or broken housings, piping, or vessels, excessive deflections, bent or broken shafts, broken or chipped gear teeth, premature bearing failure, excessive wear or excessive leakage around seals. Failures which are directly and clearly traceable to operator abuse, such as operations in conflict with published operating procedures or improper maintenance, such as substitution of unauthorized replacement parts, use of incorrect lubricants or chemicals, flagrant over-or under-lubrication and using maintenance procedures not conforming with published maintenance instructions, shall be exempted from the scope of the one-year warranty. Should multiple failures occur in a given item, all products of the same size and type shall be disassembled, inspected, modified or replaces as

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necessary and guarantee for one year.

- E. The Contractor shall, at Contractor's own expense, furnish all labor, materials, tools and equipment required and shall make such repairs and removals and shall perform such work or reconstruction as may be made necessary by any structural or functional defect or failure resulting from neglect, faulty workmanship or faulty materials, in any part of the Work performed by the Contractor. Such repair shall also include refilling of trenches, excavations, or embankments which show settlement or erosion after backfilling or placement.
- F. Except as noted on the Drawings or as specified, all structures such as embankments and fences shall be returned to their original condition prior to the completion of the Contract. Any and all damage to any facility (not designated for removal) resulting from the Contractor's operations, shall be promptly repaired by the Contractor at no cost to the Owner.
- G. The Contractor shall be responsible for all road and entrance reconstruction and repairs and maintenance of same for a period of one year from the date of final acceptance. In the event the repairs and maintenance are not made immediately and it becomes necessary for the owner of the road to make such repairs, the Contractor shall reimburse the owner of the road for the cost of such repairs.
- H. In the event the Contractor fails to proceed to remedy the defects upon mortification within 15 days of the date of such notice, the Owner reserves the right to cause the required materials to be procured and the work to be done, as described in the Drawings and Specifications, and to hold the Contractor and the sureties on Contractor's bond liable for the cost and expense thereof.
- I. Notice to Contractor for repairs and reconstruction will be made in the form of a registered letter addressed to the Contractor at Contractor's home office.
- J. Neither the foregoing paragraphs nor any provision in the Contract Documents, nor any special guarantee time limit implies any limitation of the Contractor's liability within the law of the place of construction.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

- A. Clearing and grubbing includes, but is not limited to, removing from the Project site, trees, stumps, roots, brush, structures, abandoned utilities, trash, debris and all other materials found on or near the surface of the ground in the construction area and understood by generally accepted engineering practice not to be suitable for construction of the type contemplated. Precautionary measures that prevent damage to existing features to remain is part of the Work.
- B. Clearing and grubbing operations shall be coordinated with temporary and permanent erosion and sedimentation control procedures.

1.02 QUALITY ASSURANCE

- A. The Contractor shall comply with applicable codes, ordinances, rules, regulations and laws of local, municipal, state or federal authorities having jurisdiction over the Project. All required permits of a temporary nature shall be obtained for construction operations by the Contractor.
- B. Open burning, if allowed, shall first be permitted by the local authority having jurisdiction. The Contractor shall notify the local fire department and abide by fire department restrictions.

1.03 JOB CONDITIONS

Location of the Work: The area to be cleared and grubbed is shown schematically on the Drawings or specified below. It includes all areas designated for construction.

PART 2 PRODUCTS

2.01 EQUIPMENT

The Contractor shall furnish equipment of the type normally used in clearing and grubbing operations including, but not limited to, tractors, trucks and loaders.

Clearing and Grubbing

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PART 3 EXECUTION

3.01 SCHEDULING OF CLEARING

- A. The Contractor shall clear at each construction site only that length of the right-of-way, permanent or construction easement which would be the equivalent of one month's pipe laying. This length shall be determined from the Contractor's Progress Schedule.
- B. The County may permit clearing for additional lengths of the pipe line provided that temporary erosion and sedimentation controls are in place and a satisfactory stand of temporary grass is established. Should a satisfactory stand of grass not be possible, no additional clearing shall be permitted beyond that specified above.
- C. A satisfactory stand of grass shall have no bare spots larger than one square yard. Bare spots shall be scattered and the bare area shall not comprise more than one percent of any given area.

3.02 CLEARING AND GRUBBING

- A. Clear and grub as required on each side of the pipeline before excavating. Remove all trees, growth, debris, stumps and other objectionable matter. Clear the construction easement or road right-of-way only if necessary.
- B. Grubbing shall consist of completely removing roots, stumps, trash and other debris from all graded areas so that topsoil is free of roots and debris. Topsoil is to be left sufficiently clean so that further picking and raking will not be required.
- C. All stumps, roots, foundations and planking embedded in the ground shall be removed and disposed of. Piling and butts of utility poles shall be removed to a minimum depth of two feet below the limits of excavation for structures, trenches and roadways or two feet below finish grade, whichever is lower.
- D. Landscaping features shall include, but are not necessarily limited to, fences, cultivated trees, cultivated shrubbery, property corners, man-made improvements, subdivision and other signs within the right-of-way and easement. The Contractor shall take extreme care in moving landscape features and promptly re-establishing these features.
- E. Surface rocks and boulders shall be grubbed from the soil and removed from the site if not suitable as rip rap.
- F. Where the tree limbs interfere with utility wires, or where the trees to be felled are in close proximity to utility wires, the tree shall be taken down in sections to eliminate

the possibility of damage to the utility.

- G. Any work pertaining to utility poles shall comply with the requirements of the appropriate utility.
- H. All fences adjoining any excavation or embankment that, in the Contractor's opinion, may be damaged or buried, shall be carefully removed, stored and replaced. Any fencing that, in the County's opinion, is significantly damaged shall be replaced with new fence material.
- I. The Contractor shall exercise special precautions for the protection and preservation of trees, cultivated shrubs, sod, fences, etc. situated within the limits of the construction area but not directly within excavation and/or fill limits. The Contractor shall be held liable for any damage the Contractor's operations have inflicted on such property.
- J. The Contractor shall be responsible for all damages to existing improvements resulting from Contractor's operations.

3.03 DISPOSAL OF DEBRIS

- A. The debris resulting from the clearing and grubbing operation shall be hauled to a disposal site secured by the Contractor and shall be disposed of in accordance with all requirements of federal, state, county and municipal regulations. No debris of any kind shall be deposited in any stream or body of water, or in any street or alley. No debris shall be deposited upon any private property except with written consent of the property owner. A copy of written consent shall be provided to the County for permanent records. In no case shall any material or debris be left on the Project, shoved onto abutting private properties or buried on the Project.
- B. When approved in writing by the Owner and when authorized by the proper authorities, the Contractor may dispose of such debris by burning on the Project site provided all requirements set forth by the governing authorities are met. The authorization to burn shall not relieve the Contractor in any way from damages which may result from Contractor's operations. On easements through private property, the Contractor shall not burn on the site unless written permission is also secured from the property owner, in addition to authorization from the proper authorities.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

- A. The work specified in this Section consists of providing, maintaining, and removing temporary erosion and sedimentation controls.

- B. Temporary erosion controls, include, but are not limited to, grassing, mulching, watering and reseeded on-site surfaces and spoil and borrow area surfaces, and providing interceptor ditches at ends of berms and at those locations which will ensure that erosion during construction will be either eliminated or maintained within acceptable limits as established by the Georgia Erosion and Sedimentation Act of 1975, as amended, Section 402 of the Federal Clean Water Act, and applicable codes, ordinances, rules, regulations and laws of local and municipal authorities having jurisdiction.

- C. Temporary sedimentation controls include, but are not limited to, silt dams, traps, barriers, filter stone and appurtenances at the foot of sloped surfaces which will ensure that sedimentation pollution will be either eliminated or maintained within acceptable limits as established by the Federal Clean Water Act of 1987, as amended.

- D. Land disturbance activity shall not commence until the Land Disturbance Permit has been issued.

- E. Basic Principles
 - 1. Conduct the earthwork and excavation activities in such a manner to fit the topography, soil type and condition.
 - 2. Minimize the disturbed area and the duration of exposure to erosion elements.
 - 3. Stabilize disturbed areas immediately.
 - 4. Safely convey run-off from the site to an outlet such that erosion will not be increased off site.
 - 5. Retain sediment on site that was generated on site.
 - 6. Minimize encroachment upon watercourses.

- F. Temporary Erosion and Sedimentation Control: In general, temporary erosion and sedimentation control procedures shall be directed toward:

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1. Preventing soil erosion at the source.
 2. Preventing silt and sediment from entering any waterway if soil erosion cannot be prevented.
 3. Preventing silt and sediment from migrating downstream in the event it cannot be prevented from entering the waterway.
- G. Permanent Erosion Control: Permanent erosion control measures shall be implemented to prevent sedimentation of the waterways and to prevent erosion of the Project site.

1.02 QUALITY ASSURANCE

- A. General: Perform all work under this Section in accordance with all pertinent rules and regulations including, but not necessarily limited to, those stated above and these Specifications.
- B. Conflicts: Where provisions of pertinent rules and regulations conflict with these Specifications, the more stringent provisions shall govern.

PART 2 PRODUCTS

2.01 SEDIMENT BARRIER

- A. Silt Fence: Silt fence shall be as shown on the Standard Detail Drawings.
- B. Stone Check Dams: Stone shall conform to the requirements of Section 805.01 of the Georgia Department of Transportation Standard Specification, latest edition, for Stone Dumped Rip Rap except the stone shall be 8-inches or less at the greatest dimension.
- C. Hay Bales: Hay bales shall be clean, seed-free cereal hay.
- D. Concrete Blocks: Concrete blocks shall be hollow, non-load-bearing type.
- E. Plywood shall be 3/4-inch thick exterior type.

2.02 CONSTRUCTION EXIT STONE

Use sound, tough, durable stone resistant to the action of air and water. Slabby or

shaley pieces will not be acceptable. Aggregate size shall be in accordance with the National Stone Association Size R-2 (1.5 to 3.5-inch stone) or Type 3 rip rap stone conforming to Section 805.01 of the Georgia Department of Transportation Standard Specifications.

2.03 CONCRETE

Concrete shall have a compressive strength of not less than 3,000 psi, with not less than 5.5 bags of cement per cubic yard and a slump between 3 and 5-inches. Ready-mixed concrete shall be mixed and transported in accordance with ASTM C 94. Reinforcing steel shall conform to the requirements of ASTM A 615, Grade 60.

2.04 RIP RAP

- A. Stone Rip Rap: Use sound, tough, durable stones resistant to the action of air and water. Slabby or shaley pieces will not be acceptable. Unless shown or specified otherwise, stone rip rap shall be Type III.
 - 1. Type 1 Rip Rap: Rip rap size shall conform to Section 805.01 of the Georgia Department of Transportation Standard Specification for Type 1 Stone Dumped Rip Rap.
 - 2. Type 3 Rip Rap: Rip rap size shall conform to Section 805.01 of the Georgia Department of Transportation Standard Specifications for Type 3 Stone Dumped Rip Rap.
 - 3. 200 Pound Rip Rap: Minimum weight of individual stones shall be 200 pounds.

2.05 FILTER FABRIC

- A. The filter fabric for use under rip rap shall be a monofilament, polypropylene woven fabric meeting the specifications as established by Task Force 25 for the Federal Highway Administration. The filter fabric shall have an equivalent opening size (EOS) of 70.
- B. Filter fabric under rip rap shall be Mirafi, Amoco or Exxon.

2.06 GRASSING

- A. Grassing materials shall meet the requirements of the following sections of the Georgia Department of Transportation Standard Specifications, latest edition:

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| Material | Section |
|-------------------|----------------|
| Topsoil | 893.01 |
| Seed and Sod | 890 |
| Fertilizer | 891.01 |
| Agricultural Lime | 882.02 |
| Mulch | 893.02 |
| Inoculants | 893.04 |

- B. Seed species shall be provided as shown on the approved Erosion Control Plan.
- C. Mulch Binder: Mulch on slopes exceeding 3 (horizontal) to 1 (vertical) shall be held in place by the use of a mulch binder, as approved by the Owner. The mulch binder shall be non-toxic to plant and animal life and shall be approved by the Owner.
- D. Water: Water shall be free of excess and harmful chemicals, organisms and substances that may be harmful to plant growth or obnoxious to traffic. Salt or brackish water shall not be used. Water shall be furnished by the Contractor.

PART 3 EXECUTION

3.01 GENERAL

- A. Standards: Provide all materials and promptly take all actions necessary to achieve effective erosion and sedimentation control in accordance with the Federal Clean Water Act of 1987, as amended, local enforcing agency guidelines and these Specifications.
- B. Implementation: The Contractor shall have the responsibility to actively take all steps necessary to control soil erosion and sedimentation.

3.02 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Temporary erosion and sedimentation control procedures should be initially directed toward preventing silt and sediment from entering the waterways. The preferred method is to provide an undisturbed natural buffer, extending a minimal five feet from the water, to filter the run-off. Should this buffer prove infeasible due to construction activities being too close to the water, or if the amount of sediment overwhelms the buffer, the Contractor shall place silt fences to filter the run-off and, if necessary, place permanent rip rap to stabilize the bank.

- B. Silt dams, silt fences, traps, barriers, check dams, appurtenances and other temporary measures and devices shall be installed as indicated on the approved plans and working drawings, shall be maintained until no longer needed, and shall then be removed. Deteriorated hay bales and dislodged filter stone shall be replaced with new materials.
- C. Where permanent grassing is not appropriate, and where the Contractor's temporary erosion and sedimentation control practices are inadequate, the Owner may direct the Contractor to provide temporary vegetative cover with fast growing seedlings.
- D. All erosion and sedimentation control devices, including check dams, shall be inspected by the Contractor at least weekly and after each rainfall occurrence and cleaned out and repaired by the Contractor as necessary.
- E. Temporary erosion and sedimentation control devices shall be installed and maintained from the initial land disturbance activity until the satisfactory completion and establishment of permanent erosion control measures. At that time, temporary devices shall be removed.

3.03 PERMANENT EROSION CONTROL

- A. Permanent erosion control shall include:
 - 1. Restoring the work site to its original contours, unless shown otherwise on the Drawings or directed by the Owner.
 - 2. Permanent vegetative cover shall be performed in accordance with "Grassing" of this Section.
- B. Permanent erosion control measures shall be implemented as soon as practical after the completion of pipe installation or land disturbance for each segment of the Project. In no event shall implementation be postponed when no further activities related to pipe installation will impact that portion or segment of the Project. Partial payment requests may be withheld for those portions of the Project not complying with this requirement.

3.04 GRASSING

- A. General
 - 1. Grassing shall be performed as shown on the approved Erosion Control Plan.

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2. All references to grassing, unless noted otherwise, shall relate to establishing permanent vegetative cover as specified herein for seeding, fertilizing, mulching, etc.
3. When final grade has been established, all bare soil, unless otherwise required by the Contract Documents, shall be seeded, fertilized and mulched in an effort to restore to a protected condition. Critical areas shall be sodded as approved or directed by the Owner.
4. Specified permanent grassing shall be performed at the first appropriate season listed below following establishment of final grading in each section of the site.

B. Materials

1. Topsoil: Natural, fertile, agricultural soil typical of the locality, capable of sustaining vigorous plant growth, from a well drained site free of flooding, not in frozen or muddy condition, not less than six percent organic matter, and pH value of 5.9 to 7.0. Free from subsoil, slag, clay, stones, lumps, live plants, roots, sticks, crabgrass, couch grass, noxious weeds, and foreign matter.
2. Peatmoss: Horticultural grade Class A decomposed plant material, elastic and homogeneous. Free of decomposed colloidal residue, wood, sulphur, and iron. Peatmoss shall have a pH value of 5.9 to 7.0, 60 percent organic matter by weight, moisture content not exceeding 15 percent and water absorption capacity of not less than 300 percent by weight on oven dry basis.
3. Sand: Hard, granular, natural, beach sand, washed, free of impurities, chemical, or organic matter.
4. Fertilizer: 6-12-12 grade Commercial type with six percent nitrogen, 12 percent P₂O₅, and 12 percent K₂O.
5. Lime: Standard agricultural type containing at least 85 percent total carbonates applied at a rate of 4,000 pounds per acre (92 pounds per 1,000 square feet), or as required by the test results and recommendations as specified above. Before seeding, apply lime and fertilizer and incorporate them into the soil at least 3-inches deep by discing and harrowing, at the rates recommended above or required by the above test results.
6. Seed: Seed shall be uniform mixtures of the kinds and applied at the rates shown in the approved Erosion Control Plan.

- C. Replant grass removed or damaged in residential areas using the same variety of grass and at the first appropriate season. Where sod is removed or damaged, replant such areas using sod of the same species of grass at the first appropriate season. Outside of residential or landscaped areas, grass the entire area disturbed by the work on completion of work in any area. In all areas, promptly establish successful stands of grass.

3.05 RIP RAP

- A. Unless shown otherwise on the Drawings and/or approved Erosion Control Plan, rip rap shall be placed where ordered by the Owner. Carefully compact backfill and place rip rap to prevent subsequent settlement and erosion.
- B. Preparation of Foundations: The ground surface upon which the rip rap is to be placed shall be brought in reasonably close conformity to the correct lines and grades before placement is commenced. Where filling of depressions is required, the new material shall be compacted with hand or mechanical tampers.
- C. Placement of Filter Fabric: The surface to receive fabric shall be prepared to a relatively smooth condition free from obstructions, depressions and debris. The fabric shall be placed with the long dimension running up the slope and shall be placed to provide a minimum number of overlaps. The strips shall be placed to provide a minimum width of one foot of overlap for each joint. The filter fabric shall be anchored in place with securing pins of the type recommended by the fabric manufacturer. Pins shall be placed on or within 3-inches of the centerline of the overlap. The fabric shall be placed so that the upstream strip overlaps the downstream strip. The fabric shall be placed loosely so as to give and therefore avoid stretching and tearing during placement of the stones. The stones shall be dropped no more than three feet during construction. The fabric shall be protected at all times during construction from clogging due to clay, silts, chemicals or other contaminants. Any contaminated fabric or any fabric damaged during its installation or during placement of rip rap shall be removed and replaced with uncontaminated and undamaged fabric at no expense to the Owner.
- D. Placement of Rip Rap: The rip rap shall be placed on a 6-inch layer of soil, crushed stone or sand overlaying the filter fabric. This 6-inch layer shall be placed to maximize the contact between the soil beneath the filter fabric and the filter fabric. Rip rap shall be placed with its top elevation conforming with the natural slope of the stream bank and stream bottom. Stone rip rap shall be dumped into place to form a uniform surface and to the thickness specified on the Drawings. The thickness tolerance for the course shall be -6-inches and +12-inches. If the Drawings or Bid do not specify a thickness, the course shall be placed to a thickness of not less than 18-inches.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

The work to be performed under this Section shall consist of furnishing all labor, equipment, appliances and materials, and performing all operations in connection with the basic pipeline construction methods and procedures.

1.02 RELATED SECTIONS

1. Section 02665 – Water Mains and Accessories
2. Section 02730 – Sewer and Accessories
3. Section 02731 – Force Mains

PART 3 EXECUTION

3.01 EXISTING UTILITIES AND OBSTRUCTIONS

- A. The Drawings indicate utilities or obstructions that are known to exist according to the best information available to the OWNER. The Contractor shall call the Utilities Protection Center (UPC) (325-5000 or 1-800-282-7411) as required by Georgia law (O.C.G.A. §25-9-1 through §25-9-13) and all utilities, agencies or departments that own and/or operate utilities in the vicinity of the construction work site, at least 72 hours (three business days) prior to construction, to verify the location of the existing utilities.
- B. Existing Utility Location: The following steps shall be exercised to avoid interruption of existing utility service.
 1. Provide the required notice to the utility owners and allow them to locate their facilities according to Georgia law. Field utility locations are valid for only 10 days after original notice. The Contractor shall ensure, at the time of any excavation, that a valid utility location exists at the point of excavation.
 2. Expose the facility, for a distance of at least 200 feet in advance of pipeline construction, to verify its true location and grade. Repair, or have repaired, any damage to utilities resulting from locating or exposing their true location.
 3. Avoid utility damage and interruption by protection with means or methods recommended by the utility owner.
 4. Maintain a log identifying when phone calls were made, who was called,

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area for which utility relocation was requested and work order number issued, if any. The Contractor shall provide the OWNER an updated copy of the log bi-weekly, or more frequently if required.

C. Conflict with Existing Utilities

1. **Horizontal Conflict:** Horizontal conflict shall be defined as when the actual horizontal separation between a utility, main, or service and the proposed pipeline does not permit safe installation of the pipeline by the use of sheeting, shoring, tying-back, supporting, or temporarily suspending service of the parallel or crossing facility. The Contractor may change the proposed alignment of the pipeline to avoid horizontal conflicts if the new alignment remains within the available right-of-way or easement, complies with regulatory agency requirements and after a written request to and subsequent approval by the OWNER. If, in the opinion of the OWNER, the pipeline's proposed location cannot be adjusted, thus requiring the relocation of an existing utility, the OWNER will direct the Contractor to relocate the utility as part of the Contract with the costs of such relocation being paid for as part of a change order.
2. **Vertical Conflict:** Vertical conflict shall be defined as when the actual vertical separation between a utility, main, or service and the proposed pipeline does not permit the crossing without immediate or potential future damage to the utility, main, service, or the pipeline. The Contractor may change the proposed grade of the pipeline to avoid vertical conflicts if the changed grade maintains adequate cover and complies with regulatory agencies requirements after written request to and subsequent approval by the OWNER. If, in the opinion of the OWNER, the pipeline's proposed location cannot be adjusted, thus requiring the relocation of an existing utility, the OWNER will direct the Contractor to relocate the utility as part of the Contract with the costs of such relocation being paid for as part of a change order.

D. **Electronic Locator:** Have available at all times an electronic pipe locator and a magnetic locator, in good working order, to aid in locating existing pipe lines or other obstructions.

E. Water and Sewer Separation

1. Water mains should maintain a minimum 10-foot edge-to-edge separation from sewer lines, whether gravity or pressure. If the main cannot be installed in the prescribed easement or right-of-way and provide the 10-foot separation, the separation may be reduced, provided the bottom of the water main is a minimum of 18-inches above the top of the sewer. Should neither

of these two separation criteria be possible, the water main shall be installed below the sewer with a minimum vertical separation of 18-inches. Where possible, a full joint of sewer pipe shall be centered over the water main. Any deviation shall be requested in writing to the OWNER.

2. The water main, when installed below the sewer, shall be encased in concrete with a minimum 6-inch concrete depth to the first joint in each direction. Where water mains cross the sewer, the pipe joint adjacent to the pipe crossing the sewer shall be cut to provide maximum separation of the pipe joints from the sewer.
 3. No water main shall pass through, or come in contact with, any part of a sanitary sewer manhole.
- F. **Miscellaneous Obstructions:** The Contractor shall coordinate its work with the individual property owners during the installation of the proposed pipeline. Property owners may have invisible fences, underground sprinkler systems, storm drainage, and other miscellaneous obstructions which must be worked around. The Contractor shall take all necessary measures to minimize disruption or damage to such systems. The Contractor shall restore any damage to personal property as soon as possible.

3.02 CONSTRUCTION ALONG HIGHWAYS, STREETS AND ROADWAYS

- A. Install pipe lines and appurtenances along highways, streets and roadways in accordance with the applicable regulations of, and permits issued by, the Georgia Department of Transportation, Turner County and the City of Sycamore with reference to construction operations, safety, traffic control, road maintenance and repair.
- B. **Traffic Control**
 1. The Contractor shall provide, erect and maintain all necessary barricades, suitable and sufficient lights and other traffic control devices; provide qualified flagmen where necessary to direct traffic; take all necessary precautions for the protection of the work and the safety of the public.
 2. Construction traffic control devices and their installation shall be in accordance with the current **Manual on Uniform Traffic Control Devices for Streets and Highways**.
 3. Placement and removal of construction traffic control devices shall be coordinated with the Georgia Department of Transportation, the City of Sycamore and Turner County a minimum of 48 hours in advance of the

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activity.

4. Placement of construction traffic control devices shall be scheduled ahead of associated construction activities. Construction time in street right-of-way shall be conducted to minimize the length of time traffic is disrupted. Construction traffic control devices shall be removed immediately following their useful purpose. Traffic control devices used intermittently, such as "Flagmen Ahead", shall be removed and replaced when needed.
5. Existing traffic control devices within the construction work zone shall be protected from damage. Traffic control devices requiring temporary relocation shall be located as near as possible to their original vertical and horizontal locations. Original locations shall be measured from reference points and recorded in a log prior to relocation. Temporary locations shall provide the same visibility to affected traffic as the original location. Relocated traffic control devices shall be reinstalled in their original locations as soon as practical following construction.
6. Construction traffic control devices shall be maintained in good repair and shall be clean and visible to affected traffic for daytime and nighttime operation. Traffic control devices affected by the construction work zone shall be inspected daily.
7. Construction warning signs shall be black legend on an orange background. Regulatory signs shall be black legend on a white background. Construction sign panels shall meet the minimum reflective requirements of the Georgia Department of Transportation, the City of Sycamore and Turner County. Sign panels shall be of durable materials capable of maintaining their color, reflective character and legibility during the period of construction.
8. Channelization devices shall be positioned preceding an obstruction at a taper length as required by the current **Manual on Uniform Traffic Control Devices for Streets and Highways**, as appropriate for the speed limit at that location. Channelization devices shall be patrolled to ensure that they are maintained in the proper position throughout their period of use.

C. Construction Operations

1. Perform all work along highways, streets and roadways to minimize interference with traffic.
2. Stripping: Where the pipe line is laid along road right-of-way, strip and stockpile all sod, topsoil and other material suitable for right-of-way restoration.

3. Trenching, Laying, and Backfilling: Do not open the trench any further ahead of pipe laying operations than is necessary. Backfill and remove excess material immediately behind laying operations. Complete excavation and backfill for any portion of the trench in the same day.
 4. Shaping: Reshape damaged slopes, side ditches, and ditch lines immediately after completing backfilling operations. Replace topsoil, sod, and any other materials removed from shoulders.
 5. Construction operations shall be limited to 400 feet along areas, including clean-up and utility exploration unless otherwise approved by the OWNER.
- D. Excavated Materials: Do not place excavated material along highways, streets, and roadways in a manner which obstructs traffic. Sweep all scattered excavated material off of the pavement in a timely manner.
- E. Drainage Structures: Keep all side ditches, culverts, cross drains, and other drainage structures clear of excavated material. Care shall be taken to provide positive drainage to avoid ponding or concentration of runoff.
- F. Landscaping Features: Landscaping features shall include, but are not necessarily limited to: fences; property corners; cultivated trees and shrubbery; manmade improvements; subdivision, and other signs within the right-of-way and easement. The Contractor shall take extreme care in moving landscape features and promptly re-establishing these features.
- G. Maintaining Highways, Streets, Roadways and Driveways
1. Maintain streets, highways, roadways and driveways in suitable condition for movement of traffic until completion and final acceptance of the Work.
 2. During the time period between pavement removal and completing permanent pavement replacement, maintain highways, streets and roadways by the use of steel running plates. Running plate edges shall have asphalt placed around their periphery to minimize vehicular impact. The backfill above the pipe shall be compacted as specified elsewhere up to the existing pavement surface to provide support for the steel running plates.
 3. Furnish a road grader or front-end loader for maintaining highways, streets, and roadways. The grader or front-end loader shall be available at all times.
 4. Immediately repair all driveways that are cut or damaged. Maintain them in a suitable condition for use until completion and final acceptance of the

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Work.

5. The pressure mains shall be punched under all paved surfaces. After several unsuccessful attempts to punch the pipe, the OWNER may direct the Contractor to trench across the pavement.

3.03 PIPE DISTRIBUTION

- A. Pipe shall be distributed and placed in such a manner that will not interfere with traffic.
- B. No pipe shall be strung further along the route than 1,000 feet beyond the area in which the Contractor is actually working without written permission from the OWNER. The OWNER reserves the right to reduce this distance to a maximum distance of 200 feet in residential and commercial areas based on the effects of the distribution to the adjacent property owners.
- C. No street or roadway may be closed for unloading of pipe without first obtaining permission from the proper authorities. The Contractor shall furnish and maintain proper warning signs and obstruction lights for the protection of traffic along highways, streets and roadways upon which pipe is distributed.
- D. No distributed pipe shall be placed inside drainage ditches.
- E. Distributed pipe shall be placed as far as possible from the roadway pavement, but no closer than five feet from the roadway pavement, as measured edge-to-edge.

3.04 PROTECTION AND RESTORATION OF WORK AREA

- A. General: Return all items and all areas disturbed, directly or indirectly by work under these Specifications, to their original condition or better, as quickly as possible after work is started.
 1. The Contractor shall plan, coordinate, and prosecute the work such that disruption to personal property and business is held to a practical minimum.
 2. All construction areas abutting lawns and yards of residential or commercial property shall be restored promptly. Backfilling of underground facilities, ditches, and disturbed areas shall be accomplished on a daily basis as work is completed. Finishing, dressing, and grassing shall be accomplished immediately thereafter, as a continuous operation within each area being constructed and with emphasis placed on completing each individual yard or business frontage. Care shall be taken to provide positive drainage to avoid ponding or concentration of runoff.

3. Handwork, including raking and smoothing, shall be required to ensure that the removal of roots, sticks, rocks, and other debris is removed in order to provide a neat and pleasing appearance.
 4. The Department of Transportation's engineer shall be authorized to stop all work by the Contractor when restoration and cleanup are unsatisfactory and to require appropriate remedial measures.
- B. Man-Made Improvements: Protect, or remove and replace with the OWNER's approval, all fences, walkways, mail boxes, pipe lines, drain culverts, power and telephone lines and cables, property pins and other improvements that may be encountered in the Work.
- C. Cultivated Growth: Do not disturb cultivated trees or shrubbery unless approved by the OWNER. Any such trees or shrubbery which must be removed shall be heeled in and replanted under the direction of an experienced nurseryman.
- D. Cutting of Trees: Do not cut trees for the performance of the work except as absolutely necessary. Protect trees that remain in the vicinity of the work from damage from equipment. Do not store spoil from excavation against the trunks. Remove excavated material stored over the root system of trees within 30 days to allow proper natural watering of the root system. Repair any damaged tree over 3-inches in diameter, not to be removed, under the direction of an experienced nurseryman. All trees and brush that require removal shall be promptly and completely removed from the work area and disposed of by the Contractor. No stumps, wood piles, or trash piles will be permitted on the work site.
- E. Disposal of Rubbish: Dispose of all materials cleared and grubbed during the construction of the Project in accordance with the applicable codes and rules of the appropriate OWNER, state and federal regulatory agencies.
- F. Swamps and Other Wetlands
1. The Contractor shall not construct permanent roadbeds, berms, drainage structures or any other structures which alter the original topographic features within the easement.
 2. All temporary construction or alterations to the original topography will incorporate measures to prevent erosion into the surrounding swamp or wetland. All areas within the easement shall be returned to their original topographic condition as soon as possible after work is completed in the area. All materials of construction and other non-native materials shall be disposed by the Contractor.

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3. The Contractor shall provide temporary culverts or other drainage structures, as necessary, to permit the free migration of water between portions of a swamp, wetland or stream which may be temporarily divided by construction.
4. The Contractor shall not spread, discharge or dump any fuel oil, gasoline, pesticide, or any other pollutant to adjacent swamps or wetlands.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Grading.
- B. Excavation.
- C. Backfilling.
- D. Compaction.
- E. Remove and Replace Topsoil.
- F. Dressing of Shoulders and Banks.
- G. Stone Drainage Filter.
- H. Water Control.
- I. Testing.

1.02 RELATED SECTIONS

Section 02110 - Clearing and Grubbing

1.03 MEASUREMENT AND PAYMENT

- A. Grading to subgrades, construction of ditches, dressing of disturbed areas, removing and replacing topsoil, excavating, backfilling and compacting to required elevations, testing, staking, and construction supervision shall be included in the contract lump sum price in the item to which it pertains
- B. Unsuitable Material - Payment will be included in the item to which it pertains. Payment will include excavation and disposal of unsuitable material.
- C. Borrow - Payment will be included in the item to which it pertains. Payment will include furnishing materials required in excess of suitable materials available on site.
- D. Earthwork - All earthwork shall not be measured for direct payment. Payment for the earthwork shall be included in the item to which it pertains.

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- E. Dewatering - No direct payment shall be made for dewatering. Dewatering shall be included in the item to which it pertains.
- F. Proof Rolling - Payment will be included in the item to which it pertains. Payment will include furnishing a loaded truck, truck driver, fuel and rolling the designated areas.

1.04 REFERENCES

- A. ASTM D 448-86 (Reapproved 1993) - Sizes of Aggregate for Road and Bridge Construction.
- B. ASTM D 1556-90 - Density and Unit Weight of Soil in Place by the Sand-Cone Method.
- C. ASTM D 1557-91 - Laboratory Compaction Characteristics of Soil Using Modified Effort.
- D. ASTM D 2167-94 - Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
- E. ASTM D 2487-93 - Classification of Soils for Engineering Purposes.
- F. ASTM D 2922-91 - Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
- G. ASTM D 301 7-88 (Reapproved 1993) - Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
- H. ASTM D 3740-94a - Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
- I. ASTM E 329-93b - Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction.

1.05 SUBMITTALS

- A. Section 01340 - Submittals: Procedures for submittals.
- B. Materials Source: Submit names of materials source.

1.06 QUALITY ASSURANCE

Perform work in accordance with Federal, State of Georgia, County of Cook, Municipality of Adel, standards.

1.07 TESTING

- A. Laboratory tests for moisture density relationship for fill materials shall be in accordance with ASTM D 1557, (Modified Proctor).
- B. In place density tests in accordance with ASTM D 1556 or ASTM D 2922.
- C. Testing laboratory shall operate in accordance to ASTM D 3740 and E 329 and shall be accepted by the Engineer.
- D. The testing laboratory and Project Engineer/Project Representative shall be given a minimum of 48 hours notice prior to taking any of the tests.
- E. Testing shall be the responsibility of the Contractor and shall be performed at the Contractor's expense by a commercial testing laboratory that operates in accordance with subparagraph C above.
- F. Test results shall be furnished to the Engineer.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Borrow shall consist of sand or sand-clay soils capable of being readily shaped and compacted to the required densities, and shall be free of roots, trash and other deleterious material.
- B. All soils used for structural fills shall have a P₁ (plastic index) of less than 10, and a LL (liquid limit) of less than 30. Fill soils shall be dried to appropriate moisture contents prior to compaction.
- C. Additionally, fill soils used for the top 2 feet of fill beneath roads and parking lots shall have no more than 15% passing the # 200 sieve. Fill soils used for house lots shall have no more than 25% passing the # 200 sieve.
- D. Contractor shall furnish all borrow material.
- E. Contractor shall be responsible for and bear all expenses in developing borrow

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sources including securing necessary permits, drying the material, haul roads, clearing, grubbing, and excavating the pits, haul roads, placing, restoration of pits and haul roads to a condition satisfactory to property owners and in compliance with applicable state and local laws and regulations.

2.02 SOURCE QUALITY CONTROL

- A. If tests indicate materials do not meet specified requirements, change material and retest.
- B. Provide materials of each type from same source throughout the Work.

PART 3 EXECUTION

3.01 TOPSOIL

- A. Contractor shall strip all topsoil and stockpile on site at a location determined by the Owner at the Contractor's expense.
- B. Topsoil shall be placed to a depth of 4" over all disturbed areas.
- C. Any remaining topsoil determined by the Owner or Engineer to be useful will be stored on site at a location determined by the Owner at the Contractor's expense.

3.02 EXCAVATION

- A. Shall be defined as unclassified excavation.
- B. Suitable excavation material shall be transported to and placed in fill areas within the limits of the work.
- C. Unsuitable material, encountered in areas to be paved and under building pads, shall be excavated 2 feet below final grade and replaced with suitable material from site or borrow excavations.
- D. Unsuitable and surplus excavation material not required for fill shall be disposed of off site.
- E. Proper drainage, including sediment and erosion control, shall be maintained at all times. Methods shall be in accordance with the National Pollutant Discharge Elimination System standards and other local, state and federal regulations.

- F. Unsuitable materials as stated herein shall be highly plastic clay soils, of the CH and MH designation, borderline soils of the SC-OH description, and organic soils of the OL and OH description based on the Unified Soils Classification System. Further, any soils for the top two feet of pavement subgrade shall have no more than 15% passing the # 200 sieve.

3.03 GROUND SURFACE PREPARATION FOR FILL

- A. All vegetation such as roots, brush, heavy sods, heavy growth of grass, decayed vegetable matter, rubbish, and other unsuitable material within the areas to be filled shall be stripped and removed prior to beginning the fill operation.
- B. Sloped ground surfaces steeper than 1 vertical to 4 horizontal, on which fill is to be placed shall be plowed, stepped, or benched, or broken up as directed, in such a manner that the fill material will bond with the existing surface.
- C. Surfaces on which fill is to be placed and compacted shall be wetted or dried as may be required to obtain the specified compaction.

3.04 FILL

- A. Shall be reasonably free from roots, organic material, trash, and stones having dimensions greater than 4 inches.
- B. Shall be placed in successive horizontal layers 8 inches to 12 inches in loose depth for the full width of the cross-section and compacted as required.

3.05 TOLERANCES

- A. Unpaved areas to within 0.1 feet of elevations shown on the drawings provided such deviation does not create low spots that do not drain.
- B. Paved Areas - Subgrade to within 0.05 feet of the drawing elevations less the compacted thickness of the base and paving.

3.06 FINISHED GRADING

- A. All areas covered by the project including excavated and filled sections and adjacent transition areas shall be smooth graded and free from irregular surface changes.
- B. Degree of finish shall be that ordinarily obtainable from either blade-grader or scraper operations, supplemented with hand raking and finishing, except as otherwise specified.

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- C. The finished surface of unpaved areas shall be not more than 0.10' above or below the established grade or approved cross-section.
- D. Ditches and lagoon banks shall be finished graded, dressed, and seeded within fourteen (14) calendar days of work to reduce erosion and permit adequate drainage.

3.07 DISPOSAL OF WASTE MATERIAL

All vegetation roots, brush, sod, broken pavements, curb and gutter, rubbish, and other unsuitable or surplus material stripped or removed from the limits of construction shall be disposed of by the Contractor.

3.08 PROTECTION

- A. Graded areas shall be protected from traffic, erosion, settlement, or any washing away that may occur from any cause prior to acceptance.
- B. The Contractor shall be responsible for protection of below grade utilities shown on the drawings or indicated to him by the Owner at all times during earthwork operations.
- C. Repair or re-establishment of graded areas prior to final acceptance shall be at the Contractor's expense.
- D. Site drainage shall be provided and maintained by Contractor during construction until final acceptance of the project. Drainage may be by supplemental ditching, or pumping if necessary, prior to completion of permanent site drainage.

3.09 DRAINAGE

The Contractor shall be responsible for providing surface drainage away from all construction areas. This shall include maintenance of any ditches that exist or may be constructed by others in the immediate vicinity of the work. Contractor shall provide proper and effective measures to prevent siltation of wetlands, streams, and ditches both on the Owner's property, and those properties downstream.

3.10 FIELD QUALITY CONTROL

- A. Compaction testing shall be performed in accordance with ASTM D 1556 or D 2922. Where tests indicate the backfill does not meet specified requirements, the

backfill shall be removed, replaced, and retested at the Contractors expense.

- B. Unpaved areas - at least 90% of maximum laboratory density at optimum moisture content unless otherwise approved by the Engineer.
- C. Paved Areas and Under Structures - top 6-inch layer of subgrade to at least 98% of maximum laboratory density at optimum moisture content. Layers' below top 6 inches shall be compacted to 95% of maximum laboratory density at optimum moisture content.
- D. Rolling and compaction equipment and methods shall be subject to approval by the Engineer. Approval in no way relieves Contractor of the responsibility to perform in correct and timely means.
- E. Number of Tests - Under paved areas, no less than one density test per horizontal layer per 5,000 square feet of subgrade shall be made. In unpaved areas, no less than one density test per horizontal layer per 10,000 square feet of fill area shall be made.

Under curb and gutter, no less than one density test per every 300 linear feet.

3.11 PROOF ROLLING

Shall be required on the subgrade of all curb and gutter and paved areas and on the base of all paved areas where designated by the Engineer. Proof rolling shall take place after all underground utilities are installed and backfilled. The operation shall consist of rolling the subgrade or base with a fully loaded ten (10) wheeled dump truck. A full load shall consist of ten (10) to twelve (12) cubic yards of soil or rock. The dump truck shall be capable of traveling at a speed of two (2) to five (5) miles per hour and be in sound mechanical shape with no exhaust leaks or smoking from burning oil. The Engineer shall determine number of passes and areas rolled.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

- A. The work under this Section consists of furnishing all labor, equipment, and materials and performing all operations in connection with the trench excavation and backfill required to install the pipelines shown on the Drawings and as specified.
- B. Excavation shall include the removal of any trees, stumps, brush, debris, or other obstacles which remain after the clearing and grubbing operations, which may obstruct the work, and the excavation and removal of all earth, rock or other materials to the extent necessary to install the pipe and appurtenances in conformance with the lines and grades shown on the Drawings and as specified.
- C. Backfill shall include the refilling and compaction of the fill in the trenches and excavations up to the surrounding ground surface or road grade at crossing.
- D. The trench is divided into five specific areas:
 - 1. Foundation: The area beneath the bedding, sometimes also referenced to as trench stabilization.
 - 2. Bedding: The area above the trench bottom (or foundation) and below the bottom of the barrel of the pipe.
 - 3. Haunching: The area above the bottom of the barrel of the pipe up to a specified height above the bottom of the barrel of the pipe.
 - 4. Initial Backfill: The area above the haunching material and below a plane 18 inches above the top of the barrel of the pipe or the top of duct bank.
 - 5. Final Backfill: The area above a plane 18 inches above the top of the barrel of the pipe.
- E. The choice of method, means, techniques and equipment rests with the Contractor. The Contractor shall select the method and equipment for trench excavation and backfill depending upon the type of material to be excavated and backfilled, the depth of excavation, the amount of space available for operation of equipment, storage of excavated material proximity of man-made improvements to be protected, available easement or right-of-way and prevailing practice in the area.

1.02 QUALITY ASSURANCE

- A. Density: All references to "maximum dry density" shall mean the maximum dry

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- density defined by the "Maximum Density-Optimum Moisture Test", ASTM D 698, except that for non-cohesive materials "maximum dry density" shall mean the maximum index density as determined by the "Maximum Index Density of Soils Using a Vibratory Table", ASTM D 4253. Determination of the density of foundation, bedding, haunching, or backfill materials in place shall meet with the requirements of ASTM D 1556, "Density of Soil In Place by the Sand Cone Method", ASTM D 2937, "Density of Soil In Place by the Drive-Cylinder Method" or ASTM D 2922, "Density of Soil and Soil-Aggregate In Place by Nuclear Methods (Shallow Depth)".
- B. Sources and Evaluation Testing: Testing of materials to certify conformance with the Specifications shall be performed by an independent testing laboratory. All imported fill materials shall meet the requirements of on-site fill materials.
- C. All costs associated with compaction testing ordered by the Owner shall be paid for by the Contractor. The extent of testing required shall be reasonable, but shall also be dependent upon soil conditions, Contractor's means and methods of operation, and regulatory requirements. As a minimum, compaction tests shall be performed in two foot lifts at a single location per each public right-of-way.

1.03 SAFETY

Perform all trench excavation and backfilling activities in accordance with the Occupational Safety and Health Act of 1970 (PL 91-596), as amended. The Contractor shall pay particular attention to the Safety and Health Regulations Part 1926, Subpart P "Excavation, Trenching & Shoring" as described in OSHA publication 2226. Particular attention is drawn to the requirement that the Contractor must have on site and individual with current competent person training certification.

PART 2 PRODUCTS

2.01 TRENCH FOUNDATION MATERIALS

Crushed stone shall be utilized for trench foundation (trench stabilization) and shall meet the requirements of the Georgia Department of Transportation Specification 800.01, Group I (limestone, marble or dolomite) or Group II (quartzite, granite or gneiss). Stone sizes shall be between No. 57 and No. 4, inclusive.

2.02 BEDDING AND HAUNCHING MATERIALS

- A. Unless shown on the Drawings or specified otherwise, bedding and haunching material shall be suitable earth materials.

- B. Earth materials utilized for bedding and haunching shall be suitable materials selected from materials excavated from the trench. Suitable materials shall be clean and free of rock larger than 2 inches at its largest dimension, organics, cinders, stumps, limbs, frozen earth or mud, man-made wastes and other unsuitable materials. Should the material excavated from the trench be saturated, the saturated material may be used as earth material, provided it is allowed to dry properly and it is capable of meeting the specified compaction requirements. When necessary, earth bedding and haunching materials shall be moistened to facilitate compaction by tamping. If materials excavated from the trench are not suitable for use as bedding or haunching material, as determined by the Owner, provide select material conforming to the requirements of this Section.

2.03 INITIAL BACKFILL

- A. Unless shown on the Drawings or specified otherwise, initial backfill material shall be crushed stone or earth materials as specified for bedding and haunching materials.
- B. Earth materials utilized for initial backfill shall be suitable materials selected from materials excavated from the trench. Suitable materials shall be clean and free of rock larger than 2 inches at its largest dimension, organics, cinders, stumps, limbs, frozen earth or mud, man-made wastes, and other unsuitable materials. Should the material excavated from the trench be saturated, the saturated material may be used as earth material, provided it is allowed to dry properly and it is capable of meeting the specified compaction requirements. When necessary, initial backfill materials shall be moistened to facilitate compaction by tamping. If materials excavated from the trench are not suitable for use as initial backfill material, as determined by the Owner, provide select material conforming to the requirements of this Section.

2.04 FINAL BACKFILL

Unless shown on the Drawings or specified otherwise, final backfill material shall be general excavated earth materials, shall not contain more than one-third broken rock, of which no stone or boulder shall weigh more than 50 pounds, cinders, stumps, limbs, man-made wastes and other unsuitable materials. If materials excavated from the trench are not suitable for use as final backfill material, as determined by the Owner, provide select material conforming to the requirements of this Section.

2.05 SELECT BACKFILL

Select backfill shall be materials which meet the requirements as specified for bedding, haunching, initial backfill or final backfill materials, including compaction requirements.

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2.06 CONCRETE

Concrete for bedding, haunching, initial backfill or encasement shall have a compressive strength of not less than 3,000 psi, with not less than 5.5 bags of cement per cubic yard and a slump between 3 and 5 inches. Ready-mixed concrete shall be mixed and transported in accordance with ASTM C 94. Reinforcing steel shall conform to the requirements of ASTM A 615, Grade 60.

PART 3 EXECUTION

3.01 TRENCH EXCAVATION

- A. Topsoil and grass shall be stripped a minimum of 6 inches over the trench excavation site and stockpiled separately for replacement over the non-paved, finished grading areas.
- B. Trenches shall be excavated to the lines and grades shown on the Drawings with the centerlines of the trenches on the centerlines of the pipes and to the dimensions which provide the proper support and protection of the pipe and other structures and accessories.
- C. Trench Width for Pipelines
 - 1. The sides of all trenches shall be as vertical as is practical to a minimum of one foot above the top of the pipe. Unless otherwise indicated on the Drawings, the maximum trench width shall be equal to the sum of the outside diameter of the pipe plus two feet. The minimum trench width shall be that which allows the proper consolidation of the haunching and initial backfill material.
 - 2. Excavate the top portion of the trench to any width within the construction easement or right-of-way which will not cause unnecessary damage to adjoining structures, roadways, pavement, utilities, trees or private property. Where necessary to accomplish this, provide sheeting and shoring.
 - 3. Where rock is encountered in trenches, excavate to remove boulders and stones to provide a minimum of 6 inches clearance between the rock and any part of the pipe or appurtenance.
 - 4. Wherever the prescribed maximum trench width is exceeded, the Contractor shall use the next higher Class or Type of bedding and haunching as shown on the Drawings for the full trench width as actually cut. The excessive

trench width may be due to unstable trench walls, inadequate or improperly placed bracing and sheeting which caused sloughing, accidental over-excavation, intentional over-excavation necessitated by the size of the Contractor's tamping and compaction equipment, intentional over-excavation due to the size of the Contractor's excavation equipment, or other reasons beyond the control of the Owner.

D. Depth

1. The trenches shall be excavated to the required depth or elevation which allow for the placement of the pipe and bedding to the dimensions shown on the Drawings or specified.
2. Excavate trenches to provide a minimum cover of 48 inches. Within the right-of-way of highways, streets, or roadways, also excavate to place the top of the pipe a minimum of 36 inches below the nearest pavement edge or drainage ditch.
3. Increase the depth of cover where specifically shown on the Drawings and where necessary to avoid interference with underground utilities and obstructions.
4. Where rock is encountered in trenches for pipelines, excavate to the minimum depth which will provide clearance below the pipe barrel of 8 inches for pipe 21 inches in diameter and smaller and 12 inches for larger pipe, valves, and manholes. Remove boulders and stones to provide a minimum of 6-inches clearance between the rock and any part of the pipe, manhole, or accessory.

E. Excavated Materials

1. Excavated materials shall be placed adjacent to the work to be used for backfilling as required. Top soil shall be carefully separated and lastly placed in its original location.
2. Excavated material shall be placed sufficiently back from the edge of the excavation to prevent caving of the trench wall, to permit safe access along the trench and not cause any drainage problems. Excavated material shall be placed so as not to damage existing landscape features or man-made improvements.

3.02 SHEETING, BRACING, AND SHORING

- A. Sheeting, bracing and shoring shall be performed in the following instances:

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1. Where sloping of the trench walls does not adequately protect persons within the trench from slides or cave-ins.
 2. In caving ground.
 3. In wet, saturated, flowing, or otherwise unstable materials. The sides of all trenches and excavations shall be adequately sheeted, braced, and shored.
 4. Where necessary to prevent damage to adjoining buildings, structures, roadways, pavement, utilities, trees, or private properties which are required to remain.
 5. Where necessary to maintain the top of the trench within the available construction easement or right-of-way.
- B. In all cases, excavation protection shall strictly conform to the requirements of the Occupational Safety and Health Act of 1970, as amended.
- C. Timber: Timber for shoring, sheeting, or bracing shall be sound and free of large or loose knots and in good, serviceable condition. Size and spacing shall be in accordance with OSHA regulations.
- D. Steel Sheeting and Sheet Piling: Steel sheet piling shall be the continuous interlock type. The weight, depth and section modulus of the sheet piling shall be sufficient to restrain the loads of earth pressure and surcharge from existing foundations and live loads. Procedure for installation and bracing shall be so scheduled and coordinated with the removal of the earth that the ground under existing structures shall be protected against lateral movement at all times. The Contractor shall provide closure and sealing between sheet piling and existing facilities.
- E. Trench Shield: A trench shield or box may be used to support the trench walls. The use of a trench shield does not necessarily preclude the additional use of bracing and sheeting. When trench shields are used, care must be taken to avoid disturbing the alignment and grade of the pipe or disrupting the haunching of the pipe as the shield is moved. When the bottom of the trench shield extends below the top of the pipe, the trench shield will be raised in 6-inch increments with specified backfilling occurring simultaneously. At no time shall the trench shield be "dragged" with the bottom of the shield extending below the top of the pipe or utility.
- F. Remove bracing and sheeting in units when backfill reaches the point necessary to protect the pipe and adjacent property. Leave sheeting in place when in the opinion of the Owner it cannot be safely removed or is within three feet of an existing structure, utility, or pipeline. Cut off any sheeting left in place at least two feet

below the surface.

- G. Sheet piling within three feet of an existing structure or pipeline shall remain in place, unless otherwise directed by the Owner.

3.03 ROCK EXCAVATION

- A. Definition of Rock: Any material which cannot be excavated with conventional excavating equipment, and is removed by drilling and blasting, or mechanically fracturing by means other than a trench excavator, and occupies an original volume of at least one-half cubic yard.
- B. Blasting: Provide licensed, experienced workmen to perform blasting. Conduct blasting operations in accordance with all existing ordinances and regulations. Protect all buildings and structures from the effects of the blast. Repair any resulting damage. If the Contractor repeatedly uses excessive blasting charges or blasts in an unsafe or improper manner, the Owner may direct the Contractor to employ an independent blasting consultant to supervise the preparation for each blast and approve the quantity of each charge.
- C. Removal of Rock: Dispose of rock off site that is surplus or not suitable for use as rip rap or backfill.
- D. The Contractor shall notify the Owner prior to any blasting. Additionally, the Contractor shall notify the Owner and local fire department before any charge is set.
- E. The Contractor shall conduct pre-blast and post-blast inspections of structures, including photographs or videos, and maintain a detailed written log.

3.04 DEWATERING EXCAVATIONS

- A. Dewater excavation continuously to maintain a water level two feet below the bottom of the trench.
- B. Control drainage in the vicinity of excavation so the ground surface is properly pitched to prevent water running into the excavation.
- C. There shall be sufficient pumping equipment, in good working order, available at all times, to remove any water that accumulates in excavations. Where the utility crosses natural drainage channels, the work shall be conducted in such a manner that unnecessary damage or delays in the prosecution of the work will be prevented. Provision shall be made for the satisfactory disposal of surface water to prevent damage to public or private property.

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- D. In all cases, accumulated water in the trench shall be removed before placing bedding or haunching, laying pipe, placing concrete or backfilling.
- E. Where dewatering is performed by pumping the water from a sump, crushed stone shall be used as the medium for conducting the water to the sump. Sump depth shall be at least two feet below the bottom of the trench, Pumping equipment shall be of sufficient quantity and/or capacity to maintain the water level in the sump two feet below the bottom of the trench. Pumps shall be a type such that intermittent flows can be discharged. A standby pump shall be required in the event the operating pump or pumps clog or otherwise stop operation.
- F. Dewater by use of a well point system when pumping from sumps does not lower the water level two feet below the trench bottom. Where soil conditions dictate, the Contractor shall construct well points cased in sand wicks. The casing, 6 to 10-inches in diameter, shall be jetted into the ground, followed by the installation of the well point, filling casing with sand, and withdrawing the casing.

3.05 TRENCH FOUNDATION AND STABILIZATION

- A. The bottom of the trench shall provide a foundation to support the pipe and its specified bedding. The trench bottom shall be graded to support the pipe and bedding uniformly throughout its length and width.
- B. If, after dewatering as specified above, the trench bottom is spongy, or if the trench bottom does not provide firm, stable footing and the material at the bottom of the trench will still not adequately support the pipe, the trench will be determined to be unsuitable and the Owner shall then authorize payment for trench stabilization.
- C. Should the undisturbed material encountered at the trench bottom constitute, in the opinion of the Owner, an unstable foundation for the pipe, the Contractor shall be required to remove such unstable material and fill the trench to the proper subgrade with crushed stone or surge stone as directed by the Owner.
- D. Where trench stabilization is provided, the trench stabilization material shall be compacted to at least 90 percent of the maximum dry density, unless shown or specified otherwise.

3.06 BEDDING AND HAUNCHING

- A. Prior to placement of bedding material, the trench bottom shall be free of any water, loose rocks, boulders, or large dirt clods.
- B. Bedding material shall be placed to provide uniform support along the bottom of the pipe and to place and maintain the pipe at the proper elevation. The initial layer of

bedding placed to receive the pipe shall be brought to the grade and dimensions indicated on the Drawings. All bedding shall extend the full width of the trench bottom. The pipe shall be placed and brought to grade by tamping the bedding material or by removal of the excess amount of the bedding material under the pipe. Adjustment to grade line shall be made by scraping away or filling with bedding material. Wedging or blocking up of pipe shall not be permitted. Applying pressure to the top of the pipe, such as with a backhoe bucket, to lower the pipe to the proper elevation or grade shall not be permitted. Each pipe section shall have a uniform bearing on the bedding for the length of the pipe, except immediately at the joint.

- C. At each joint, excavate bell holes of ample depth and width to permit the joint to be assembled properly and to relieve the pipe bell of any load.
- D. After the pipe section is properly placed, add the haunching material to the specified depth. The haunching material shall be shovel sliced, tamped, vigorously chinked, or otherwise consolidated to provide uniform support for the pipe barrel and to fill completely the voids under the pipe, including the bell hole. Prior to placement of the haunching material, the bedding shall be clean and free of any water, loose rocks, boulders, or dirt clods.
- E. Ductile Iron Pipe
 - 1. Unless otherwise shown on the Drawings or specified, utilize earth materials for bedding and haunching. Type 2, 3, 4, and 5 bedding shall be as detailed on the Drawings.
 - 2. Unless specified or shown otherwise, bedding shall meet the requirements for Type 2 Pipe Bedding. Unless specified or shown otherwise for restrained joint pipe and fittings, bedding shall meet the requirements for Type 3 Pipe Bedding.
 - 3. Where the depth of cover over the piping exceeds 15 feet, the pipe bedding shall meet the requirements of Type 4 Pipe Bedding. Where the depth of cover over the piping exceeds 28 feet, the pipe bedding shall meet the requirements of Type 5 Pipe Bedding.
 - 4. Type 4 or Type 5 Pipe Bedding called for on the Drawings, specified or ordered by the Owner, shall meet requirements for Type 4 or Type 5 Pipe Bedding, utilizing sand, gravel, or crushed stone bedding and haunching material.
- F. Polyvinyl Chloride Pipe
 - 1. Unless shown otherwise on the Drawings, utilize earth materials for bedding

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and haunching.

2. Unless shown otherwise on the Drawings, bedding and haunching shall meet the requirements for Type 2 Pipe Bedding, as detailed on the Drawings.

G. Excessive Width and Depth

1. Water Mains: If the trench is excavated to excess width, provide the next higher type or class of pipe bedding, but a minimum of Type 4, as detailed on the Drawings.
2. If the trench is excavated to excessive depth, provide sand, gravel, or crushed stone to place the bedding at the proper elevation or grade.

- ### H. Compaction: Bedding and haunching materials under pipe, manholes, and accessories shall be compacted to a minimum of 90 percent of the maximum dry density, unless shown or specified otherwise.

3.07 INITIAL BACKFILL

- A. Initial backfill shall be placed to anchor the pipe, protect the pipe from damage by subsequent backfill, and ensure the uniform distribution of the loads over the top of the pipe.
- B. Place initial backfill material carefully around the pipe in uniform layers to a depth of at least 18 inches above the pipe barrel. Layer depths shall be a maximum of 6 inches.
- C. Backfill on both sides of the pipe simultaneously to prevent side pressures.
- D. Compact each layer thoroughly with suitable hand tools or tamping equipment.
- E. Initial backfill shall be compacted to a minimum 90 percent of the maximum dry density, unless shown or specified otherwise.
- F. If materials excavated from the trench are not suitable for use as backfill materials, provide select backfill material conforming to the requirements of this Section.

3.08 CONCRETE ENCASEMENT FOR PIPELINES

Where concrete encasement is shown on the Drawings for pipelines, excavate the trench to provide a minimum of 6-inches clearance from the bell of the pipe. Lay the pipe to line and grade on concrete blocks. In lieu of bedding, haunching and initial backfill, place concrete to the full width of the trench and to a height of not less than 6 inches above the pipe bell. Do not backfill the trench for a period of at least 24 hours after concrete is placed.

3.09 FINAL BACKFILL

- A. Backfill carefully to restore the ground surface to its original condition.
- B. The top 6 inches shall be topsoil obtained as specified in "Trench Excavation" of this Section.
- C. Excavated material which is unsuitable for backfilling, and excess material, shall be disposed of, at no additional cost to the Owner, in a manner approved by the Owner. Surplus soil may be neatly distributed and spread over the site, if approved by the Owner. If such spreading is allowed, the site shall be left in a clean and slightly condition and shall not affect pre-construction drainage patterns. Surplus rock from the trenching operations shall be removed from the site.
- D. If materials excavated from the trench are not suitable for use as backfill materials, provide select backfill material conforming to the requirements of this Section.
- E. After initial backfill material has been placed and compacted, backfill with final backfill material. Place backfill material in uniform layers, compacting each layer thoroughly as follows:
 - 1. In 6 inch layers, if using light power tamping equipment, such as a "jumping jack"
 - 2. In 12 inch layers, if using heavy tamping equipment, such as hammer with tamping feet
 - 3. In 24 inch layers, if using a hydra-hammer
- F. Settlement: If trench settles, re-fill and grade the surface to conform to the adjacent surfaces.
- G. Final backfill shall be compacted to a minimum 90 percent of the maximum dry density, unless specified otherwise.

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3.10 ADDITIONAL MATERIAL

Where final grades above the pre-construction grades are required to maintain minimum cover, additional fill material will be as shown on the Drawings. Utilize excess material excavated from the trench, if the material is suitable. If excess excavated materials are not suitable, or if the quantity available is not sufficient, provide additional suitable fill material.

3.11 BACKFILL UNDER ROADS

Compact backfill underlying pavement and sidewalks, and backfill under dirt and gravel roads to a minimum 98 percent of the maximum dry density. The top 12 inches shall be compacted to a minimum of 98 percent of the maximum dry density.

3.12 BACKFILL WITHIN GEORGIA DOT RIGHT-OF-WAY

Backfill within the Georgia DOT right-of-way shall meet the requirements stipulated in the "Utility Accommodation Policy and Standards", published by the Georgia Department of Transportation.

3.13 BACKFILL ALONG RESTRAINED JOINT PIPE

Backfill along restrained joint pipe shall be compacted to a minimum 90 percent of the maximum dry density.

3.14 TESTING AND INSPECTION

- A. The soils testing laboratory is responsible for the following:
1. Compaction tests in accordance with Article 1.02 of this Section.
 2. Field density tests as ordered by the Owner.
 3. Inspecting and testing stripped site, subgrades, and proposed fill materials.
- B. The Contractor's duties relative to testing include:
1. Notifying laboratory of conditions requiring testing.
 2. Coordinating with laboratory for field testing.
 3. Paying costs for all testing performed at the request of the Owner beyond the scope of that required and for re-testing where initial tests reveal

non-conformance with specified requirements.

4. Providing excavation as necessary for laboratory personnel to conduct tests.

C. Inspection

1. Earthwork operations, acceptability of excavated materials for bedding or backfill, and placing and compaction of bedding and backfill is subject to inspection by the Owner.
2. Where required by the Owner, foundations and shallow spread footing foundations are required to be inspected by a geotechnical engineer, who shall verify suitable bearing and construction.

- D. Comply with applicable codes, ordinances, rules, regulations and laws of local, municipal, state or federal authorities having jurisdiction.

- E. Owner shall have the right to select the location of compaction tests, no more than one per 1,000 feet of pipeline, and shall be notified by Contractor 24-hours in advance for the Owner to be present.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

- A. The work covered by this Section includes furnishing all labor, materials and equipment required to bore and jack casings and to properly complete pipeline construction as described herein and/or shown on the Drawings.

- B. General: Supply all materials and perform all work in accordance with applicable American Society for Testing and Materials (ASTM), American Water Works Association (AWWA), American National Standards Institute (ANSI), shall conform to requirements of the Georgia Department of Transportation for crossings of state highways or to the applicable railroad owner for railroad crossings if more stringent than the requirements specified herein, or other recognized standards. Latest revisions of all standards are applicable. If requested by the Owner, submit evidence that manufacturer has consistently produced products of satisfactory quality and performance over a period of at least two years.

1.02 SUBMITTALS

- A. Submit shop drawings, product data and experience.

- B. Material Submittals: The Contractor shall provide shop drawings and other pertinent specifications and product data as follows:
 - 1. Shop drawings for casing pipe showing sizes and connection details.
 - 2. Casing Spacers.

- C. Experience Submittals: Boring and jacking casings is deemed to be specialty contractor work. If the Contractor elects to perform the work, the Contractor shall provide evidence as required by the General Conditions. A minimum of five continuous years of experience in steel casing construction is required of the casing installer. Evidence of this experience must be provided with the shop drawings for review by the Owner.

1.03 STORAGE AND PROTECTION

All materials shall be stored and protected in accordance with the manufacturer's recommendations and as approved by the Owner.

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PART 2 PRODUCTS

2.01 MATERIALS AND CONSTRUCTION

A. Casing for Pipe Greater than 3 Inches in Diameter

1. The casing shall be new and unused pipe. Casing pipe shall be steel pipe, conforming to ASTM A-139, Grade B, Electric fusion welded steel pipe, having a minimum yield strength of 35,000 psi. The exterior and interior of the steel casing pipe shall be coated with a coal tar varnish.
2. The thicknesses of casing shown in paragraph B. below are minimum thicknesses. Actual thicknesses shall be determined by the casing installer, based on an evaluation of the required forces to be exerted on the casing when jacking. Any buckling of the casing due to jacking forces shall be repaired at no additional cost to the Owner.
3. The diameters of casing shown in paragraph B. below and shown on the Drawings are minimum. Larger casings, with the Owner's approval, may be provided at no additional cost to the Owner, for whatever reasons the Contractor may decide, whether casing size availability, line and grade tolerances, soil conditions, etc.
4. Casing Sizes

| UNDER RAILROADS | | | |
|------------------------------|--------------------------------|-------------------------------|-----------------|
| Pipe Diameter, inches | Casing Diameter, inches | Wall Thickness, inches | |
| | | Coated | Uncoated |
| 6 | 14 | 0.250 | 0.282 |
| 8 | 18 | 0.250 | 0.313 |
| 10 | 20 | 0.281 | 0.344 |
| 12 | 22 | 0.312 | 0.375 |

| UNDER HIGHWAYS | | |
|------------------------------|--------------------------------|-------------------------------|
| Pipe Diameter, inches | Casing Diameter, inches | Wall Thickness, inches |
| 6 | 12 | 0.250 |
| 8 | 16 | 0.250 |
| 10 | 16 | 0.250 |
| 12 | 18 | 0.250 |

- B. Casing for Pipe Less than or Equal to 3 Inches in Diameter: Casing shall be polyvinyl chloride pipe which has a minimum wall thickness equal to Schedule 80.
- C. Casing Spacers: Casing spacers shall meet one of the following requirements:
 - 1. Casing spacers shall be flanged, bolt-on style with a two-section stainless steel shell lined with a PVC liner, minimum 0.09-inch thick also having a hardness of 85-90 durometer. Runners shall be attached to stainless steel risers which shall be properly welded to the shell. The height of the runners and risers shall be manufactured such that the pipe does not float within the casing. Casing spacers shall be Cascade Waterworks Manufacturing Company or Advanced Products & Systems, Inc.
 - 2. Casing spacers shall be a two-section, flanged, bolt on style constructed of heat fused PVC coated steel, minimum 14-gauge band, and 10-gauge risers, with 2-inch wide glass reinforced polyester insulating skids, heavy duty PVC inner liner, minimum 0.09-inch thick having a hardness of 85-90 durometer, and all stainless steel or cadmium plated hardware shall be Pipeline Seal and Insulator, Inc.
- D. Carrier Pipe: Carrier pipes shall meet requirements as specified in these Specifications.

2.02 EQUIPMENT

A cutting head shall be attached to a continuous auger mounted inside the casing pipe.

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PART 3 EXECUTION

3.01 GENERAL

- A. Interpretation of soil investigation reports and data, investigating the site and determination of the site soil conditions prior to bidding is the sole responsibility of the Contractor. Any subsurface investigation by the Bidder or Contractor must be approved by the appropriate authority having jurisdiction over the site.
- B. Casing construction shall be performed so as not to interfere with, interrupt or endanger roadway surface and activity thereon, and minimize subsidence of the surface, structures, and utilities above and in the vicinity of the casing. Support the ground continuously in a manner that will prevent loss of ground and keep the perimeters and face of the casing, passages, and shafts stable. The Contractor shall be responsible for all settlement resulting from casing operations and shall repair and restore damaged property to its original or better condition at no cost to the Owner.
- C. Face Protection: The face of the excavation shall be protected from the collapse of the soil into the casing.
- D. Casing Design: Design of the bore pit and required bearing to resist jacking forces are the responsibility of the Contractor. The excavation method selected shall be compatible with expected ground conditions. The lengths of the casing shown on the Drawings are the minimum lengths required. The length of the casing may be extended for the convenience of the Contractor, at no additional cost to the Owner. Due to restrictive right-of-way and construction easements, boring and jacking casing lengths less than the nominal 20-foot length may be necessary.
- E. Highway Crossings
 - 1. The Contractor shall be held responsible and accountable for the coordinating and scheduling of all construction work within the highway right-of-way.
 - 2. Work along or across the highway department rights-of-way shall be subject to inspection by such highway department.
 - 3. All installations shall be performed to leave free flows in drainage ditches, pipes, culverts or other surface drainage facilities of the highway, street or its connections.
 - 4. No excavated material or equipment shall be placed on the pavement or shoulders of the roadway without the express approval of the highway department.
 - 5. In no instance will the Contractor be permitted to leave equipment (trucks,

backhoes, etc.) on the pavement or shoulder overnight. Construction materials to be installed, which are placed on the right-of-way in advance of construction, shall be placed in such a manner as not to interfere with the safe operation of the roadway.

6. The Contractor shall be responsible for providing the Owner sufficient information to obtain a blasting permit in a timely manner.

F. Railroad Crossings

1. The Contractor shall secure permission from the Railroad to schedule work so as not to interfere with the operation of the Railroad.
2. Additional insurance is required for each railroad crossing. The Contractor shall furnish the Railroad with such additional insurance as may be needed, cost of the same shall be borne by the Contractor.
3. All work on the Railroad right-of-way, including necessary support of tracks, safety of operations and other standard and incidental operation procedures may be under the supervision of the appropriate authorized representative of the Railroad affected and any decisions of this representative pertaining to construction and/or operations shall be final and construction must be governed by such decisions.
4. If, in the opinion of the Railroad, it becomes necessary to provide flagging protection, watchmen or the performance of any other work in order to keep the tracks safe for traffic, the Contractor shall coordinate such work and shall reimburse the Railroad, in cash, for such services, in accordance with accounting procedures agreed on by the Contractor and affected Railroad before construction is started.
5. No blasting shall be permitted within the Railroad right-of-way.

3.02 GROUNDWATER CONTROL

- A. The Contractor shall control the groundwater throughout the construction of the casing.
- B. Methods of dewatering shall be at the option and responsibility of the Contractor. Maintain close observation to detect settlement or displacement of surface facilities due to dewatering. Should settlement or displacement be detected, notify the Owner immediately and take such action as necessary to maintain safe conditions and prevent damage.
- C. When water is encountered, provide and maintain a dewatering system of sufficient

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capacity to remove water on a 24-hour basis keeping excavations free of water until the backfill operation is in progress. Dewatering shall be performed in such a manner that removal of soil particles is held to a minimum. Dewater into a sediment trap and comply with requirements specified in Section 02125 of these Specifications.

3.03 SAFETY

- A. Provide all necessary bracing, bulkheads, and shields to ensure complete safety to all traffic, persons, and property at all times during the work. Perform the work in such a manner as to not permanently damage the roadbed or interfere with normal traffic over it.
- B. Observe all applicable requirements of the regulations of the authorities having jurisdiction over this site. Conduct the operations in such a manner that all work will be performed below the level of the roadbed.
- C. Perform all activities in accordance with the Occupational Safety and Health Act of 1970 (PL-596), as amended, applicable regulations of the Federal Government, OSHA 29CFR 1926, and applicable criteria of ANSI A10.16-81, "Safety Requirements for Construction of Tunnel Shafts and Caissons".

3.04 BORING AND JACKING

- A. Shaft
 - 1. Conduct boring and jacking operations from a shaft excavated at one end of the section to be bored. Where conditions and accessibility are suitable, place the shaft on the downstream end of the bore.
 - 2. The shaft shall be rectangular and excavated to a width and length required for ample working space. If necessary, sheet and shore shaft properly on all sides. Shaft sheeting shall be timber or steel piling of ample strength to safely withstand all structural loadings of whatever nature due to site and soil conditions. Keep preparations dry during all operations. Perform pumping operations as necessary.
 - 3. The bottom of the shaft shall be firm and unyielding to form an adequate foundation upon which to work. In the event the shaft bottom is not stable, excavate to such additional depth as required and place a gravel sub-base or a concrete sub-base if directed by the Owner due to soil conditions.
- B. Jacking Rails and Frame
 - 1. Set jacking rails to proper line and grade within the shaft. Secure rails in place to prevent settlement or movement during operations. The jacking rails shall cradle

- and hold the casing pipe on true line and grade during the progress of installing the casing.
2. Place backing between the heels of jacking rails and the rear of the shaft. The backing shall be adequate to withstand all jacking forces and loads.
 3. The jacking frame shall be of adequate design for the magnitude of the job. Apply thrust to the end of the pipe in such a manner to impart a uniformly balanced load to the pipe barrel without damaging the joint ends of the pipe.
- C. Boring and jacking of casing pipes shall be accomplished by the dry auger boring method without jetting, sluicing, or wet boring.
 - D. Auger the hole and jack the casing through the soil simultaneously.
 - E. Bored installations shall have a bored-hole diameter essentially the same as the outside diameter of the casing pipe to be installed, as closely as practicable. Any voids which develop during the installation operation and which are determined by the Engineer to be detrimental to the roadbed, shall be pressure grouted with and approved mix.
 - F. Execute boring ahead of the casing pipe with extreme care, commensurate with the rate of casing pipe penetration. Boring may proceed slightly in advance of the penetrating pipe and shall be made in such a manner to prevent any voids in the earth around the outside perimeter of the pipe. Make all investigations and determine if the soil conditions are such as to require the use of a shield.
 - G. As the casing is installed, check the horizontal and vertical alignment frequently. Make corrections prior to continuing operation. For casing pipe installations over 100 feet in length, the auger shall be removed and the alignment and grade checked at minimum intervals of 60 feet.
 - H. Any casing pipe damaged in jacking operations shall be repaired, if approved by the Owner, or removed and replaced at Contractor's own expense.
 - I. Lengths of casing pipe, as long as practical, shall be used except as restricted otherwise. Joints between casing pipe sections shall be butt joints with complete joint penetration, single groove welds, for the entire joint circumference, in accordance with AWS recommended procedures. Prior to welding the joints, the Contractor shall ensure that both ends of the casing sections being welded are square.
 - J. The Contractor shall prepare a contingency plan which will allow the use of a casing lubricant, such as bentonite, in the event excessive frictional forces jeopardize the successful completion of the casing installation.

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- K. Once the jacking procedure has begun, it should be continued without stopping until completed, subject to weather and conditions beyond the control of the Contractor.
- L. Care shall be taken to ensure that casing pipe installed by boring and jacking method will be at the proper alignment and grade. Any casing not on proper slope for gravity sewer shall be removed and the bore made again. Any expenses associated with removing the casing and reboring will be the responsibility of the contractor.
- M. The Contractor shall maintain and operate pumps and other necessary drainage system equipment to keep work dewatered at all times.
- N. Adequate sheeting, shoring, and bracing for embankments, operating pits and other appurtenances shall be placed and maintained to ensure that work proceeds safely and expeditiously. Upon completion of the required work, the sheeting, shoring, and bracing shall be left in place, cut off, or removed, as designated by the Owner.
- O. Trench excavation, all classes and type of excavation, the removal of rock, muck, debris, the excavation of all working pits, and backfill requirements of Section 02225 are included under this Section.
- P. All surplus material shall be removed from the right-of-way and the excavation finished flush with the surrounding ground.
- Q. Grout backfill shall be used for unused holes or abandoned pipes.
- R. The pipe shall be jacked from the low or downstream end. Variation in the final position of the pipe from the line and grade established by the Engineer will be permitted if approved by the Engineer, providing that the final grade of flow line shall be in the direction indicated on the plans. Wood blocking to adjust the grade of the carrier pipe may be required.
- S. The distance that the excavation extends beyond the end of the pipe will depend upon the character of the excavated material, but shall not exceed 2 feet in any case.
- T.

3.05 FREE BORING

- A. Where the Drawings indicate a pipeline is to be installed by boring without casing, the Contractor shall construct the crossing by the free bore method. The free bore method shall be accomplished by the dry auger boring method without jetting, sluicing, wet boring, or by "punching".
- B. The diameter of the free bore shall not exceed the pipe bell outside diameter or the pipe barrel outside diameter plus 1-inch, whichever is greater.

- C. Free boring, where indicated on the Drawings, is to be performed at the Contractor's option. The Contractor may choose to construct the crossing by the conventional bore and jack casing methodology.
- D. The Contractor shall be responsible for any settlement of the roadway caused by the free bore construction activities.
- E. If the Contractor elects to free bore, and an acceptable installation does not result for any reason, the Contractor shall install a casing pipe by the bore and jack method.

3.06 VENTILATION AND AIR QUALITY

Provide, operate, and maintain for the duration of casing project a ventilation system to meet safety and OSHA requirements.

3.07 ROCK EXCAVATION

- A. In the event that rock is encountered during the installation of the casing pipe which, in the opinion of the Owner, cannot be removed through the casing, the Owner may authorize the Contractor to complete the crossing by a method established in a change order.
- B. At the Contractor's option, the Contractor may continue to install the casing and remove the rock through the casing at no additional cost to the Owner.

3.08 INSTALLATION OF PIPE

- A. After construction of the casing is complete, and has been accepted by the Owner, install the pipeline in accordance with the Drawings and Specifications.
- B. Check the alignment and grade of the casing and prepare a plan to set the pipe at proper alignment, grade, and elevation, without any sags or high spots.
- C. The carrier pipe shall be held in the casing pipe by one of the following methods:
 - 1. The carrier pipe shall be held in the casing pipe by the use of hardwood blocks spaced radially around the pipe and secured together so that they remain firmly in place. The spacing of such blocks longitudinally in the casing pipe shall not be greater than 10 feet.
 - 2. The pipe shall be supported within the casing by use of casing spacers sized to limit radial movement to a maximum of 1-inch. Provide a minimum of one casing spacer per nominal length of pipe. Casing spacers shall be attached to the

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pipe at maximum 18-to-20-foot intervals.

- D. Close the ends of the casing with 4-inch brick walls or seal ends with one-piece synthetic rubber especially formulated for sealing casing/carrier pipe.

3.09 SHEETING REMOVAL

Remove sheeting used for shoring from the shaft and off the job site. The removal of sheeting, shoring and bracing shall be done in such a manner as not to endanger or damage either new or existing structures, private or public properties and also to avoid cave-ins or sliding in the banks.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE

- A. This section specifies requirements for sheeting, shoring, and bracing of trenches and excavations greater than 5 feet in depth. Where sheet piling, shoring, sheeting, bracing or other supports are necessary, they shall be furnished, placed, maintained, and except as shown or specified otherwise, removed by the Contractor.

1.2 DESIGN REQUIREMENTS

- A. The design, planning, installation and removal, if required, of all sheeting, shoring, sheet piling, lagging, and bracing shall be accomplished in such a manner as to maintain the required excavation or trench section and to maintain the undisturbed state of the soils below and adjacent to the excavation.
- B. The Contractor shall design sheeting, shoring, and bracing in accordance with the OSHA Safety and Health Standards as well as state and local requirements.
- C. Horizontal strutting below the barrel of a pipe and the use of pipe as support are not acceptable.
- D. When the construction sequence of structures requires the transfer of bracing to the completed portions of any new structure or to any existing structure, the Contractor shall provide the Engineer with a complete design analysis of the expected impact of that bracing on the structure. This action shall in no way absolve the Contractor of responsibility of damage resulting from said bracing.

1.3 REFERENCES

- A. OSHA 2207 Revised 1987 – OSHA Safety and Health Standards

1.4 SUBMITTALS

- A. Prior to starting any excavation work requiring sheeting, shoring, and bracing, the Contractor shall submit his plans for trench and excavation support systems to the Engineer for review and comment. No excavations shall be started until the Contractor has obtained written acceptance of the trench support system. Said acceptance will be to assure the Owner of the Contractor's general compliance with the required codes and shall not be construed as a detailed analysis for adequacy of the support system, nor shall any provisions of the above requirements be construed as relieving the Contractor of his overall responsibility

and liability for the work. Submittals shall include the following:

1. Design calculations and method of installation and removal of all sheeting, sheet piling, shoring and bracing. Calculations shall be made by a professional structural or civil engineer in the state of the project.
2. Detailed excavation support drawings.

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PART 3 EXECUTIONS

3.1 GENERAL

- A. Contractor shall be responsible for supporting and maintaining all excavations required even to the extent of sheeting and shoring the sides and ends of excavations with timber or other supports. If the sheeting, braces, shores, and stringers or walling timbers, or other supports are not properly placed or are insufficient, the Contractor shall provide additional or stronger supports. The requirement of sheeting or shoring or the addition of supports shall not relieve the Contractor of his responsibility for their sufficiency. All sheeting, shoring, and bracing shall have sufficient strength and rigidity to withstand the pressure exerted and to conform to OSHA Safety & Health Standard (29 CFR 1926/1910) OSHA 2207, latest edition.
- B. Excavations adjacent to existing or proposed buildings and structures or in paved streets or alleys shall be sheeted, shored, and braced adequately to prevent undermining beneath or subsequent settlement of such structures or pavements. Underpinning of adjacent structures shall be done when necessary to maintain structures in safe condition. The Contractor shall be held liable for any damage resulting to such structures or pavements as a result of his operations.
- C. Trench sheeting shall be left in place until the backfilling has been completed to elevation not less than twelve (12) inches above the top of the pipe. Unless otherwise ordered in writing, sheeting shall then be cut off at the top of the lowest set of bracing and the upper section shall be removed. All voids left by sheeting along trenches shall be carefully refilled and rammed with suitable tools.

- D. In unstable ground, sheeting shall be driven to such depth below bottom of the trench or side of the excavation as required to ensure stability.
- E. The need and adequacy of sheeting, shoring, bracing, or other provisions to protect men and equipment in a trench or other excavation shall be the sole and exclusive responsibility of Contractor.
- F. Underpin adjacent structures, which may be damaged by excavation work, including service utilities and pipe chases.
- G. Notify Engineer of unexpected subsurface conditions and discontinue work in affected area until notification to resume work.
- H. Protect bottom of excavations and soil adjacent to and beneath foundations from frost.
- I. Grade top perimeter of excavation to prevent surface water run-off into excavation.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE

- A. Removal of identified and discovered rock materials during excavation for the purpose of construction. Removal shall include drilling and/or blasting incidental thereto and disposal of excavated materials.
- B. When necessary for prosecution of the Work, the use of explosives to assist rock removal may be exercised by Contractor provided this use is in compliance with all local, State, Federal, and other Governmental regulations applying to transportation, storage, use, and control of explosives.

1.2 RELATED SECTIONS

- A. Section 02400 – Earthwork
- B. Section 02225 – Trench Excavation & Backfill

1.3 REFERENCES

- A. NFPA 495 – Code for the manufacture, Transportation, Storage, and Use of Explosive Materials.
- B. OSHA 2207 – Construction Industry Standards, Subpart T – Demolition.

1.4 SUBMITTALS

- A. Section 01340 – Shop Drawings, Products Data & Samples.
- B. Explosives: Indicate proposed method of blasting, delay pattern, explosive types, type of blasting mat or cover, and intended rock recovery method.
- C. Assurance/Control Submittals.
 - 1. Qualification Documentation: Submit seismic survey firm and explosives firm documentation of experience indicating compliance with specified qualification requirements.

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1.5 QUALITY ASSURANCE

A. Qualifications for Explosives:

1. Seismic Survey Firm: Company specializing in seismic surveys with five years documented experience.
2. Explosives Firm: Company specializing in explosives for destruction for removal of subsurface rock with five years documented experience.

B. Regulatory Requirements:

1. Perform rock removal in accordance with applicable requirements of governing authorities having jurisdiction.
2. Comply with all laws, rules, and regulations of Federal, State, and local authorities which govern storage, use, manufacture, sale, handling, transportation, licensing, or other disposition of explosives. Take special precautions for proper use of explosives to prevent harm to human life and damage to surface structures, all utility lines, or other subsurface structures. Do not conduct blasting operations until persons in vicinity have had ample notice and have reached positions of safety.
3. Obtain permits from authorities having jurisdiction before explosives are brought to site or drilling for setting of explosives is started.
 - a. Notify Contracting Officer of schedule and producers prior to explosive use.

C. Pre-Installation Meeting:

1. Convene a pre-installation meeting one week prior to commencing Work of this Section.
2. Require attendance of parties directly affecting Work of this Section.
3. Review conditions for use of explosives in rock removal operations, explosive rock removal procedures, and coordination with related Work.
4. Agenda:
 - a. Tour, inspect, and discuss conditions of existing soils and rock encountered.

- b. Review blast control measures and requirements.
- c. Review safety precautions relating to use of explosives
- d. Review types of explosives to be used.
- e. Review required submittals, both completed and yet to be completed.
- f. Review and finalize construction schedule relating to explosive rock removal, and verify availability of materials, personnel, equipment and facilities needed to make progress and avoid delays.
- g. Review required inspections, certifying, and material usage accounting procedures.
- h. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions.

1.5 PROJECT CONDITIONS OR SITE CONDITIONS

- A. Environmental Requirements: Determine all environmental effects associated with proposed rock removal Work and safeguard those concerns as regulated by law and authorities having jurisdiction by approved methods.
- B. Explosives: Do not bring explosives onto site or use in Work without prior written permission from Contracting Officer and authorities having jurisdiction. Comply with requirements of NFPA 495. Contractor is solely responsible for handling, storage, and use of explosive materials when their use is permitted.
 - 1. Hold harmless the Architect, Engineer, and Owner from any claim resulting from use of explosives. Removal of materials of any nature by blasting shall be done in such a manner and such time as to avoid damage affecting the integrity of design and to avoid damage to any new or existing structure included in or adjacent to work. It shall be contractors' responsibility to determine method of operation to ensure desired results and integrity of completed work.
- C. Existing Conditions:
 - 1. Geotechnical Data:

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- a. Reports of Subsurface Investigation and data are not a part of Contract Documents.
 - b. Soil and subsurface investigations were conducted at the site by an independent testing laboratory and a report with log of borings prepared. This report was obtained for Engineer's design use only.
 - c. A copy of the report is provided by Owner and is made available for convenience of the Contractor.
 - d. Soils investigation data is not warranted to indicate actual conditions. Owner and Engineer do not assume responsibility for variations in kind, depth, quantity and condition of soils; they disclaim responsibility for accuracy, true location, and extent of soils investigation that has been prepared by others; and they further disclaim responsibility for interpretation of that data by Contractor as in projecting soil bearing values, rock profiles, soil stability, and presence, level, and extent of underground water.
 - e. Additional test borings and other exploratory operations may be made by Contractor at no additional cost to Owner.
2. Immediately report any discrepancy between Contract Documents and amount and type of rock to be removed to Owner.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Rock (Definition) – Solid mineral material with a volume in excess of ½ cubic yard that cannot be broken down and removed by use of heavy construction equipment, such as a Caterpillar 215 or equivalent, bulldozer such as a Caterpillar D8K equipped with single tooth hydraulic ripper, ¾ cubic yard capacity power shovel, rooters, etc., and without drilling or blasting. Materials which can be loosened with a pick, hard pan, boulders less than ½ cubic yard in volume, chert, clay, soft shale, soft and disintegrated rock, and any similar material shall not be considered as rock. (All materials to be considered unclassified or common excavation).
- B. Explosives – Shall be suitable for intended purposes at the Contractor's option subject to review by Owner and Engineer.
- C. Delay Devices – Type recommended by explosives firm to be used as accessory

to explosives. Subject to review by Engineer.

- D. Blasting Mat – When the use of explosives is necessitated during prosecution of the Work, Contractor shall incorporate the use of blasting mats or type recommended by explosives form to lessen the danger of projectiles occasionally resultant from blasting of rock.

PART 3 EXECUTIONS

3.1 EXAMINATION

- A. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to for rock excavation to begin.
- B. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- C. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the Owner.

3.2 ROCK EXCAVATION

- A. Perform rock excavation in a manner that will produce material of such size as to permit it being placed in embankments in accordance with Section 02300. Remove rock to limits indicated. Remove loose or shattered rock, overhanging ledges and boulders, which might dislodge.
- B. Rock Excavation - Mechanical Method:
 - 1. Excavate for and remove rock by mechanical method. Drill holes and utilize expansive tools and wedges to fracture rock.
 - 2. Cut away rock at excavation bottom to form level bearing. Remove shaled layers to provide sound and unshattered base for foundations.
 - 3. In utility trenches, excavate to 6 inches below invert elevation of pipe and 24 inches wider than pipe diameter.
 - 4. Remove shaled layers to provide sound unshattered base for footings and foundations.
 - 5. Re-use excavated rock materials on-site in accordance with Section 02300.

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6. Remove excavated rock materials not re-used off-site.

C. Rock Excavation - Explosives Method:

1. If rock is uncovered requiring the explosives method for rock disintegration and removal, the Engineer shall be notified immediately so that the surface can be examined. Blasting will not be permitted unless written authorization is given by Engineer. (All materials removed shall be considered common excavation.)
2. Where igneous, metamorphic, or sedimentary rock is encountered that cannot be removed by rippers or other mechanical methods, remove rock by explosives method.
3. The Contractor shall notify any owners of adjacent buildings or structures, and any public utility owners having structures or other installations above or below ground, in writing prior to use of explosives. Such notice shall be given sufficiently in advance so that they may take such steps as they may deem necessary to protect their property from injury and/or damage.
4. Rock excavation by use of explosives shall be conducted with due regard for safety of persons and property in the vicinity and in strict conformance with requirements of local, State, and Federal ordinance, laws, and regulations governing the use of explosives.
5. Blasting shall be conducted so as not to endanger persons or property, and whenever required, the blast shall be covered with mats or otherwise satisfactorily confined. The contractor shall be held responsible for and shall make good any damage caused by blasting or accidental explosions.
6. The Contractor shall permit only authorized and qualified persons to handle and use explosives.
7. Smoking, firearms, matches, open flame lamps, and other fires, flame, or heat producing devices and sparks shall be prohibited in or near explosive magazines or while explosives are being handled, transported, or used.
8. No person shall be allowed to handle or use explosives while under the influence of intoxicating liquors, narcotics, or other dangerous drugs.
9. All explosives shall be accounted for at all times. Explosives not being used shall be kept in a locked magazine, unavailable to persons not

authorized to handle them. The Contractor shall maintain an inventory and use record of all explosives. Appropriate authorities shall be notified of any loss, theft, or unauthorized entry into a magazine.

10. No explosives or blasting agents shall be abandoned.
 11. Contractor's employees authorized to prepare explosive charges or conduct blasting operations shall use every reasonable precaution including, but not limited to, visual and audible warning signals such as flags, or barricades, to ensure safety.
 12. It shall be contractor's responsibility to incorporate the use of seismic monitoring should rock excavation, by use of explosives, occur within 150 feet of any residential structure and within 300 feet of any miscellaneous structure. Blasting conducted near dams or bridge foundations shall incorporate the use of seismic monitor should such blasting occur within 25 feet of said dam and/or bridge foundation. Contractor shall maintain all seismic records and blasting logs to be furnished to Engineer upon request.
 13. Disintegrate rock and remove from excavation.
 14. Cut away rock at excavation bottom for form level bearing.
 15. Remove shaled layers to provide sound and unshattered base for pipe foundations.
 16. Remove excavated material from site.
 17. Comply with requirements of NFPA 495.
- D. Use lean concrete or suitable materials to replace rock over blast or over excavation in building area and in expansion area to facilitate placement of utilities and future footings.

3.3 FIELD QUALITY CONTROL

- A. Inspection: Contracting Officer will inspect bearing surfaces and cavities formed by removed rock.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

The work to be performed under this Section shall consist of removing and replacing existing base and pavement, sidewalks and curbs in paved areas where such have been removed for construction of water mains, sewers, force mains, manholes and all other sewer and utility appurtenances and structures.

1.02 SUBMITTALS

Provide certificates stating that materials supplied comply with Specifications. Certificates shall be signed by the asphalt producer and the Contractor.

1.03 CONDITIONS

- A. Weather Limitations
 - 1. Do not conduct paving operations when surface is wet or contains excess of moisture which would prevent uniform distribution and required penetration.
 - 2. Construct prime and tack coats, and asphaltic courses only when atmospheric temperature in the shade is above 50 degrees F, when the underlying base is dry, and when weather is not rainy.
 - 3. Place base course when air temperature is above 35 degrees F and rising.
- B. Grade Control: Establish and maintain the required lines and grades for each course during construction operations.

PART 2 PRODUCTS

2.01 MATERIALS AND CONSTRUCTION

- A. Graded Aggregate Base Course: Graded aggregate base course shall be of uniform quality throughout and shall meet the requirements of Section 815.01 of the Georgia Department of Transportation Standard Specifications.
- B. Surface Course: The surface course for all pavement, including prime or tack coat when required by the Owner, shall conform to the requirements of Section 400, Type "F" of the Georgia Department of Transportation Standard Specifications.
- C. Concrete: Provide concrete and reinforcing for concrete pavement or base courses in accordance with the requirements of the Georgia Department of Transportation

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Standard Specifications, Section 430. Concrete shall be of the strength classifications shown on the Drawings.

- D. Special Surfaces: Where driveways or roadways are disturbed or damaged which are constructed of specialty type surfaces, e.g., brick or stone, these driveways and roadways shall be restored utilizing similar, if not original, materials. Where the nature of these surfaces dictate, a specialty contractor shall be used to restore the surfaces to their previous or better condition. Special surfaces shall be removed and replaced to the limits to which they were disturbed.

2.02 TYPES OF PAVEMENTS

- A. General: All existing pavement removed, destroyed or damaged by construction shall be replaced with the same type and thickness of pavement as that existing prior to construction, unless otherwise directed by the Owner. Materials, equipment and construction methods used for paving work shall conform to the Georgia Department of Transportation specifications applicable to the particular type required for replacement, repair, or new pavements.
- B. Aggregate Base: Aggregate base shall be constructed in accordance with the requirements of Section 310 of the Georgia Department of Transportation Standard Specifications. The maximum thickness to be laid in a single course shall be 6-inches compacted. If the design thickness of the base is more than 6-inches, it shall be constructed in two or more courses of approximate equal thickness. After the material placed has been shaped to line, grade and cross-section, it shall be rolled until the course has been uniformly compacted to at least 100 percent of the maximum dry density when Group 2 aggregate is used, or to at least 98 percent of maximum dry density when Group 1 aggregate is used.
- C. Concrete Pavement: Concrete pavement or base courses shall be replaced with concrete. The surface finish of the replaced concrete pavement shall conform to that of the existing pavement. The surface of the replaced concrete base course shall be left rough. The slab depth shall be equivalent to the existing concrete pavement or base course, but in no case less than 6-inches thick. Transverse and longitudinal joints removed from concrete pavement shall be replaced at the same locations and to the same types and dimensions as those removed. Concrete pavements or concrete base courses shall be reinforced.
- D. Asphaltic Concrete Surface Course: Asphaltic concrete surface course construction shall conform to Georgia Department of Transportation Standard Specifications, Section 400. The pavement mixture shall not be spread until the designated surface has been previously cleaned and prepared, is intact, firm, properly cured, dry and the tack coat has been applied. Apply and compact the base in maximum layer thickness by asphalt spreader equipment of design and operation approved by the Owner. Apply and

compact the surface course in a manner approved by the Owner. Immediately correct any high, low or defective areas by cutting out the course, replacing with fresh hot mix, and immediately compacting to conform and thoroughly bond to the surrounding area.

- E. Surface Treatment Pavement: Bituminous penetration surface treatment pavement shall be replaced with a minimum thickness of 1-inch conforming to Section 424, Georgia Department of Transportation Standard Specifications.
- F. Gravel Surfaces: Existing gravel road, drive, and parking area replacement shall meet the requirements of graded aggregate base course. This surfacing may be authorized by the Owner as a temporary surface for paved streets until replacement of hard surfaced pavement is authorized.
- G. Temporary Measures: During the time period between pavement removal and complete replacement of permanent pavement, maintain highways, streets and roadways by the use of steel running plates anchored to prevent movement. The backfill above the pipe shall be compacted, as specified in Section 02225 of these Specifications, up to the existing pavement surface to provide support for the steel running plates. All pavement shall be replaced within seven calendar days of its removal.

PART 3 EXECUTION

3.01 REMOVING PAVEMENT

- A. General: Remove existing pavement as necessary for installing the pipe line and appurtenances.
- B. Marking: Before removing any pavement, mark the pavement neatly paralleling pipe lines and existing street lines. Space the marks the width of the trench.
- C. Breaking: Break asphalt pavement along the marks using pavement shearing equipment, jack hammers or other suitable tools. Break concrete pavement along the marks by scoring with a rotary saw and breaking below the score by the use of jack hammers or other suitable tools.
- D. Machine Pulling: Do not pull pavement with machines until the pavement is completely broken and separated from pavement to remain.
- E. Damage to Adjacent Pavement: Do not disturb or damage the adjacent pavement. If the adjacent pavement is disturbed or damaged, remove and replace the damaged pavement.

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- F. Damage to Traffic Signal Loops: Any pavement removal which will include removal of traffic signal loops embedded in the pavement shall be coordinated with the Traffic Engineering Department having jurisdiction over the traffic signal five days prior to pavement removal.
- G. Sidewalk: Remove and replace any sidewalks disturbed by construction for their full width and to the nearest undisturbed joint.
- H. Curbs: Tunnel under or remove and replace any curb disturbed by construction to the nearest undisturbed joint.

3.02 REPLACING PAVEMENT

- A. Pavement shall be replaced no later than seven days after the original surface was cut.
- B. Preparation of Subgrade: During backfilling and compaction of the backfill, arrange to have the compaction tested by an independent testing laboratory. After compaction testing has been satisfactorily completed, replace all pavements, sidewalks, and curbs removed.
 - 1. The existing street pavement or surface shall be removed along the lines of the work for the allowable width specified for the trench or structure. After the installation of the sewerage or water works facilities and after the backfill has been compacted suitably, the additional width of pavement to be removed, as shown on the Standard Detail Drawings, shall be done immediately prior to replacing the pavement.
 - 2. Trench backfill shall be compacted for the full depth of the trench as specified in Section 02225 of these Specifications.
 - 3. Temporary trench backfill along streets and driveways shall include 6-inches of crushed stone or cherty clay as a temporary surfacing of the trenches or asphalt as directed by the Owner. This temporary surface shall be maintained carefully at grade and dust-free by the Contractor until the backfill of the trench has thoroughly compacted in the opinion of the Owner and permission is granted to replace the street pavement.
 - 4. When temporary crushed stone or chert surface is considered by the Owner to be sufficient surface for gravel pavement, the surface shall be graded smooth and to an elevation that will make the final permanent surfacing level with the adjacent surfacing that was undisturbed.

C. Pavement Replacement

1. Prior to replacing pavement, make a final cut in concrete pavement 12-inches back from the edge of the damaged pavement with a concrete saw. Remove asphalt pavement 12-inches back from the edge of the damaged pavement using pavement shearing equipment, jack hammers or other suitable tools.
2. Replace all street and roadway pavement as shown on the Drawings. Replace driveways, sidewalks and curbs with the same material, to nearest existing undisturbed construction joint and to the same dimensions as those existing.
3. If the temporary crushed stone or chert surface is to be replaced, the top 6-inches shall be removed and the crushed stone surfacing for unpaved streets or the base for the bituminous surface shall be placed.
4. Following this preparation, the chert or crushed stone base shall be primed with a suitable bituminous material and surfaced with the proper type of bituminous surface treatment.
5. Where the paved surface is to be replaced with asphaltic concrete pavement, concrete pavement, or with a concrete base and a surface course, the temporary chert or crushed stone surface and any necessary backfill material, additional existing paving, and new excavation shall be removed to the depth and width shown on the Standard Detail Drawings. All edges of the existing pavement shall be cut to a straight, vertical edge. Care shall be used to get a smooth joint between the old and new pavement and to produce an even surface on the completed street. Concrete base slabs and crushed stone bases, if required, shall be placed and allowed to cure for three days before bituminous concrete surface courses are applied. Expansion joints, where applicable, shall be replaced in a manner equal to the original joint.
6. Where driveways or roadways, constructed of specialty type surfaces, e.g. brick or stone are disturbed or damaged, these driveways and roadways shall be restored utilizing similar materials. Where the nature of these surfaces dictate, a specialty contractor shall be used to restore the surfaces to their previous or better condition. Special surfaces shall be removed and replaced to the limits to which they were disturbed.

D. Pavement Resurfacing

1. Certain areas to be resurfaced may be specified or noted on the Drawings. Where pavement to be resurfaced has been damaged with potholes, the Contractor shall remove all existing loose pavement material and fill the hole with Bituminous Plant Mix Base, as specified, to the level of the existing pavement. After all pipe

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line installations are complete and existing pavement has been removed and replaced along the trench route, apply tack coat and surface course as specified.

2. Resurfacing limits shall be perpendicular to the road centerline. The limits of resurfacing shall be 10 feet beyond the edge of the pavement replacement on the main road being resurfaced, and to the point of tangency of the pavement on the side streets.
- E. Pavement Striping: Pavement striping removed or paved over shall be replaced with the same type, dimension, and material as original unless directed otherwise by the Owner.
- F. Traffic Signal Loops: The replacement or repair of all traffic signal loops removed or damaged during the removal and replacement of pavement shall be coordinated by the Contractor with the Traffic Engineering Department having jurisdiction over each traffic signal. The Contractor shall be responsible for payment of all fees associated with replacement or repair of traffic signal loops.

3.03 SIDEWALK AND CURB REPLACEMENT

A. Construction

1. All concrete sidewalks and curbs shall be replaced with concrete.
2. Preformed joints shall be 1/2-inch thick, conforming to the latest edition of AASHTO M 59 for sidewalks and AASHTO M 123 for curbs.
3. Forms for sidewalks shall be of wood or metal, shall be straight and free from warp, and shall be of sufficient strength, when in place, to hold the concrete true to line and grade without springing or distorting.
4. Forms for curbs shall be metal and of an approved section. They shall be straight and free from distortions, showing no vertical variation greater than 1/8-inch in 10 feet and no lateral variation greater than 1/4-inch in 10 feet from the true plain surface on the vertical face of the form. Forms shall be of the full depth of the structure and constructed such to permit the inside forms to be securely fastened to the outside forms.
5. Securely hold forms in place true to the lines and grades to match existing.
6. Wood forms may be used on sharp turns and for special sections, as approved by the Owner. Where wooden forms are used, they shall be free from warp and shall be the nominal depth of the structure.

7. All mortar and dirt shall be removed from forms and all forms shall be thoroughly oiled or wetted before any concrete is deposited.
- B. When a section is removed, the existing sidewalk or curb shall be cut to a neat line, perpendicular to both the centerline and the surface of the concrete slab. Existing concrete shall be cut along the nearest existing construction joints; if such joints do not exist, the cut shall be made at minimum distances to match existing.
- C. Existing concrete sidewalks and curbs that have been cut and removed for construction purposes shall be replaced with the same width and surface as the portion removed. Sidewalks shall have a minimum uniform thickness of 4-inches. The new work shall be neatly jointed to the existing concrete so that the surface of the new work shall form an even, unbroken plane with the existing surfaces.
- D. The subgrade shall be formed by excavating to a depth equal to the thickness of the concrete, plus 2-inches. Subgrade shall be of such width as to permit the proper installation and bracing of the forms. Subgrades shall be compacted by hand tamping or rolling. Soft, yielding, or unstable material shall be removed and backfilled with satisfactory material. Place 2-inches of porous crushed stone under all sidewalks and curbs and compact thoroughly, then finish to a smooth, unyielding surface at proper line, grade and cross section.
- E. Joint for Curbs
 1. Joints shall be constructed to match existing and as specified. Construct joints true to line with their faces perpendicular to the surface of the structure and within 1/4-inch of their designated position.
 2. Thoroughly spade and compact the concrete at the faces of all joints filling all voids.
 3. Install expansion joint materials at the point of curve at all street returns. Install expansion joint material behind the curb at abutment to sidewalks and adjacent structures.
 4. Place contraction joints every 10 feet along the length of the curbs and gutters. Form contraction joints using steel templates or division plates which conform to the cross section of the structure. Leave the templates in place until the concrete has set sufficiently to hold its shape, but remove them while the forms are still in place. Contraction joint templates or plates shall not extend below the top of the steel reinforcement or they shall be notched to permit the reinforcement to be continuous through the joint. Contraction joints shall be a minimum of 1-1/2-inches deep.

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- F. Expansion joints shall be required to replace any removed expansion joints. Expansion joints shall be true and even, shall present a satisfactory appearance, and shall extend to within 1/2-inch of the top of finished concrete surface.

- G. Finishing
 - 1. Strike off the surface with a template and finish the surface with a wood float using heavy pressure, after which, contraction joints shall be made and the surface finished with a wood float or steel trowel.
 - 2. Finish the face of the curbs at the top and bottom with an approved finishing tool of the radius to match existing.
 - 3. Finish edges with an approved finishing tool having a 1/4-inch radius.
 - 4. Provide a final broom finish by lightly combing with a stiff broom after troweling is complete.
 - 5. The finished surface shall not vary more than 1/8-inch in 10 feet from the established grade.

- H. Driveway and Sidewalk Ramp Openings
 - 1. Provide driveway openings of the widths and at the locations to match existing and as directed by the Owner.
 - 2. Provide sidewalk ramp openings to match existing, in conformance with the applicable regulations and as directed by the Owner.

- I. Concrete shall be suitably protected from freezing and excessive heat. It shall be kept covered with burlap or other suitable material and kept wet until cured. Provide necessary barricades to protect the work. All damage caused by people, vehicles, animals, rain, the Contractor's operations and the like shall be repaired by the Contractor, at no additional expense to the Owner.

3.04 MAINTENANCE

The Contractor shall maintain the surfaces of roadways built and pavements replaced until the acceptance of the Project. Maintenance shall include replacement, scraping, reshaping, wetting and rerolling as necessary to prevent raveling of the road material, the preservation of reasonably smooth surfaces and the repair of damaged or unsatisfactory surfaces, to the satisfaction of the Owner. Maintenance shall include sprinkling as may be necessary to abate dust from the gravel surfaces.

3.05 SUPERVISION AND APPROVAL

- A. Pavement restoration shall meet the requirements of the regulatory agency responsible for the pavement. Obtain agency approval of pavement restorations before requesting final payment.
- B. Obtain the Owner's approval of restoration of pavement, such as private roads and drives, that are not the responsibility of a regulatory agency.
- C. Complete pavement restoration as soon as possible after backfilling.
- D. Failure of Pavement: Should any pavement restoration or repairs fail or settle during the life of the Contract, including the bonded period, promptly restore or repair defects.

3.06 CLEANING

The Contractor shall remove all surplus excavation materials and debris from the street surfaces and rights-of-way and shall restore street, roadway or sidewalk surfacing to its original condition.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

This Section covers the work necessary to move in and move out necessary and equipment, set up and remove crane and temporary facilities, and clean up site, complete.

1.02 MATERIALS & EQUIPMENT

Provide all materials and equipment required to accomplish the work as specified.

1.03 WORKMANSHIP

- A. Set up all equipment necessary to complete all work within the area designated by the Engineer. Accomplish all required work in accordance with applicable portions of these specifications.
- B. Some obstructions may not be shown. Bidders are advised to carefully inspect the existing facilities before preparing their proposals. The removal and replacement of minor obstructions such as electrical conduits, water, waste piping, and similar items shall be anticipated and accomplished, even though not shown or specifically mentioned.

1.04 SECURITY FENCE

Contractors' security fence may be constructed for the protection of materials, tools, and equipment or the Contractor and subcontractors. At completion of the work, remove fence from the site and restore the area.

1.05 CONTAMINATION PRECAUTIONS

Avoid contamination of the project area. Do not dump waste oil, rubbish, or other similar materials on the ground.

1.06 CLEANUP OF CONSTRUCTION AREAS

Upon completion and acceptance of the elevated water storage tank, remove from the site the crane and equipment, complete, and all debris, unused materials, temporary construction buildings, and other miscellaneous items resulting from or used in the operations. Replace or repair any facility, which has been damaged during the construction work. Restore the site as nearly as possible to its original condition.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE

- A. This Section describes products to be incorporated into the water mains and requirements for the installation and use of these items. The Contractor shall furnish all products and perform all labor necessary to fulfill the requirements of these Specifications. It includes, but is not limited to the construction of the following items:
1. Piping.
 2. Valves.
 3. Fittings.
 4. Connections to Existing Systems.
 5. All appurtenances necessary to convey potable water from the existing system to the location shown on the construction plans.

1.2 RELATED SECTIONS

- A. Section 02230 – Clearing & Grubbing
- B. Section 02250 – Sheeting, Shoring, & Bracing
- C. Section 02315 – Trench Excavation & Backfill
- D. Section 02445 – Bore & Jack Casing
- E. Section 02920 – Grassing

1.3 REFERENCES

- A. ASTM Specifications:
1. ASTM D 3740-94a – Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
 2. ASTM E 329-93b – Agencies Engaged in the Testing and/or Inspection of Materials as Used in Construction.

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3. ASTM D 3034-94 – Type PSM PVC Sewer Pipe and Fittings.
4. ASTM D 2321-89 – Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Installations.
5. ASTM A 746-95 – Ductile Iron Gravity Sewer Pipe.
6. ASTM D 3212-92 – Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
7. ASTM F 477-95 – Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
8. ASTM D 2241-94 – PVC Pressure-Rated Pipe (SDR – Series).
9. ASTM D 3139-95 – Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seams.
10. ASTM A 139-93a – Electric-Fusion (Arc) Welded Steel Pipe (NPS 4 and over).
11. ASTM C 478-94 – Precast Reinforced Concrete Manhole sections.
12. ASTM C 443-94 – Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
13. ASTM C 39-94 – Compressive Strength of Cylindrical Concrete Specimens.
14. ASTM C 890-91 – Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures.
15. ASTM C 891-90 – Installation of Underground Precast Concrete Utility Structures.
16. ASTM C 913-89 – Precast Concrete Water and Wastewater Structures.
17. ASTM A 615/A 615 M-95b – Deformed and Plain Billet – Steel Bars for Concrete Reinforcement.
18. ASTM D-2922-91 – Test methods for Density of Soil and Soil Aggregate In-Place by Nuclear Methods (Shallow Depth).
19. ASTM D-1557-91 – Laboratory Compaction Characteristics of Soil Using Modified Effort.

20. ASTM D 1556-90 – Density and Unit Weight of Soil In-Place by The Sand-Cone Method.
21. ASTM D 71-87 (re-approved 1994) – Evaluation Degree of Blistering of Paints.
22. ASTM D 2794-93 – Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
23. ASTM E 96-95 – Water Vapor Transmission of Materials.
24. ASTM G 53-95 – Operating Light and Water-Exposure Apparatus (Fluorescent UV – Condensation Type) for Exposure of Nonmetallic Materials.
25. ASTM A 377-95 – Index of Specifications for Ductile Iron Pressure Pipe.

B. ANSI/AWWA Specifications:

1. ANSI/AWWA C 150/A 21.50-96 – Thickness Design of Ductile Iron Pipe.
2. ANSI/AWWA C 151/A 21.51-91 – Ductile Iron Pipe, Centrifugally Cast, for Water or Other Liquids.
3. ANSI/AWWA C-500-93 – Metal-Seated Gate Valves for Water Supply Service.
4. ANSI/AWWA C-509-94 – Resilient-Seated Gate Valves for Water Supply Service.
5. ANSI/AWWA C 111/A 21.11-95 – Rubber-Gasket Joints for Ductile Iron Pressure Pipe and Fittings.
6. ANSI/AWWA C 600-93 – Installation of Ductile Iron Water Mains and their appurtenances.

C. ACI Specifications:

1. ACI 318-89 – Building Code Requirements for Reinforced concrete.

D. AASHTO Standards:

1. AASHTO T 191-91 – Density of Soil In-Place by the Sand-Cone Method.

1.4 QUALIFICATIONS

- A. If requested by the Owner, submit evidence that manufacturers have consistently produced products of satisfactory quality and performance for a period of at least two years.
- B. The specifications describe several materials. Where manufacturers and models of equipment are named in the specification, it is intended that these are to describe the quality and function required. The Contractor may use equipment or materials of other manufacturers provided they are reviewed and accepted by the Engineer and the Owner as meeting the specifications.
- C. The Contractor will furnish the Engineer and the Owner a description of all materials before ordering. The Engineer will review the contractor's submittals and provide in writing an acceptance or rejection of material. However, an acceptance of any material by the Engineer does not relieve the Contractor of this responsibility to meet the requirements of the construction plans or these specifications.

1.5 SUBMITTALS

- A. Complete shop drawings, product data, and engineering data for all products shall be submitted to the Owner.

1.6 QUALITY ASSURANCE

- A. Material and equipment shall be the standard product of a manufacturer who has manufactured them for a minimum of 2 years and who provides published data on the quality and performance of the project.
- B. A Subcontractor for any part of the work must have experience on similar work and if required, furnish the Engineer with a list of projects and the Owners or Engineers who are familiar with his competence.
- C. Devices, equipment, structures, and systems not designated by the Engineer that the Contractor wishes to furnish shall be designed either by a registered professional engineer or by someone the Engineer approved as qualified. If required, complete design calculations and assumptions shall be furnished to the Engineer or the Owner before acceptance.
- D. All testing of the piping shall be made by the Contractor with equipment qualified by the Owner, Engineer, or utility company and in the presence of the Engineer, Owner and utility company. The Engineer or his representative reserves the right to accept or reject testing equipment.

- E. Soil testing shall be done by a testing laboratory regularly engaged in soil testing, and shall be approved by the engineer prior to engagement. Mill certificates of test on materials made by manufactures will be accepted provided the manufacturer maintains an adequate testing laboratory, makes regularly scheduled tests that are spot checked by an outside laboratory, and furnishes satisfactory certificates with the name of the one making the test.
- F. The details of all welded joints shall comply with all of the requirements for joints, which are accepted without qualification test under the “Code of Arc and Gas Welding in Building Construction of the American Welding Society”. Workmanship shall conform to A.I.S.C. Specifications for Fabrication and Erection. All work shall be executed by skilled workmen under experienced supervision. All welding shall be done by welders who have been previously qualified by tests as prescribed in the “American Welding Society Standard Qualification Procedure” to perform the type of work required. Welders shall have passed the qualification test (Qualification tests using procedures covered in AWSS B3.0 Part II) within the preceding 12 months.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Unloading: Furnish equipment and facilities for unloading, handling, distributing and storing pipe, fittings, valves, and accessories. Make equipment available at all times for use in unloading. Do not drop or dump materials. Any materials dropped or dumped will be subject to rejection without additional justification. Pipe handled on skids shall not be rolled or skidded against the pipe on the ground.
- B. Handling: Handle pipe, fittings, valves, and accessories carefully to prevent shock or damage. Handle pipe by rolling on skids, forklift, or front-end loader. Do not use material damaged in handling. Slings, hooks, or pipe tongs shall be padded and used in such a manner as to prevent damage to the exterior coatings or internal lining of the pipe.
- C. Store all pipe which cannot be distributed along the route. Make arrangements for the use of suitable storage areas.
- D. Stored materials shall be kept safe from damage. The interior of all pipe, fittings and other appurtenances shall be kept free from dirt or foreign matter at all times. Valves and hydrants shall be drained and stored in a manner that will protect them from damage by freezing.
- E. Pipe shall not be stacked higher than the limits recommended by the manufacturer. The bottom tier shall be kept off the ground on timbers, rails, or concrete. Pipe in tiers shall be alternated: bell, plain end; bell, plain end. At least two rows of timbers shall be placed between tiers and chocks, affixed to each other in order to prevent movement. The timbers shall be large enough to prevent contact between the pipe in adjacent tiers.

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- F. Stored mechanical and push-on joint gaskets shall be placed in a cool location out of direct sunlight. Gaskets shall not come in contact with petroleum products. Gaskets shall be used on a first-in, first-out basis.
- G. Mechanical-joint bolts shall be handled and stored in such a manner that will ensure proper use with respect to types and sizes.

1.8 SEQUENCING, SCHEDULING

- A. The Contractor shall arrange his work so that sections of mains between valves are tested, sterilized, placed in service as soon as reasonable after it is placed.

1.9 ALTERNATIVES

- A. The intention of these specifications is to produce the best system for the Owner. If the Contractor suggests that alternate material, equipment or procedures will improve the results at no additional cost, the Engineer and the Owner will examine the suggestion and if it is accepted, it may be used. The basis upon which acceptance of an alternate will be given is its value to the Owner, and not for the convenience of the Contractor.

1.10 GUARANTEE

- A. The Contractor shall guarantee the quality of the materials, equipment, and workmanship for 12 months after acceptance of the completed Project. Defects discovered during that period shall be repaired by the Contractor, at no cost to the Owner. The Performance Bond shall reflect this guarantee.
- B. The manufacturers of equipment, valves, pumps, controls, measuring devices and special equipment shall test the equipment at field conditions for compliance with the specifications. The manufacturer shall guarantee his product to be free from defects in material and factory workmanship for a period of 1 year from date of acceptance of the completed project, provided the product is properly installed, serviced and operated under normal conditions and according to the manufacturer's instructions. The manufacturer shall furnish a replacement for any component that proves defective during the guarantee period, except such items which are seals. The Contractor shall furnish the services of a representative of the manufacturer to check the installation after it is completed and to furnish the Engineer with a certificate that the equipment meets the specifications and will perform as required. The manufacturer shall furnish four field trips to the plant by a service representative during the first year after completion of the Project at no cost to the Owner.

1.11 EXISTING UTILITIES

- A. All known utility facilities are shown schematically on plans, and are not necessarily accurate in location as to plan or elevation. Utilities such as service lines or unknown facilities not shown on plans will not relieve the contractor of his responsibility under this requirement. “Existing Utilities Facilities” means any utility that exists on the project in its original, relocated or newly installed position. The Contractor will be held responsible for the cost of repairs to damaged underground facilities; even when such facilities are to shown on the plans. The Contractor shall contact all utility companies prior to beginning the work and request an accurate field location of their respective utility lines.
- B. Damage to any part of the existing water system and facilities by the Contractor or Subcontractors, that is required by the User’s and Owner’s forces, shall be charged to the Contractor on the basis of time and material, plus 30% for overhead and administration.

1.12 REQUIREMENTS OF REGULATORY AGENCIES

- A. Water mains shall be sterilized to meet the requirements of the appropriate Health Department. Sterilization shall be in accordance with AWWA Standards C-651, latest revision.

1.13 CONNECT NEW MAIN TO EXISTING SYSTEM

- A. The Contractor shall furnish the necessary pipe and perform all excavation, dewatering, shoring, backfilling, etc. necessary to make the connection of a new main to the existing water system. The Contractor shall contact the Superintendent of the Water Utility a minimum of 48 hours in advance of construction. The Contractor shall be responsible for coordinating his construction with the utility operator.

1.14 ACCEPTANCE OF PORTIONS OF WORK

- A. The Owner reserves the right to accept and use any portion of the work whenever it is considered in the public interest to do so.

1.15 RECORD DATA

- A. It will be required of the Contractor to keep accurate, legible records of the location of any deviations from the construction drawings, any additional items or structures to the construction drawings, and all utilities encountered which are not shown on the construction drawings. These records will be made available to the Engineer before his inspection for incorporation into the Engineer’s Record Drawings.

PART 2 PRODUCTS

2.1 PIPING MATERIALS AND ACCESSORIES

A. Ductile Iron Pipe (DIP):

1. Ductile iron pipe shall be manufactured in accordance with and conform to ANSLI A21.50 (AWWAC-150) latest edition and ANSI A21.51 (AWWA C151) latest edition. It shall be of a thickness according to 21.50 ANSI (AWWA), latest edition, for laying condition 2, and shall be class 50 minimum. It shall be cement lined in accordance with ANSI A 21.4 (AWWA C 104).
2. All pipe, except specials, shall be furnished in nominal lengths of 18 to 20 feet. Sizes will be as shown on the Drawings.
3. Ductile iron pipe shall be encased in polyethylene film where shown on the Drawings. Polyethylene film shall have a minimum thickness of 8 mils and shall meet the requirements of AWWA C105.
4. Acceptance will be on the basis of the Engineer's/Owner's inspection and the manufacturer's written certification that the pipe was manufactured and tested in accordance with the applicable standards.

B. Polyvinyl Chloride (PVC) Pipe and Fittings

1. Plastic Pipe – Shall be PVC Class 150, DR 18, C-900 for 12” and smaller and Class 165, DR 25, C-905 for 14” and larger. All pipe shall conform to ASTM D-2241 and be installed in accordance with ASTM D-2321. Joints shall be in accordance with ASTM D-3036. Sizes and dimensions shall be as follows:

| 150 PSI, DR 18, C-900 | | | 165 PSI, DR 25, C-905 | | |
|------------------------------|------------|---------------------------|------------------------------|------------|---------------------------|
| Nom. Pipe Size | O.D. (in.) | Min. Wall Thickness (in.) | Nom. Pipe Size | O.D. (in.) | Min. Wall Thickness (in.) |
| 4” | 4.800 | 0.267 | 14” | 15.300 | 0.612 |
| 6” | 6.900 | 0.383 | 16” | 17.400 | 0.696 |
| 8” | 9.050 | 0.503 | 18” | 19.500 | 0.780 |
| 10” | 11.100 | 0.617 | 20” | 21.600 | 0.864 |
| 12” | 13.200 | 0.733 | 24” | 25.800 | 1.032 |
| | | | 30” | 32.000 | 1.280 |
| | | | 36” | 38.300 | 1.530 |

2. All PVC pipe less than 2” diameter shall be schedule 40 unless otherwise noted.
 3. Pipe shall bear the National Sanitation Foundation seal of approval and shall comply with the requirements of Type I, Grade I (PVC 1120) of the ASTM resin specification D-1784 (AWWA C 151-76). Certificates of conformance with the foregoing specifications shall be furnished with each lot of pipe supplied. Plastic pipe shall be jointed by means of a rubber ring bell joint which shall be an integral part of the barrel or solvent welded at the factory. The joints shall have a space to provide expansion and contraction of the pipe without leaking. Fittings for plastic pipes shall be PVC with ring tite rubber joints; or ductile iron with adapters to PVC pipe.
 4. The bell shall consist of an integral wall section with a bounded-in solid cross section shall be designed to be at least as hydrostatically strong as the pipe wall and meet the requirements of UNI-BELL-B-11.
 5. Each standard and random length of pipe shall be tested to two times the rated pressure of the pipe for a minimum of 5 seconds. The integral bell shall be tested with the pipe.
 6. Pipe shall be supplied in minimum lengths of 20 feet.
 7. Acceptance will be on the basis of the Owner's inspection and the manufacturer's written certification that the pipe was manufactured and tested in accordance with the applicable standards, including the National Sanitation Foundation. Additionally, each piece of pipe shall be stamped "NSF Approved".
- C. Plastic Tubing – Tubing for house service lines shall be:
1. Polyethylene Tubing – CTS PE 3408 conforming to all requirements of AWWA C-901 and ASTM D-2737 (SDR9). The tubing shall be copper tubing size and rated for a minimum working pressure of 200 psi. Marking on the tubing shall include – nominal tubing pipe size; type of tubing material – PE 3408; SDR 9; pressure rating – 200 psi; ASTM D-2737; manufacturer’s name and seal of the National Sanitation Foundation.

2.2 JOINTS

- A. Flanged Joints – Shall conform to ANSI A21.15 (AWWA C-115) latest revision. Bolts shall conform to ANSI B18.2.1 and nuts shall conform to ANSI B18.2.2. Gaskets shall be rubber, either ring or full face, and shall be 1/8 inch thick. Gaskets shall conform to the dimensions recommended by AWWA C-115 latest revision.

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- B. Mechanical Joints – In ductile iron pipe shall conform to ANSI A21.11 (AWWA C-111) latest revision.
- C. Push-On-Joints – In ductile iron pipes shall conform to ANSI A21.11 latest revision.
- D. Plastic Pipe – Joints in plastic pipe 4-inches and larger shall meet all requirements of AWWA C-900 latest revision. Joints in plastic pipe with a diameter less than 4-inches shall conform to ASTM D-3139 latest revision.
- E. Restrained Joints – Restrained joints for pipe, valves and fittings shall be mechanical joints with ductile iron retainer glands or push-on type joints equivalent to American “FLEX-RING” or “FAST-GRIP” OR us pipe “TR FLEX” or “FIELD LOK” and shall have a minimum rated working pressure of 250 psi. The joints shall be in accordance with the applicable portions of AWWA C111. The manufacturer of the joints shall furnish certification, witnessed by an independent laboratory, that the joints furnished have been tested at a pressure of 500 psi without signs of leakage or failure. Restrained joints shall be capable of being deflected after assembly. No field Welding of restrained joint pipe will be permitted.
- F. Flexible Expansion Joints – Shall be rated for a 350-psi working pressure and constructed of ductile-iron conforming to the material properties of ANSI/AWWA C153/A21.53. All flexible expansion joints shall consist of an expansion joint designed and cast as an integral part of a ball and socket type flexible joint, having a minimum of 15° deflection per ball and a 24” minimum expansion.
- G. Provide the appropriate gaskets for mechanical and flange joints. Gaskets for flange joints shall be made of 1/8-inch thick, cloth reinforced rubber; gaskets may be ring type or full-face type.
- H. Bolts and Nuts:
 - 1. Provide the necessary bolts for connections. All bolts and nuts shall be threaded in accordance with ANSI B1.1, Coarse Thread Series, Class 2A external and 2B internal fit. All bolts and nuts shall be made in the U.S.A.
 - 2. Bolts and nuts for mechanical joints shall be Tee Head Bolts and nuts of high strength low-alloy steel in accordance with ASTM A 242 to the dimensions shown in AWWA C 111/ANSI A21.11.

3. Bolts for exposed service shall be zinc plated, cold pressed, steel machine bolts conforming to ASTM A307, Grade B. Nuts for exposed service shall be zinc plated, heavy hex conforming to ASTM A 563. Zinc plating shall conform to ASTM B 633, Type II.
- I. Thrust collars shall be welded-on ductile iron body type designed to withstand thrust due to 250 psi internal pressure on a dead end.

2.3 FITTINGS

- A. Fittings for Ductile Iron – Shall be short body ductile iron, manufactured in accordance with ASA 21.53 (AWWA C-153) latest revision. They shall be cement lined in accordance with ANSI A-21.4 (AWWA C-104) latest revision. Fittings shall be designed to accommodate the type of pipe used and to have a minimum rated working pressure of 350 psi. American Iron & Steel is in place for this project
- B. Fittings for Flanged Pipe – Shall be manufactured in accordance with ASA B 16.1, Class 125 flanges.
- C. Fittings for PVC Pipe – Less than 4” shall be PVC with ring tite rubber joints. PVC Fittings 4” and larger shall not be allowed.

2.4 GATE VALVES (GV)

- A. 3-Inches in Diameter and Smaller: Gate valves shall be bronze, heavy duty, rising stem, wedge type with screwed or union bonnet. Valve ends shall be threaded type. Valves shall have a minimum 200 psi working pressure for water (125 psi working pressure for steam). Valves shall be made in the U.S.A. Gate valves shall be equal to Crane No. 428 (threaded).
- B. 4-Inches through 12-Inches in Diameter: Gate valves 4-inches through 12-inches shall be resilient wedge type conforming to the requirements of AWWA C509 rated for 200 psi working pressure.
 1. Valves shall be provided with two O-ring stem seals with one O-ring located above and one O-ring below the stem collar. The area between the O-rings shall be filled with lubricant to provide lubrication to the thrust collar bearing surfaces each time the valve is operated. At least one anti-friction washer shall be utilized to further minimize operating torque. All seals between valve parts, such as body and bonnet, bonnet and bonnet cover, shall be flat gaskets or O-rings.

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2. The gate valve shall be made of cast iron having a vulcanized, synthetic rubber coating, or a seat ring attached to the disc with retaining screws. Sliding of the rubber on the seating surfaces to compress the rubber will not be allowed. The design shall be such that compression-set of the rubber shall not affect the ability of the valve to seal when pressure is applied to either side of the gate. The sealing mechanism shall provide zero leakage at the water working pressure when installed with the line flow in either direction.
 3. All internal ferrous surfaces shall be coated with epoxy to a minimum thickness of 4 mils. The epoxy shall be non-toxic, impart no taste to the water and shall conform to AWWA C550, latest revision.
 4. Gate valves 4 through 12-inches shall be manufactured by American-Darling, Mueller, M & H Valve, or approved equal.
- C. 14-inches in Diameter and Larger: Valves shall be U.S. Metro Seal or equal conforming to the requirements of AWWA C509.
1. Valve ends shall be mechanical joint type except where flanged or restrained joint ends are shown. Flanged joints shall meet the requirements of ANSI B16-1, Class 125.
 2. Buried valves shall be equipped with valve boxes unless access to the operator is provided by a manhole.
 3. Manually operated valves, shall be non-rising stern type having O-ring seals.
 4. Valves shall be installed in a vertical position without a bypass valve. Valves shall be metro seal 250 R/S resilient seated manufactured by U.S. Pipe. Resilient seat gate valves shall conform to AWWA Standard Specification C-509.
 5. Valves shall be designed for a water working pressure of 150 psi and a test pressure pf 300 psi.
- D. Butterfly Valves:
1. Butterfly valves shall be resilient seated, short body design, and shall be designed, manufactured, and tested in accordance with all requirements of AWWA C504. Valves shall be designed for a rated working pressure of 150 psi, unless shown otherwise on the drawings.

2. Valve bodies shall be ductile iron conforming to ASTM A 536, Grade 65-45-12 or ASTM A 126, Grade B cast iron. Shafts shall be 18-8, Type 304 stainless steel, machined and polished. Valve discs shall be ductile iron, ASTM A 536, Grade 65-45-12 or ASTM A 126, Grade B cast iron. The resilient valve seat shall be located either on the valve disc or in the valve body and shall be fully field replaceable for valves 30" and larger.
3. Valves shall be equipped with geared actuators designed, manufactured and tested in accordance with AWWA C504. Actuators shall be capable of holding the disc in any position full open and full closed without any movement or fluttering of the disc. Actuators shall be furnished with full adjustable mechanical stop-limiting devices. Actuators that utilize the sides of the actuator housing to limit disc travel are unacceptable. Valve actuators shall be capable of withstanding a minimum of 450-foot pounds of input torque in either the open or closed position without damage.
4. Valves shall be installed with the valve shafts horizontal. Valves and actuators shall have seals on all shafts and gaskets on valve actuator covers to prevent the entry of water. Actuator mounting brackets shall be totally enclosed and shall have gasket seals.
5. Valve ends shall be mechanical joint type, except where flanged or restrained joint ends are shown. Flange joints shall meet the requirements of ANSI B16.1, Class 125.
6. Butterfly valves shall be manufactured by Henry Pratt, Dezurik, K or equal.

2.5 FIRE HYDRANTS (FH)

- A. All fire hydrants shall conform to the requirements of AWWA C502 for 200 psi working pressure. Hydrants shall be the compression type, closing with line pressure. The valve opening shall be 5 1/4-inches.
- B. In the event of a traffic accident, the hydrant barrel shall break away from the standpipe at a point above grade and in a manner which will prevent damage to the barrel and stem, preclude opening of the valve, and permit rapid and inexpensive restoration without digging or cutting off the water.
- C. The means for attaching the barrel to the standpipe shall permit facing the hydrant a minimum of eight different directions.
- D. Hydrants shall be fully bronze mounted with all working parts of bronze. Valve seat ring shall be bronze and shall screw into a bronze retainer.

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- E. All working parts, including the seat ring shall be removable through the top without disturbing the barrel of the hydrant.
- F. The operating nut shall match those on the existing hydrants. The operating threads shall be totally enclosed in an operating chamber, separated from the hydrant barrel by a rubber O-ring stem seal and lubricated by grease.
- G. Hydrant shall be a non-freezing design and be provided with a simple, positive, and automatic drain which shall be fully closed whenever the main valve is opened.
- H. Hose and pumper connections shall be breech-locked, pinned, or threaded and pinned to seal them into the hydrant barrel. Each hydrant shall have two 2-1/2-inch hose connections and one 4-1/2-inch pumper connection, all with National Standard threads and each equipped with cap and non-kinking chain.
- I. Hydrants shall be installed with a hydrant tee, 6" gate valve with box and 14" long ductile anchor coupling unless a different length is specified and furnished with a mechanical joint connection to the spigot of the 6-inch hydrant lead.
- J. Minimum depth of bury shall be **4.5 feet**. Provide extension section where necessary for proper vertical installation and in accordance with manufacturer's recommendations.
- K. All outside surfaces of the barrel above grade shall be painted red with enamel equal to KopCoat Glamortex 501.
- L. Hydrants shall be traffic model and shall be M & H Valve 129 or 929.

2.6 VALVE BOXES (VB) AND EXTENSION STEMS

- A. All valves shall be equipped with valve boxes. The valve boxes shall be cast iron two-piece screw type with drop covers. Valve boxes shall have a 5.25-inch inside diameter. Valve box covers shall weigh a minimum of 13 pounds. The valve boxes shall be adjustable to 6-inches up or down from the nominal required cover over the pipe. Valve boxes shall be of sufficient length that bottom flange of the lower belled portion of the box is below the valve operating nut. Ductile or cast-iron extensions shall be provided as necessary. Covers shall have "WATER VALVE" or "WATER" cast into them. Valve boxes shall be manufactured in the United States and shall be equal to U.S. Foundry No. 7500 screw type.
- B. Extension stems shall be provided so as to set the top of the operating nut 30-inches below finished grade. Connection to the valve shall be with a wrench nut coupling and a set screw to secure the coupling to the valve's operating nut. The coupling and square wrench nut shall be welded to the extension stem. Extension stems shall be equal to Mueller A-26441 or M & H Valve Style 3801.

2.7 SERVICE CONNECTIONS

- A. Taps in pipe larger than 3-inches shall be made with a tapping machine. A corporation stop shall be installed at the connection to the main. The corporation stop shall be brass manufactured in conformance with AWWA C-800. Inlet and outlet threads shall conform to AWWA C-800.

The key and body seating surfaces shall be accurately machined and fit to a taper of 1-3/4 inches per foot. The stem and retaining nut shall be so designed that failure from over tightening of the retaining nut results in thread stripping rather than stem fracture. Corporation stops shall be 1-inch equivalent to Muller H-15008 or Ford F-1000 with a stainless-steel stiffener. Service saddles shall give 1-inch AWWA taps, equal to Ford Styles 202B or S70. Contractor shall adhere to pipe manufacturer's recommendations on maximum tap sizes for each main size.

- B. Where connections to larger service pipes are required, multiple taps shall be made and connected by branch. Taps for house services in PVC pipe 2-inches and smaller shall be made with a Dresser Style 294 "Qwik Tap" or a PVC Tee. The connection shall be capable of withstanding internal water pressure continuously at 150 psi. House service lines will be 1-inc plastic with a curb stop at the property line. The end of the service lateral at the property line shall be marked with a 2 x 4 stake, 36-inch long with the top 6-inches above the ground and painted blue. The depth of the pipe shall be marked on the back of the stake. Location of service line must appear on the "as-built" information and record drawings.

2.8 TAPPING SLEEVES AND VALVES (TS&V)

- A. Tapping sleeves shall be cast or ductile iron of the split-sleeve, mechanical joint type. The Contractor shall be responsible for determining the outside diameter of the pipe to be connected to prior to ordering the sleeve. Valves shall be gate valves furnished in accordance with the specifications shown above, with flanged connection to the tapping sleeve and mechanical joint connection to the branch pipe. The tapping sleeve and valve shall be supplied by the valve manufacturer. Tapping sleeves shall be equal to American-Darling, Mueller or M & H Valve.

2.9 VALVE MARKERS

- A. The Contractor shall provide a concrete valve marker as detailed on the Drawings for each valve installed. Valve markers shall be stamped "WATER". Contractor shall provide raised pavement markers that meet the specifications and requirements set forth in the most current edition of the State of Georgia Department of Transportation "Standard Specifications for the Construction of Roads and Bridges", Section 654. RPM shall be installed as specified in Part 3 of this Section.

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2.10 CORPORATION COCKS AND CURB STOPS

- A. Corporation cocks and curb stops shall be ground key type, shall be made of bronze conforming to ASTM B 61 or B 62, and shall be suitable for the working pressure of the system. Ends shall be suitable for grip type joint. Threaded ends for inlet and outlet of corporation cocks shall conform to AWWA C800; coupling nut for connection to flared copper tubing shall conform to ANSI B16.26. Corporation cocks and curb stops shall be manufactured by Mueller or Ford.

2.11 RETAINER GLANDS

- A. Retainer glands for ductile iron pipe shall be Megalug Series 1100, as manufactured by EBAA Iron Sales, Inc.
- B. Retainer glands for polyvinyl chloride pipe shall be Megalug Series 2000 PV, as manufactured by EBAA Iron Sales, Inc.

2.12 HYDRANT TEES

- A. Hydrant tees shall be equal to ACIPCO A10180, U.S. Pipe U-592, American or equal.

2.13 ANCHOR COUPLINGS

- A. Lengths and sizes shall be as shown on the Drawings. Anchor couplings shall be equal to ACIPCO A 10895 or U.S. Pipe U-591.

2.14 CONCRETE

- A. Concrete shall have a compressive strength of not less than 3000 psi, with not less than 5.5 bags of cement per cubic yard and a slump between 3 and 5-inches. For job mixed concrete, submit the concrete mix design for approval by the Owner. Ready-mixed concrete shall be mixed and transported in accordance with ASTM C 94. Reinforcing steel shall conform to the requirements of ASTM A 615, Grade 60.

2.15 DETECTION TAPE AND TRACER WIRE

- A. Detection tape shall be composed of a solid aluminum foil encased in a protective plastic jacket. Tapes shall be color coded in accordance with APWA color codes with the following legends: Water Systems, Safety Precaution Blue, "Caution: Water Line Buried Below". Colors may be solid or striped. Tape shall be permanently printed with no surface printing allowed. Tape width shall be minimum 2-inches when buried less than 10-inches below the surface. Tape width shall be minimum 3-inches when buried greater than 10-inches and less than

20-inches. Detection tape shall be equal to Lineguard Type III Detectable or Allen Systems Detectatape. In addition, prior to backfill of trench, the Contractor shall furnish and install 14-gauge coated copper wire. The wire shall be installed along the pipe during the backfill operation. Wire shall be brought up at each hydrant and valve.

PART 3 EXECUTIONS

3.1 EXISTING UTILITIES AND OBSTRUCTIONS

- A. The Drawings indicate utilities or obstructions that are known to exist according to the best information available to the Owner. The Contractor shall call the Utilities Protection Center (UPC) (325-5000 or 1-800-282-7411) as required by Georgia law (O.C.G.A. §25-9-1 through §25-9-13) and all utilities, agencies or departments that own and/or operate utilities in the vicinity of the construction work site, at least 72 hours (three business days) prior to construction, to verify the location of the existing utilities.

- B. Existing Utility Location: The following steps shall be exercised to avoid interruption of existing utility service.
 - 1. Provide the required notice to the utility owners and allow them to locate their facilities according to Georgia law. Field utility locations are valid for only 10 days after original notice. The Contractor shall ensure, at the time of any excavation, that a valid utility location exists at the point of excavation.

 - 2. Expose the facility, for a distance of at least 200 feet in advance of pipeline construction, to verify its true location and grade. Repair, or have repaired, any damage to utilities resulting from locating or exposing their true location.

 - 3. Avoid utility damage and interruption by protection with means or methods recommended by the utility owner.

 - 4. Maintain a log identifying when phone calls were made, who was called, area for which utility relocation was requested and work order number issued, if any. The Contractor shall provide the Owner an updated copy of the log bi-weekly, or more frequently if required.

- C. Conflict with Existing Utilities
 - 1. Horizontal Conflict: Horizontal conflict shall be defined as when the actual horizontal separation between a utility, main, or service and the proposed

water main does not permit safe installation of the water main by the use of sheeting, shoring, tying-back, supporting, or temporarily suspending service of the parallel or crossing facility. The Contractor may change the proposed alignment of the water main to avoid horizontal conflicts if the new alignment remains within the available right-of-way or easement, complies with regulatory agency requirements and after a written request to and subsequent approval by the Owner. If, in the opinion of the Owner, the water main's proposed location cannot be adjusted, thus requiring the relocation of an existing utility, the Owner will direct the Contractor to relocate the utility as part of the Contract with the costs of such relocation being paid for as part of a change order.

2. Vertical Conflict: Vertical conflict shall be defined as when the actual vertical separation between a utility, main, or service and the proposed water main does not permit the crossing without immediate or potential future damage to the utility, main, service, or the water main. The Contractor may change the proposed grade of the water main to avoid vertical conflicts if the changed grade maintains adequate cover and complies with regulatory agencies requirements after written request to and subsequent approval by the Owner. If, in the opinion of the Owner, the water main's proposed location cannot be adjusted, thus requiring the relocation of an existing utility, the Owner will direct the Contractor to relocate the utility as part of the Contract with the costs of such relocation being paid for as part of a change order.

D. Electronic Locator: Have available at all times an electronic pipe locator and a magnetic locator, in good working order, to aid in locating existing pipe lines or other obstructions.

E. Water and Sewer Separation

1. Water mains should maintain a minimum 10-foot edge-to-edge separation from sewer lines, whether gravity or pressure. If the main cannot be installed in the prescribed easement or right-of-way and provide the 10-foot separation, the separation may be reduced, provided the bottom of the water main is a minimum of 18-inches above the top of the sewer. Should neither of these two separation criteria be possible, the water main shall be installed below the sewer with a minimum vertical separation of 18-inches.
2. The water main, when installed below the sewer, shall be encased in concrete with a minimum 6-inch concrete depth to the first joint in each direction. Where water mains cross the sewer, the pipe joint adjacent to the pipe crossing the sewer shall be cut to provide maximum separation of the pipe joints from the sewer.

3. No water main shall pass through, or come in contact with, any part of a sanitary sewer manhole.

3.2 CONSTRUCTION ALONG HIGHWAYS, STREETS, AND ROADWAYS

- A. Install pipe lines and appurtenances along highways, streets and roadways in accordance with the applicable regulations of, and permits issued by, the Georgia Department of Transportation and local governing municipalities with reference to construction operations, safety, traffic control, road maintenance and repair.
- B. Traffic Control
 1. The Contractor shall provide, erect, and maintain all necessary barricades, suitable and sufficient lights, and other traffic control devices; provide qualified flagmen where necessary to direct traffic; take all necessary precautions for the protection of the work and the safety of the public.
 2. Construction traffic control devices and their installation shall be in accordance with the current Manual on Uniform Traffic Control Devices for Streets and Highways.
 3. Placement and removal of construction traffic control devices shall be coordinated with the Georgia Department of Transportation and local governing municipalities a minimum of 48 hours in advance of the activity.
 4. Placement of construction traffic control devices shall be scheduled ahead of associated construction activities. Construction time in street right-of-way shall be conducted to minimize the length of time traffic is disrupted. Construction traffic control devices shall be removed immediately following their useful purpose. Traffic control devices used intermittently, such as "Flagmen Ahead", shall be removed and replaced when needed.
 5. Existing traffic control devices within the construction work zone shall be protected from damage. Traffic control devices requiring temporary relocation shall be located as near as possible to their original vertical and horizontal locations. Original locations shall be measured from reference points and recorded in a log prior to relocation. Temporary locations shall provide the same visibility to affected traffic as the original location. Relocated traffic control devices shall be reinstalled in their original locations as soon as practical following construction.

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6. Construction traffic control devices shall be maintained in good repair and shall be clean and visible to affected traffic for daytime and nighttime operation. Traffic control devices affected by the construction work zone shall be inspected daily.
7. Construction warning signs shall be black legend on an orange background. Regulatory signs shall be black legend on a white background. Construction sign panels shall meet the minimum reflective requirements of the Georgia Department of Transportation and local governing municipalities. Sign panels shall be of durable materials capable of maintaining their color, reflective character and legibility during the period of construction.
8. Channelization devices shall be positioned preceding an obstruction at a taper length as required by the current Manual on Uniform Traffic Control Devices for Streets and Highways, as appropriate for the speed limit at that location. Channelization devices shall be patrolled to ensure that they are maintained in the proper position throughout their period of use.

C. Construction Operations

1. Perform all work along highways, streets and roadways to minimize interference with traffic.
2. Stripping: Where the pipe line is laid along road right-of-way, strip and stockpile all sod, topsoil and other material suitable for right-of-way restoration.
3. Trenching, Laying and Backfilling: Do not open the trench any further ahead of pipe laying operations than is necessary. Backfill and remove excess material immediately behind laying operations. Complete excavation and backfill for any portion of the trench in the same day.
4. Shaping: Reshape damaged slopes, side ditches, and ditch lines immediately after completing backfilling operations. Replace topsoil, sod and any other materials removed from shoulders.
5. Construction operations shall be limited to 400 feet along areas, including clean-up and utility exploration unless otherwise approved by the Owner.

- D. Excavated Materials: Do not place excavated material along highways, streets and roadways in a manner which obstructs traffic. Sweep all scattered excavated material off of the pavement in a timely manner.

- E. Drainage Structures: Keep all side ditches, culverts, cross drains, and other drainage structures clear of excavated material. Care shall be taken to provide positive drainage to avoid ponding or concentration of runoff.
- F. Landscaping Features: Landscaping features shall include, but are not necessarily limited to: fences; property corners; cultivated trees and shrubbery; manmade improvements; subdivision and other signs within the right-of-way and easement. The Contractor shall take extreme care in moving landscape features and promptly re-establishing these features.
- G. Maintaining Highways, Streets, Roadways and Driveways
 - 1. Maintain streets, highways, roadways and driveways in suitable condition for movement of traffic until completion and final acceptance of the Work.
 - 2. During the time period between pavement removal and completing permanent pavement replacement, maintain highways, streets and roadways by the use of steel running plates. Running plate edges shall have asphalt placed around their periphery to minimize vehicular impact. The backfill above the pipe shall be compacted as specified elsewhere up to the existing pavement surface to provide support for the steel running plates.
 - 3. Furnish a road grader or front-end loader for maintaining highways, streets, and roadways. The grader or front-end loader shall be available at all times.
 - 4. Immediately repair all driveways that are cut or damaged. Maintain them in a suitable condition for use until completion and final acceptance of the Work.

3.3 PIPE DISTRIBUTION

- A. Pipe shall be distributed and placed in such a manner that will not interfere with traffic.
- B. No pipe shall be strung further along the route than 1,000 feet beyond the area in which the Contractor is actually working without written permission from the Owner. The Owner reserves the right to reduce this distance to a maximum distance of 200 feet in residential and commercial areas based on the effects of the distribution to the adjacent property owners.
- C. No street or roadway may be closed for unloading of pipe without first obtaining permission from the proper authorities. The Contractor shall furnish and maintain proper warning signs and obstruction lights for the protection of traffic along highways, streets and roadways upon which pipe is distributed.

- D. No distributed pipe shall be placed inside drainage ditches.
- E. Distributed pipe shall be placed as far as possible from the roadway pavement, but no closer than five feet from the roadway pavement, as measured edge-to-edge.

3.4 LOCATION AND GRADE

- A. The Drawings show the alignment of the water main and the location of valves, hydrants and other appurtenances.
- B. Depth of Pipe: Where pipe is laid in roadways and parkways of streets, the top of the barrel of the pipe shall have a minimum cover of **forty-eight** inches below the curb line of the street or where not curb line has been established, below the existing ground line. Where the pipe is laid in open, unsubdivided areas, a minimum of **forty-eight** inches of cover is required. A greater depth of cover is required in certain sections of the main, such as railroad crossings, valve locations and other sections of special construction, and within State and Federal highway rights-of-way.
- C. After the Contractor locates and marks the water main centerline or baseline, the Contractor shall perform clearing and grubbing.
- D. Construction shall begin at a connection location and proceed without interruption. Multiple construction sites shall not be permitted without written authorization from the Owner for each site.

3.5 LAYING AND JOINTING PIPE AND ACCESSORIES

- A. Lay all pipe and fittings to accurately conform to the lines and grades established by the engineering plans.
- B. Pipe Installation
 - 1. Proper implements, tools and facilities shall be provided for the safe performance of the Work. All pipe, fittings, valves and hydrants shall be lowered carefully into the trench by means of slings, ropes or other suitable tools or equipment in such a manner as to prevent damage to water main materials and protective coatings and linings. Under no circumstances shall water main materials be dropped or dumped into the trench.
 - 2. All pipe, fittings, valves, hydrants and other appurtenances shall be examined carefully for damage and other defects immediately before installation. Defective materials shall be marked and held for inspection by the Owner, who may prescribe corrective repairs or reject the materials.

3. All lumps, blisters and excess coating shall be removed from the socket and plain ends of each pipe, and the outside of the plain end and the inside of the bell shall be wiped clean and dry and free from dirt, sand, grit or any foreign materials before the pipe is laid. No pipe containing dirt shall be laid.
4. Foreign material shall be prevented from entering the pipe while it is being placed in the trench. No debris, tools, clothing or other materials shall be placed in the pipe at any time.
5. As each length of pipe is placed in the trench, the joint shall be assembled and the pipe brought to correct line and grade. The pipe shall be secured in place with approved backfill material.
6. It is not mandatory to lay pipe with the bells facing the direction in which work is progressing.
7. Applying pressure to the top of the pipe, such as with a backhoe bucket, to lower the pipe to the proper elevation or grade, shall not be permitted.

C. Alignment and Gradient

1. Lay pipe straight in alignment and gradient or follow true curves as nearly as practicable. Do not deflect any joint more than the maximum deflection recommended by the manufacturer.
2. Maintain a transit, level and accessories on the job to lay out angles and ensure that deflection allowances are not exceeded.

D. Expediting of Work: Excavate, lay the pipe, and backfill as closely together as possible. Do not leave unjointed pipe in the trench overnight. Backfill and compact the trench as soon as possible after laying and jointing is completed. Cover the exposed end of the installed pipe each day at the close of work and at all other times when work is not in progress. If necessary to backfill over the end of an uncompleted pipe or accessory, close the end with a suitable plug, either push-on, mechanical joint, restrained joint or as approved by the Owner.

1. The Contractor shall inspect each pipe joint within 500 feet on either side of main line valves to ensure 100 percent seating of the pipe spigot, except as noted otherwise.
2. Each restrained joint shall be inspected by the Contractor to ensure that it has been "homed" 100 percent.

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- F. Cutting Pipe: Cut ductile iron pipe using an abrasive wheel saw. Cut PVC pipe using a suitable saw; remove all burrs and smooth the end before jointing. The Contractor shall cut the pipe and bevel the end, as necessary, to provide the correct length of pipe necessary for installing the fittings, valves, accessories and closure pieces in the correct location. Only push-on or mechanical joint pipe shall be cut.
- G. Polyethylene Encasement: Installation shall be in accordance with AWWA C105 and the manufacturer's instructions. All ends shall be securely closed with tape and all damaged areas shall be completely repaired to the satisfaction of the Owner. Installation shall be at locations shown on the Drawings.
- H. Valve and Fitting Installation
1. Prior to installation, valves shall be inspected for direction of opening, number of turns to open, freedom of operation, tightness of pressure-containing bolting and test plugs, cleanliness of valve ports and especially seating surfaces, handling damage and cracks. Defective valves shall be corrected or held for inspection by the Owner. Valves shall be closed before being installed.
 2. Valves, fittings, plugs and caps shall be set and joined to the pipe in the manner specified in this Section for cleaning, laying and joining pipe, except that 12-inch and larger valves shall be provided with special support, such as treated timbers, crushed stone, concrete pads or a sufficiently tamped trench bottom so that the pipe will not be required to support the weight of the valve. Valves shall be installed in the closed position.
 3. A valve box shall be provided on each underground valve. They shall be carefully set, centered exactly over the operating nut and truly plumbed. The valve box shall not transmit shock or stress to the valve. The bottom flange of the lower belled portion of the box shall be placed below the valve operating nut. This flange shall be set on brick, so arranged that the weight of the valve box and superimposed loads will bear on the base and not on the valve or pipe. Extension stems shall be installed where depth of bury places the operating nut in excess of 60-inches beneath finished grade so as to set the top of the operating nut 30-inches below finished grade. The valve box cover shall be flush with the surface of the finished area or such other level as directed by the Owner.
 4. In no case shall valves be used to bring misaligned pipe into alignment during installation. Pipe shall be supported in such a manner as to prevent stress on the valve.

5. A valve marker shall be provided for each underground valve. Raised pavement markers (RPM's) shall be provided and installed along the appropriate roadway centerline for each in-line valve on Owner owned right-of-way. RPM's for in-line valves shall be Type I, two-way, and white in color.

I. Hydrant Installation

1. Prior to installation, inspect all hydrants for direction of opening, nozzle threading, operating nut and cap nut dimensions, tightness of pressure-containing bolting, cleanliness of inlet elbow, handling damage and cracks. Defective hydrants shall be corrected or held for inspection by the Owner.
2. All hydrants shall stand plumb and shall have their nozzles parallel with or at right angles to the roadway, with pumper nozzle facing the roadway, except that hydrants having two-hose nozzles 90 degrees apart shall be set with each nozzle facing the roadway at an angle of 45 degrees.
3. Hydrants shall be set to the established grade, with the centerline of the lowest nozzle at least 12-inches above the ground or as directed by the Owner.
4. Each hydrant shall be connected to the main with a 6-inch branch controlled by an independent 6-inch valve. When a hydrant is set in soil that is pervious, drainage shall be provided at the base of the hydrant by placing coarse gravel or crushed stone mixed with coarse sand from the bottom of the trench to at least 6-inches above the drain port opening in the hydrant to a distance of 12-inches around the elbow.
5. When a hydrant is set in clay or other impervious soil, a drainage pit 2 x 2 x 2 feet shall be excavated below each hydrant and filled with coarse gravel or crushed stone mixed with coarse sand under and around the elbow of the hydrant and to a level of 6-inches above the drain port.
6. Hydrants shall be located as shown on the Drawings or as directed by the Owner. In the case of hydrants that are intended to fail at the ground-line joint upon vehicle impact, specific care must be taken to provide adequate soil resistance to avoid transmitting shock moment to the lower barrel and inlet connection. In loose or poor load bearing soil, this may be accomplished by pouring a concrete collar approximately 6-inches thick to a diameter of 24-inches at or near the ground line around the hydrant barrel.

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7. Raised pavement markers (RPM's) shall be provided and installed along the appropriate roadway centerline for each fire hydrant on Owner owned right-of-way. RPM's for in-line valves shall be Type I, two-way, and blue in color.

3.6 CONNECTIONS TO WATER MAINS

- A. Make connections to existing pipe lines with tapping sleeves and valves, unless specifically shown otherwise on the Drawings.
- B. Location: Before laying pipe, locate the points of connection to existing water mains and uncover as necessary for the Owner to confirm the nature of the connection to be made.
- C. Interruption of Services: Make connections to existing water mains only when system operations permit. Operate existing valves only with the specific authorization and direct supervision of the Owner.
- D. Tapping Saddles and Tapping Sleeves
 1. Holes in the new pipe shall be machine cut, either in the field or at the factory. No torch cutting of holes shall be permitted.
 2. Prior to attaching the saddle or sleeve, the pipe shall be thoroughly cleaned, utilizing a brush and rag, as required.
 3. Before performing field machine cut, the watertightness of the saddle or sleeve assembly shall be pressure tested. The interior of the assembly shall be filled with water. An air compressor shall be attached, which will induce a test pressure as specified in this Section. No leakage shall be permitted for a period of five minutes.
 4. After attaching the saddle or sleeve to an existing main, but prior to making the tap, the interior of the assembly shall be disinfected. All surfaces to be exposed to potable water shall be swabbed or sprayed with a one percent hypochlorite solution.
- E. Connections and Repairs: Where connections or repairs are required, Contractor shall only use solid sleeves and provide all materials and labor necessary to make the connection or repair to the existing pipeline, excluding service lines 2" or smaller.

3.7 THRUST RESTRAINT

- A. Provide restraint at all points where hydraulic thrust may develop.
- B. Retainer Glands: Provide retainer glands where shown on the Drawings and on fire hydrants and all associated fittings, valves and related piping. Retainer glands shall be installed in accordance with the manufacturer's recommendations, particularly, the required torque of the set screws. The Contractor shall furnish a torque wrench to verify the torque on all set screws which do not have inherent torque indicators.
- C. Harnessing
 - 1. Provide harness rods only where specifically shown on the Drawings or directed by the Owner.
 - 2. Harness rods shall be manufactured in accordance with ASTM A 36 and shall have an allowable tensile stress of no less than 22,000 psi. Harness rods shall be hot dip galvanized or field coated with bitumastic before backfilling.
 - 3. Where possible, harness rods shall be installed through the mechanical joint bolt holes. Where it is not possible, provide 90-degree bend eye bolts.
 - 4. Eye bolts shall be of the same diameter as specified in AWWA C111 for that pipe size. The eye shall be welded closed. Where eye bolts are used in conjunction with harness rods, an appropriate size washer shall be utilized with a nut on each end of the harness rod. Eye bolts shall be of the same material and coating as the harness rods.
- D. Hydrants: Hydrants shall be attached to the water main as shown on the Standard Detail.
- E. Thrust Collars: Collars shall be constructed as shown on the Drawings. Concrete and reinforcing steel shall meet the requirements as specified in this Section. The welded-on collar shall be designed to meet the minimum allowable load shown on the Drawings. The welded-on collar shall be attached to the pipe by the pipe manufacturer.
- F. Concrete Blocking
 - 1. Provide concrete blocking for all bends, tees, valves, and other points where thrust may develop, except where other exclusive means of thrust restraint are specifically shown on the Drawings.
 - 2. Concrete shall be as specified in this Section.

3. Form and pour concrete blocking at fittings as shown on the Drawings and as directed by the Owner. Pour blocking against undisturbed earth. Increase dimensions when required by over excavation.

3.8 DETECTION TAPE & TRACER WIRE

- A. Provide detection tape and tracer wire for all water mains.

3.9 INSPECTION AND TESTING - PRESSURE AND LEAKAGE TESTING

- A. All sections of the water main subject to internal pressure shall be pressure tested in accordance with AWWA C600. A section of main will be considered ready for testing after completion of all thrust restraint and backfilling.
- B. Each segment of water main between main valves shall be tested individually.
- C. Test Preparation
 1. Flush sections thoroughly at flow velocities, greater than 2.5 feet per second, adequate to remove debris from pipe and valve seats.
 2. Partially operate valves and hydrants to clean out seats.
 3. Provide temporary blocking, bulkheads, flanges and plugs as necessary, to assure all new pipe, valves and appurtenances will be pressure tested.
 4. Before applying test pressure, air shall be completely expelled from the pipeline and all appurtenances. Insert corporation cocks at highpoints to expel air as main is filled with water as necessary to supplement automatic air valves. Corporation stops shall be constructed as detailed on the Drawings with a meter box.
 5. Fill pipeline slowly with water. Provide a suitable pump with an accurate water meter to pump the line to the specified pressure.
 6. The differential pressure across a valve or hydrant shall equal the maximum possible, but not exceed the rated working pressure. Where necessary, provide temporary backpressure to meet the differential pressure restrictions.
 7. Valves shall not be operated in either the opening or closing direction at differential pressures above the rated pressure.

- D. Test Pressure: Test the pipeline at 150 psi or 1.5 times the operating pressure, whichever is greater, measured at the lowest point for at least two hours. Maintain the test pressure within 5 psi of the specified test pressure for the test duration. Should the pressure drop more than 5 psi at any time during the test period, the pressure shall be restored to the specified test pressure. Provide an accurate pressure gauge with graduation not greater than 5 psi.

- E. Leakage
 - 1. Leakage shall be defined as the sum of the quantity of water that must be pumped into the test section, to maintain pressure within 5 psi of the specified test pressure for the test duration. Leakage shall be the total cumulative amount measured on a water meter.

 - 2. The Owner assumes no responsibility for leakage occurring through existing valves.

- F. Test Results: No test section shall be accepted if the leakage exceeds the limits determined by the following formula:

$$L = \frac{SD(P)^{1/2}}{133,200}$$

- Where:
- L = allowable leakage, in gallons per hour
 - S = length of pipe tested, in feet
 - D = nominal diameter of the pipe, in inches
 - P = average test pressure during the leakage test, in pounds psi

As determined under Section 4 of AWWA C600.

If the water main section being tested contains lengths of various pipe diameters, the allowable leakage shall be the sum of the computed leakage for each diameter. The leakage test shall be repeated until the test section is accepted. All visible leaks shall be repaired regardless of leakage test results.

- G. Completion: After a pipeline section has been accepted, relieve test pressure. Record type, size and location of all outlets on record drawings.

- H. Re-Testing: Any alterations made to pipeline performed after initial testing shall be re-tested and passed again, regardless of initial test results.

- I. Notification: Owner shall be notified 24-hours in advance prior to Contractor performing pressure and leakage testing.

3.10 DISINFECTING PIPELINE

- A. After successfully pressure testing each pipeline section, disinfect in accordance with AWWA C651 for the continuous-feed method and these Specifications. Before the main is chlorinated for disinfection, it shall be filled to eliminate air pockets and shall be flushed to remove particulates. A flushing velocity of not less than 2.5 feet/second is usually maintained in pipe sizes less than 24 inches in diameter. During line disinfection, all valves and hydrants shall be operated to ensure disinfection of the appurtenances.

- B. Specialty Contractor: Disinfection shall be performed by an approved specialty contractor. Before disinfection is performed, the Contractor shall submit a written procedure for approval before being permitted to proceed with the disinfection. This plan shall also include the steps to be taken for the neutralization of the chlorinated water.

- C. Chlorination
 - 1. Apply chlorine solution to achieve a concentration of at least 25 milligrams per liter free chlorine in new line. Retain chlorinated water for 24 hours.
 - 2. Chlorine concentration shall be recorded at every outlet along the line at the beginning and end of the 24-hour period.
 - 3. After 24 hours, all samples of water shall contain at least 10 milligrams per liter free chlorine. Re-chlorinate if required results are not obtained on all samples.

- D. Disposal of Chlorinated Water: Reduce chlorine residual of disinfection water to less than one milligram per liter if discharged directly to a body of water or to less than two milligrams per liter if discharged onto the ground prior to disposal. Treat water with sulfur dioxide or other reducing chemicals to neutralize chlorine residual. Flush all lines until residual is equal to existing system.

- E. Bacteriological Testing
 - 1. After final flushing and before the water main is placed in service, the Contractor shall collect samples from the line and have tested for bacteriological quality in accordance with the rules of the Georgia Department of Natural Resources, Environmental Protection Division.
 - 2. The Contractor shall give the Owner 48-hour written notice of the planned bacteriological testing. An Owner representative must be present when samples are taken. Immediately after samples are taken, the Contractor shall

give the samples to the Owner representative for handling. The Owner representative shall be responsible for delivering the samples to the laboratory for testing. The bacteriological samples shall be analyzed for both coliform and non-coliform growth. Testing shall be performed by a laboratory certified by the State of Georgia and approved by the Owner.

3. All sampling and testing costs shall be paid for by the Contractor prior to final acceptance.
4. Re-chlorinate lines until required results are obtained.

3.11 PROTECTION AND RESTORATION OF WORK AREA

- A. General: Return all items and all areas disturbed, directly or indirectly by work under these Specifications, to their original condition or better, as quickly as possible after work is started.
 1. The Contractor shall plan, coordinate, and prosecute the work such that disruption to personal property and business is held to a practical minimum.
 2. All construction areas abutting lawns and yards of residential or commercial property shall be restored promptly. Backfilling of underground facilities, ditches, and disturbed areas shall be accomplished on a daily basis as work is completed. Finishing, dressing, and grassing shall be accomplished immediately thereafter, as a continuous operation within each area being constructed and with emphasis placed on completing each individual yard or business frontage. Care shall be taken to provide positive drainage to avoid ponding or concentration of runoff.
 3. Handwork, including raking and smoothing, shall be required to ensure that the removal of roots, sticks, rocks, and other debris is removed in order to provide a neat and pleasing appearance.
 4. The Department of Transportation's engineer shall be authorized to stop all work by the Contractor when restoration and cleanup are unsatisfactory and to require appropriate remedial measures.
- B. Man-Made Improvements: Protect, or remove and replace with the Owner's approval, all fences, walkways, mail boxes, pipe lines, drain culverts, power and telephone lines and cables, property pins and other improvements that may be encountered in the Work.
- C. Cultivated Growth: Do not disturb cultivated trees or shrubbery unless approved by the Owner. Any such trees or shrubbery which must be removed shall be heeled in and replanted under the direction of an experienced nurseryman.

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- D. Cutting of Trees: Do not cut trees for the performance of the work except as absolutely necessary. Protect trees that remain in the vicinity of the work from damage from equipment. Do not store spoil from excavation against the trunks. Remove excavated material stored over the root system of trees within 30 days to allow proper natural watering of the root system. Repair any damaged tree over 3-inches in diameter, not to be removed, under the direction of an experienced nurseryman. All trees and brush that require removal shall be promptly and completely removed from the work area and disposed of by the Contractor. No stumps, wood piles, or trash piles will be permitted on the work site.
- E. Disposal of Rubbish: Dispose of all materials cleared and grubbed during the construction of the Project in accordance with the applicable codes and rules of the appropriate Owner, state and federal regulatory agencies.
- F. Swamps and Other Wetlands
1. The Contractor shall not construct permanent roadbeds, berms, drainage structures or any other structures which alter the original topographic features within the easement.
 2. All temporary construction or alterations to the original topography will incorporate measures to prevent erosion into the surrounding swamp or wetland. All areas within the easement shall be returned to their original topographic condition as soon as possible after work is completed in the area. All materials of construction and other non-native materials shall be disposed by the Contractor.
 3. The Contractor shall provide temporary culverts or other drainage structures, as necessary, to permit the free migration of water between portions of a swamp, wetland or stream which may be temporarily divided by construction.
 4. The Contractor shall not spread, discharge or dump any fuel oil, gasoline, pesticide, or any other pollutant to adjacent swamps or wetlands.

END OF SECTION

PART 1 GENERAL

1.01 SUMMARY

- A. Scope: This item shall govern for the installation of new water service connections to new mains and the transfer of existing water services to new mains.

PART 2 PRODUCTS

A. Materials:

1. Service Pipe: Service pipe shall be 3/4" polyethylene, 200 psi.
2. Fittings: Fittings for service tubing shall be of the required sizes, and shall be standard waterworks fittings for 3/4" polyethelene.
3. Corporation Stops: Corporation stops shall be Mueller No. H-15008 or Ford F-1000.
4. Meter Yoke: Meter yoke shall be Ford LSV-HH11-233 W.
5. Service Clamps: Service clamps shall be single strap tapping saddle, JCM 403.
6. Meter: Meter shall be Badger, all bronze.
7. Meter Box: Meter box shall be PVC with cast iron lid.

PART 3 EXECUTION

3.01 CONSTRUCTION METHODS

- A. Installation of corporation stop on PVC pipe shall be made with the use of a service clamp of the proper size to fit the main. All service clamps, taps and corporation stop shall in installed before the new main has been tested and sterilized. All service connections shall be made after the new main has been tested and sterilized.
- B. Water meter, complete shall consist of connecting the new main, installing a new corporation stop, installing new curb stop, meter and meter box, tying new service pipe to the new meter and backfilling all trenches. This work shall be performed at the contract unit price for each new service and water

New Metered Services and Transfer of Services

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meter.

- C. All service pipe required to complete the new water service shall be provided as specified on the drawings. This work shall be performed at the contract unit price for 3/4" service pipe, Schedule 200.
- D. The Contract shall tunnel under pavements, sidewalks and curbing for the placement of services unless otherwise noted on the plans.

3.02 TRANSFER OF SERVICES

- A. The Contractor shall perform the transfer of services in a manner to avoid extended water outages to residents and businesses in the area. The new water mains shall be installed and tied-in before transferring any services. After the new main is tested and sterilized, the contractor shall transfer water services to the new main and then make the remaining connections to existing mains as required. Existing service connections shall be cut off at the curb stop and disconnected from the existing service line when the new service line is ready to be connected.
 - 1. Transfer of a service shall consist of tapping the new main, installation of corporation cock, curb stop, meter and meter box and tying to the existing service line. The curb stop on the existing service line shall be closed when the new service connection is ready to be installed. The Contractor shall install the new corporation cock, curb stop, service line, meter, meter box and any miscellaneous appurtenances to complete the transfer.
 - 2. At locations where existing water main and services are to be abandoned, Contractor shall locate, disconnect, plug and abandon existing service laterals outside existing pavement area. Contractor will not be required to disconnect existing services at abandoned main.
 - 3. Contractor shall note the type of existing service tubing and location. In transferring services, contractor may encounter 3/4" copper tubing, galvanized pipe or polyvinylchloride pipe. Contractor shall furnish and install a new 3/4" corporation cock, 3/4" PVC piping, and necessary fitting to tie the existing service line.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Seeding, planting grass, and fertilizing graded areas behind the structures, pipeline rights-of-way, roadway shoulders and other disturbed areas.
- B. Seed protection.
- C. Maintaining seeded areas until final acceptance.

1.02 RELATED WORK

Section 02125 – Erosion and Sedimentation Control

1.03 DELIVERY, STORAGE, AND HANDLING

- A. Deliver grass seed in original containers showing analysis of seed mixture, percentage of pure seed, year of production, net weight, date of packaging and location of packaging. Damaged packages are not acceptable.
- B. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer. Damaged bags are not acceptable.
- C. Deliver sod on pallets.
- D. All material shall be acceptable to Engineer prior to use.

1.04 PLANTING DATES

This specification provides for the establishment of a permanent grass cover between the dates of March 1 and September 30. If finished earth grades are not completed in time to permit planting and establishment of the permanent grass during the favorable season between the dates specified above unless otherwise accepted, the Contractor will be required to plant a temporary cover to protect the new graded areas from erosion and to keep windborne dust to a minimum. The temporary cover shall be planted between October 1 and February 28 unless otherwise permitted.

PART 2 PRODUCTS

2.05 SOD

Sod shall be densely rooted, good quality centipede grass, free from noxious weeds. The sod shall be obtained from areas where the soil is reasonably fertile. The sod shall be raked free of all debris and the grass mowed to two inches before cutting. The sod shall contain practically all of the dense root system and not be less than one (1) inch thick. Sod shall be cut in uniform strips not less than twelve (12) inches in width and not less than twenty-four (24) inches in length.

2.06 ACCESSORIES

- A. Straw Mulch: Oat or wheat straw, reasonably free from weeds, foreign matter detrimental to plant life, and in dry condition.
- B. Excelsior Mulch: Excelsior mulch shall consist of wood fibers cut from sound, green timber. The average length of the fibers shall be 4 to 6 inches. The cut shall be made in such a manner as to provide maximum strength of fiber, but at a slight angle to the natural grain of the wood so as to cause splintering of the fibers when weathering in order to provide adherence to each other and to the soil.
- C. Wood cellulose fiber shall be made from wood chip particles manufactured particularly for discharging uniformly on the ground surface when dispersed by a hydraulic water sprayer. It shall remain in uniform suspension in water under agitation and blend with grass seed and fertilizer to form a homogenous slurry. The mulch fibers shall intertwine physically to form a strong moisture holding mat on the ground surface and allow rainfall to percolate into the underlying soil. The mulch shall be heat processed so as to contain no germination or growth-inhibiting factors. It shall be dyed (non-toxic) an appropriate color to facilitate metering of material.

2.07 PRODUCT REVIEW

The Contractor shall provide the Engineer with a complete description of all products before ordering. The Engineer will review all products before they are ordered.

PART 3 EXECUTION

3.01 PREPARATION

- A. The areas to be seeded shall be made smooth and uniform and shall conform to the finished grade indicated on the plans.
- B. Remove foreign materials, plants, roots, stones, and debris from surfaces to be seeded.
- C. Grassing areas, if not loose, shall be loosened to a minimum depth of 3-inch before fertilizer, seed or sod is applied.

3.02 STAND OF GRASS

- A. Before acceptance of the seeding performed for the establishment of permanent vegetation, the Contractor will be required to produce a satisfactory stand of perennial grass whose root system shall be developed sufficiently to survive dry periods and the winter weather and be capable of re-establishment in the spring.
- B. Before acceptance of the seeding performed for the establishment of temporary vegetation, the Contractor will be required to produce a stand of grass sufficient to control erosion for a given area and length of time before the next phase of construction or the establishment of permanent vegetation is to commence.

3.03 SEEDING DATES

Seeding shall be performed during the periods and at the rates specified in the seeding schedules. Seeding work may, at the discretion of the Contractor, be performed throughout the year using the schedule prescribed for the given period. Seeding work shall not be conducted when the ground is frozen or excessively wet. The Contractor will be required to produce a satisfactory stand of grass regardless of the period of the year the work is performed.

3.04 APPLYING LIME AND FERTILIZER

Following advance preparation and placing selected material for shoulders and slopes, lime, if called for based on soil tests and fertilizer, shall be spread uniformly over the designated areas and shall be thoroughly mixed with the soil to a depth of approximately 2-inches. Fertilizer shall be applied at the rate of 500 pounds per acre for the initial application unless otherwise directed by the Engineer. Lime shall be applied at the rate determined by the soil test. Unless otherwise provided, lime will not be applied for temporary seeding. In all cases where practicable, acceptable mechanical spreaders shall be used for spreading

fertilizer. On steep slopes subject to slides and inaccessible to power equipment, the slopes shall be adequately scarified. Fertilizer may be applied on steep slopes by hydraulic methods as a mixture of fertilizer and seed. When fertilizer is applied with combination seed and fertilizer drills, no further incorporation will be necessary. The fertilizer and seed shall be applied together with Wood Cellulose

Fiber Mulch is used. Any stones larger than 2-1/2 inches in any dimension, larger clods, roots, or other debris brought to the surface shall be removed.

3.05 SEEDING

- A. Seed shall be sown within 24 hours following the application of fertilizer and lime and preparation of the seedbed as specified in Section 3.4. Seed shall be uniformly sown at the rate specified by the use of acceptable mechanical seed drills. Rotary hand seeders, power sprayers or other satisfactory equipment may be used on steep slopes or on other areas that are inaccessible to seed drills.
- B. The seeds shall be covered and lightly compacted by means of cultipacker or light roller if the drill does not perform this operation. On slopes inaccessible to compaction equipment, the seed shall be covered by dragging spiked chains, by light harrowing or by other satisfactory methods.
- C. Apply water with fine spray immediately after each area has been sown.
- D. Do not sow seed when ground is too dry, during windy periods or immediately following a rain.
- E. If permitted by the special provisions, wood cellulose fiber mulch or excelsior fiber mulch may be used.

3.06 SEED PROTECTION (STRAW MULCH)

All seeded areas seeded with permanent grasses shall be uniformly mulched in a continuous blanket immediately following seeding and compacting operations, using at least 2 tons of straw per acre.

3.07 SEED PROTECTION (EXCELSIOR MULCH)

Seed shall be sown as specified in Section 3.5. Within 24 hours after the covering of seed, excelsior mulch shall be uniformly applied at the rate of 2 tons per acre. The mulch may be applied hydraulically or by other acceptable methods. Should the mulch be placed in a dry condition, it shall be thoroughly wetted immediately after placing. The Engineer may require light rolling of the mulch to form a tight mat.

3.08 SEED PROTECTION (WOOD CELLULOSE FIBER MULCH)

After the lime has been applied and ground prepared as specified in Section 3.4, wood cellulose fiber mulch shall be applied at the rate of 1,500 pounds per acre in a mixture of seed and fertilizer. Hydraulic equipment shall be used for the application of fertilizer, seed, and slurry of the prepared wood pulp. This equipment shall have a built-in agitation system with an operating capacity sufficient to agitate, suspend, and homogeneously mix a slurry of the specified amount of fiber, fertilizer, seed and water. The slurry distribution lines shall be large enough to prevent stoppage. The discharge line shall be equipped with a set of hydraulic spray nozzles which will provide an even distribution of the slurry on the various areas to be seeded. The slurry tank shall have a minimum capacity of 1,000 gallons.

The seed, fertilizer, wood pulp mulch, and water shall all be combined into the slurry tank for distribution of all ingredients in one operation by the hydraulic seeding method specified herein. The materials shall be combined in a manner recommended by the manufacturer. The slurry mixture shall be so regulated that the amounts and rates of application shall result in a uniform application of all materials at rates not less than the amount specified. Using the color of the wood pulp as a guide, the equipment operator shall spray the prepared seedbed with a uniform visible coat. The slurry shall be applied in a sweeping motion, in an arched stream so as to fall like rain, allowing the wood fibers to build upon each other until an even coat is achieved.

3.09 SODDING

- A. Sod shall be placed between March 1st and December 1st.
- B. Sod shall be placed within 48 hours of cutting.
- C. Sod shall be moist when laid and placed on moist ground. The sod shall be carefully placed by hand, beginning at the toe of slopes and working upwards. The length of the strips shall be at right angles to the flow of surface water. All joints shall be tightly butted and end joints shall be staggered at least 12 inches. The sod shall be immediately pressed firmly into the ground by tamping or rolling. Fill all joints between strips with fine screened soil. Sod on slopes shall be pegged with sod pegs to prevent movement. The sod shall be watered, mowed, weeded, repaired, or otherwise maintained, to insure the establishment of a uniform healthy stand of grass until acceptance.

Grassing

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3.10 MAINTENANCE

- A. Maintain seeded surfaces until final acceptance.
- B. Maintenance shall consist of providing protection against traffic, watering to ensure uniform seed germination and to keep surface of soil damp, and repairing any areas damaged as a result of construction operations or erosion.

3.11 ACCEPTANCE

Before acceptance of the seeding performed for the establishment of permanent vegetation, the Contractor will be required to produce a satisfactory stand of perennial grass whose root system shall be developed sufficiently to survive dry periods and the winter weather and be capable of reestablishment in the spring.

END OF SECTION

PART 1 – GENERAL

1.01 Work Included

The work specified in this section consists of furnishing and installing underground utilities using the directional boring (horizontal directional drilling, HDD) method of installation, also commonly referred to as guided horizontal boring. This work shall include all services, equipment, materials, and labor for the complete and proper installation, testing, restoration of underground utilities and environmental protection and restoration.

1.02 Quality Assurance

The requirements set forth in this document specify a wide range of procedural precautions necessary to ensure that the very basic, essential aspects of a proper directional bore installation are adequately controlled. Strict adherence shall be required under specifically covered conditions outlined in this specification. Adherence to the specifications contained herein, or the Engineer's approval of any aspect of any directional bore operation covered by this specification, shall in no way relieve the Contractor of their ultimate responsibility for the satisfactory completion of the work authorized under the Contract.

1.03 Submittals

- A. **WORK PLAN:** Prior to beginning work, the Contractor must submit to the Engineer a general work plan outlining the procedure and schedule to be used to execute the project. Plan should document the thoughtful planning required to successfully complete the project.
- B. **EQUIPMENT:** Contractor will submit specifications on directional boring equipment to be used to ensure that the equipment will be adequate to complete the project. Spares inventory shall be included.
- C. **MATERIAL:** Specifications on material to be used shall be submitted to Engineer. Material shall include the pipe, fittings and any other item which is to be an installed component of the project.
- D. **PERSONNEL:** Documentation of training and relevant experience of personnel shall be submitted.

PART 2 - EQUIPMENT REQUIREMENTS

2.01 General

The directional boring equipment shall consist of a directional boring rig of sufficient capacity to perform the bore and pullback the pipe, a boring fluid mixing & delivery system of sufficient capacity to successfully complete the crossing, a guidance system to accurately guide boring operations and trained and competent personnel to operate the system. All equipment shall be in good, safe operating condition with sufficient supplies, materials and spare parts on hand to maintain the system in good working order for the duration of this project.

- A. BORING RIG: The directional boring machine shall consist of a hydraulically powered system to rotate, push and pull hollow drill pipe into the ground at a variable angle while delivering a pressurized fluid mixture to a guidable drill (bore) head. The machine shall be anchored to the ground to withstand the pulling, pushing and rotating pressure required to complete the crossing. The hydraulic power system shall be self-contained with sufficient pressure and volume to power boring operations. Hydraulic system shall be free of leaks. Rig shall have a system to monitor and record maximum pull-back pressure during pull-back operations. The rig shall be grounded during boring and pull-back operations. Sufficient spares shall be kept on hand for any break-downs which can be reasonably anticipated.
- B. BORE HEAD: The bore head shall be steerable by changing it's rotation and shall provide the necessary cutting surfaces and boring fluid jets.
- C. MUD MOTORS (if required): Mud motors shall be of adequate power to turn the required boring tools.
- D. DRILL PIPE: Shall be constructed of high quality 4130 seamless tubing, grade D or better, with threaded box and pins. Tool joints should be hardened to 32-36 RC.

2.03 Guidance System

The Guidance System shall be of a proven type and shall be setup and operated by personnel trained and experienced with this system. The Operator shall be aware of any magnetic anomalies and shall consider such influences in the operation of the guidance system if using a magnetic system.

2.04 Boring Fluid (Mud) System

- A. MIXING SYSTEM: A self-contained, closed, boring fluid mixing system shall be of sufficient size to mix and deliver boring fluid composed of

bentonite clay, potable water and appropriate additives. Mixing system shall be able to molecularly shear individual bentonite particles from the dry powder to avoid clumping and ensure thorough mixing. The boring fluid reservoir tank shall be a minimum of 300 gallons. Mixing system shall continually agitate the boring fluid during boring operations.

- B. Boring FLUIDS: Drilling fluid shall be composed of clean water and an appropriate additive. Water shall be from a clean source with a pH of 8.5 - 10. Water of a lower pH or with excessive calcium shall be treated with the appropriate amount of sodium carbonate or equal. The water and additives shall be mixed thoroughly and be absent of any clumps or clods. No hazardous additives may be used. Boring fluid shall be maintained at a viscosity sufficient to suspend cuttings and maintain the integrity of bore wall.
- C. DELIVERY SYSTEM: The mud pumping system shall have a minimum capacity of 160 GPM and be capable of delivering the boring fluid at a constant maximum fluid pressure of 40 psi or as recommended by manufacturer. The delivery system shall have filters in-line to prevent solids from being pumped into the drill pipe. Connections between the pump and drill pipe shall be relatively leak-free. Used boring fluid and boring fluid spilled during boring operations shall be contained and properly disposed of. A berm, minimum of 12" high, shall be maintained around boring equipment, boring fluid mixing system, entry and exit pits and boring fluid recycling system (if used) to prevent spills into the surrounding environment. Pumps and or vacuum truck(s) of sufficient size shall be in place to convey excess boring fluid from containment areas to storage facilities.

2.05 Other Equipment:

- A. PIPE ROLLERS: Pipe rollers, if required, shall be of sufficient size to fully support the weight of the pipe while being hydro-tested and during pull-back operations. Sufficient number of rollers shall used to prevent excess sagging of pipe.
- B. PIPE RAMMERS/PULLERS: Hydraulic or pneumatic pipe rammers or pullers may only be used if necessary and with the authorization of Engineer.

Other devices or utility placement systems for providing horizontal thrust other than those previously defined in the preceding sections shall not be used unless approved by the Engineer prior to commencement of the work. Consideration for approval will be made on an individual basis for each specified location. The proposed device or system will be evaluated prior to approval or rejection on its potential ability to complete the utility placement satisfactorily without undue stoppage and to maintain line and grade within the tolerances prescribed by the particular conditions of the project.

PART 3 – OPERATIONS

3.01 General

The Engineer must be notified 48 hours in advance of starting work. The Directional Bore shall not begin until the Engineer is present at the job site and agrees that proper preparations for the operation have been made. The Engineer approval for beginning the installation shall in no way relieve the Contractor of the ultimate responsibility for the satisfactory completion of the work as authorized under the Contract. It shall be the responsibility of Engineer to provide inspection personnel at such times as appropriate without causing undue hardship by reason of delay to the Contractor.

3.02 Personnel Requirements

All personnel shall be fully trained in their respective duties as part of the directional boring crew and in safety. Training shall be provided specific to the project if any potential hazards may be encountered which has not already been included in personnel's training.

3.03 Boring Procedure

A. **SITE PREPARATION:** Prior to any alterations to work-site, contractor shall photograph or video tape entire work area, including entry and exit points. One copy of which shall be given to Engineer and one copy to remain with contractor for a period of one year following the completion of the project.

Work site as indicated on drawings, within right-of-way, shall be graded or filled to provide a level working area. No alterations beyond what is required for operations are to be made. Contractor shall confine all activities to designated work areas.

B. **BORE PATH SURVEY:** Entire drill path shall be accurately surveyed with entry and exit stakes placed in the appropriate locations within the areas indicated on drawings. If contractor is using a magnetic guidance system, drill path will be surveyed for any surface geo-magnetic variations or anomalies.

C. **ENVIRONMENTAL PROTECTION:** Contractor shall place silt fence between all boring operations and any drainage, wetland, waterway or other area designated for such protection by contract documents, state, federal and local regulations. Additional environmental protection necessary to contain any hydraulic or boring fluid spills shall be put in place, including berms, liners, turbidity curtains and other measures. Contractor shall adhere to all applicable environmental regulations. Fuel or oil may not be stored in bulk containers within 200' of any water-body or wetland.

- D. **UTILITY LOCATES:** Contactor shall notify all companies with underground utilities in the work area via the state or local “one-call” to obtain utility locates. Once the utilities have been located Contractor shall physically identify the exact location of the utilities by vacuum or hand excavation, when possible, in order to determine the actual location and path of any underground utilities which might be within 20 feet of the bore path. Contractor shall not commence boring operations until the location of all underground utilities within the work area have been verified.
- E. **SAFETY:** Contractor shall adhere to all applicable state, federal and local safety regulations and all operations shall be conducted in a safe manner. Safety meetings shall be conducted at least weekly with a written record of attendance and topic submitted to Engineer.
- F. **PIPE:** Pipe shall be connected together in one length prior to pull-back operations, if space permits. Steel pipe welds will be X-rayed prior to being placed in bore hole. Pipe will be placed on pipe rollers before pulling into bore hole with rollers spaced close enough to prevent excessive sagging of pipe.
- G. **PILOT HOLE:** Pilot hole shall be drilled on bore path with no deviations greater than 5% of depth over a length of 100’. In the event that pilot does deviate from bore path more than 5% of depth in 100’, contractor will notify Engineer and Engineer may require contractor to pull-back and re-drill from the location along bore path before the deviation.
- H. In the event that a boring fluid fracture, inadvertent returns or returns loss occurs during pilot hole boring operations, contractor shall cease boring, wait at least 30 minutes, inject a quantity of boring fluid with a viscosity exceeding 120 seconds as measured by a Marsh funnel and then wait another 30 minutes. If mud fracture or returns loss continues, contractor will cease operations and notify Engineer. Engineer and contractor will discuss additional options and work will then proceed accordingly.
- I. **REAMING:** Upon successful completion of pilot hole, contractor will ream bore hole to a minimum of 25% greater than outside diameter of pipe using the appropriate tools. Contractor will not attempt to ream at one time more than the boring equipment and mud system are designed to safely handle.
- J. **PULL-BACK:** After successfully reaming bore hole to the required diameter, contractor will pull the pipe through the bore hole. In front of the pipe will be a swivel. Once pull-back operations have commenced, operations must continue without interruption until pipe is completely pulled into bore hole. During pull-back operations contractor will not apply more than the maximum safe pipe pull pressure at any time.

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K. In the event that pipe becomes stuck, contractor will cease pulling operations to allow any potential hydro-lock to subside and will commence pulling operations. If pipe remains stuck, contractor will notify Engineer. Engineer and contractor will discuss options and then work will proceed accordingly.

3.04 Pipe Testing

Following successful pull-back of pipe, contractor will hydro-test pipe using potable water for a period of 2 hours at a pressure of 150 psi. A calibrated pressure recorder will be used to record the pressure during the test period. This record will be presented to Engineer.

After successful completion of hydro-test, watermain will be flushed before final tie-in.

3.05 Site Restoration

Following boring operations, contractor will de-mobilize equipment and restore the work-site to original condition. All excavations will be backfilled and compacted to 95% of original density. Landscaping will be restored to original.

3.06 Record Keeping, As-Builts

Contractor shall maintain a daily project log of boring operations and a guidance system log with a copy given to Engineer at completion of project. As-built drawings shall be certified as to accuracy by contractor.

Third-party verification of as-built drawings may be done, at owner's expense.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. pH Adjusters.
2. Soil Conditioners.
3. Fertilizer.
4. Pesticides.
5. Application of topsoil.
6. Landscape grading.

B. Related Documents: The Contract Documents, as defined in Section 01110 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other documents.

C. Related Sections:

1. Section 02200 - Earthwork: Topsoil.

1.2 SUBMITTALS

A. Section 01330 - Submittal Requirements: Procedures for submittals.

1. Product Data: Manufacturer's data including installation and storage instructions for each product specified.
2. Assurance/Control Submittals:
 - a. Pesticide Control Plan: Proposed sequence of pesticide work. Include common name, chemical composition, formulation, concentration, rate and method of application, for all products furnished; and names of state certified applicator(s), in the appropriate category.
 - b. Test Reports: Topsoil composition, in duplicate.
 - c. Certifications: In duplicate.
 - d. Certification: Certify that topsoil, peat, lime, aluminum sulfate perlite and vermiculite conform with requirements specified.

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- e. Field Reports: Pesticide application, in duplicate.
- f. Qualification Documentation: Pesticide applicator documentation of experience indicating compliance with specified qualification requirements.

1.3 QUALITY ASSURANCE

- A. Applicator Qualification: Applicator specializing in performing Work of this Section with minimum 5 years documented experience.
 - 1. Pesticide applicator; state certified, using procedures, materials and equipment of type required for Work.
- B. Regulatory Requirements: Conform to applicable requirements of the Local and State Department of Agriculture Extension Service of the state in which the project is located.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Section 01600 - Product Requirements: Transport, handle, store, and protect Products.
- B. Deliver materials to job site in unopened containers bearing manufacturer's name and content identification, Environmental Protection Agency (EPA) registration number and manufacturer's registered uses.
- C. Store materials as recommended by manufacturer.

1.5 PROJECT CONDITIONS OR SITE CONDITIONS

- A. Environmental Requirements:
 - 1. Protection of Personnel Property: Apply pesticides so damage will not result to personnel or property from wither direct spray of drifting of chemicals both on and off site.
 - 2. Disposal of Excess Chemicals and Containers: In accordance with Federal, State laws and local rules and regulations.

PART 2 PRODUCTS

2.1 TOPSOIL

- A. Specified in Section 02300.

2.2 pH ADJUSTERS

- A. Lime:
 - 1. Commercial grade hydrated limestone containing not less than 50 percent of total oxides, 25 percent calcium, and 25 percent magnesium oxide.
 - 2. Gradation: Minimum 75 percent passing 100-mesh sieve and 100 percent passing 20-mesh sieve.
- B. Ferrous Sulfate: Commercial grade.

2.3 SOIL CONDITIONERS

- A. Use singly or in combinations required to meet requirements for topsoil.
- B. Soil Conditioners: Nontoxic to plants.
- C. Peat:
 - 1. Peat moss derived from a freshwater site and conforming to ASTM D 2607 as modified herein.
 - 2. Shred and granulate peat to pass 1/2 inch mesh screen and condition in storage pile for minimum six months after excavation.
- D. Sand: Clean and free of materials harmful to plants.
- E. Perlite: Horticultural grade for planters.
- F. Vermiculite: Horticultural grad for planters.
- G. Rotted Manure:

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1. Well rotted horse or cattle manure containing maximum 25 percent by volume of straw, sawdust, or other bedding materials; free of stones, sticks and soil.

H. Composted Wood Derivatives:

1. Ground bark, sawdust, or other wood waste material free of stones, sticks, and soil stabilized with nitrogen having the following properties:

- a. Particle Size: Minimum percent by weight passing:

| | |
|-------------------|------------|
| No. 4 mesh screen | 95 percent |
| No. 8 mesh screen | 80 percent |

- b. Nitrogen Content: Minimum percent based on dry weight:

| | |
|------------------|-------------|
| Redwood Sawdust | 0.5 percent |
| Fir Sawdust | 0.7 percent |
| Fir or Pine Bark | 1.0 percent |

I. Calcined Clay:

1. Granular particles produced from montmorillonite clay calcined to minimum temperature or 1200 degrees F to the following graduation:

- a. Minimum 90 percent passing 8-mesh screen.

- b. 99 percent retained on 60-mesh screen.

- c. Maximum 2 percent passing 100-mesh screen.

2. Bulk Density: 40 pounds maximum per cubic foot.

2.4 FERTILIZER

- A. Specified in Section 02920 and 02930.

2.5 PESTICIDES

- A. Soil Fumigant, Herbicide, Insecticide, and Fungicide: EPA registered and approved, for pre-emergence and broadleaf weed control.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01700 - Execution Requirements: Verification of existing conditions before starting work.
- B. Verification of Conditions: Verify that field measurements, surfaces, and conditions are as required, and ready to receive Work.
- C. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.

3.2 PREPARATION

- A. Subgrade:
 - 1. After areas required to be landscaped have been brought to required subgrade, thoroughly till to minimum depth of 6 inches by scarifying, disking, harrowing, or other approved methods.
 - 2. Remove debris and stones larger than one inch in any dimension remaining on surface after tillage.

3.3 TOPSOIL APPLICATION

- A. Immediately prior to placing topsoil, scarify subgrade to a 2-inch depth for bonding of topsoil with subsoil.
- B. Lawns: Spread topsoil evenly to indicated depth. Do not spread topsoil when frozen or excessively wet or dry.
- C. Plant Beds: Till to minimum depth of 6 inches. Spread manure uniformly over bed to minimum depth of 6 inches and thoroughly incorporate into existing soil to a minimum depth of 6 inches to obtain a uniform and well pulverized soil mix. During tillage operations remove all sticks, stones, roots, and other objectionable

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- materials, Bring plant beds to a smooth and even surface conforming to established grades.
- C. Plant Beds: Excavate existing soil in plant beds to minimum depth of 4 inches and replace with topsoil. Bring plant beds to smooth and even surface conforming to established grades.
 - D. Correct irregularities in finished surfaces to eliminate depressions.
 - E. Protect finished topsoil areas from damage by vehicular or pedestrian traffic.

3.4 FERTILIZER, pH ADJUSTERS, AND SOIL CONDITIONERS

- A. Application:
 - 1. Apply fertilizer, pH adjuster, and soil conditioner at rates and analysis determined by laboratory soil tests of soils at job site.
- B. Tillage: Incorporate fertilizer, pH adjusters, and soil conditioners into soil to minimum depth of 6 inches. This may be done as part of the subgrade tillage operation specified above.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE OF WORK (Athletic Fields)

Refer to Specification Section 01010 for a detailed description of the work.

A. Purchase & Installation of Sod on athletic fields Including Ground Preparation

Sod amounts and configuration will vary from field to field. Sodding locations and quantities will vary based on decisions made by Jones County staff. Contractor shall submit cost per square foot to prepare ground, provide and install **Tifway (Tifton 419) Bermuda grass sod.**

Sodding of Athletic Fields generally occurs May through early August. A schedule will be developed and mutually agreed upon by the contractor and the County Representative. Contractor must be able to demonstrate Athletic Field and laser grading experience. The method necessary to prepare the area will be at the discretion of the County representative.

PART 2 MATERIALS & EXECUTION

2.1 Athletic Field Sodding

A. Ground Preparation

1. Mechanically remove all existing vegetation from field. Contractor is responsible for hauling and disposal of spoils from site or distributing spoils on site per direction of County representative; prepare the soil root zone and sub-grade to accept the new sod as per specifications below.
2. Spoils should be removed from the field or area to be sodded in a manner that would minimize the amount of wear to the existing turf. Contractor is responsible for damage to existing turf, therefore should make arrangements to minimize the amount of traffic on and off the fields or surrounding grounds.
3. All sports fields and areas to receive sod will be roto-tilled at 5” in depth and will require the large and powerful roto-tiller specified later in this document. It shall be a minimum of 350 horsepower with a minimum of a 4’ high by 8’ wide tilling drum capable of 3-4 revolutions per second at the hub.
4. Two passes in slightly different directions will be required.

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5. The specified tiller will create a 15-18% fluff which will need to be wheel rolled (tracked) after each of 2 tilling passes. This is a critical step in this process and can be done with a soft tired or wobble wheel packer used in road building or a tractor with wide turf tires.

B. Laser Graded Areas

1. The Contractor and Jones County will determine together when laser grading is required. If required, it will then be paid per the square foot price on the bid schedule.
2. Field sub-grade may be laser graded to achieve original drainage patterns of field (direct storm water to existing drainage structures or off field, as required for positive/proper drainage for finished grade after sod installation). Percentage of fall shall be as shown on the grading and drainage plan with minor modification.
3. All sports fields and areas to receive sod shall be rough graded or dressed with a motor grader to within 1/10th ft.
4. All sports fields shall then have the subgrade and final grade laser graded with the laser controlled grader and then laser graded with a laser controlled box scraper set at its highest accuracy to achieve + or - .25” (inches)

C. Areas not requiring Laser Grading

The existing ground shall be graded and leveled to an elevation which will allow the placement of the sod and also allow the final elevation of the sod to drain. All irregularities or depression in the surface BL050-14 Page 3 due to weathering or other causes shall be filled or smoothed out before the sod is placed. If the existing surface has become hardened or crusted, it shall be disked or roto-tilled to break up so as to provide a bond with the sod applied. The area will be squared and shall be worked until relatively free from debris and stones.

Immediately prior, but not in excess of 24 hours before the sod is placed, the soil surface shall be worked until it is relatively free from debris, washes, gullies, clods and stones and conforms to a grade which is the thickness of the sod below the established grade.

- D. Sod shall be **Bermuda Tifway (Tifton 419)** or an approved equal, harvested within 24 hours prior to delivery and installed within a period of 36 hours after delivery. Sod shall not be harvested or transported when moisture content

(excessively dry or wet) may adversely affect its survival. Any sod that has dried out will be rejected and removed from the site by the contractor. Sod shall be machine cut at a uniform soil thickness of 1" inch, plus or minus ¼" inch. Measurement of thickness shall be based on the actual soil mat or backing of the sod, and shall exclude top growth and any thatch. Sod must be fresh cut and free of any undesirable weeds or weedy grasses.

Standard size sections of sod shall be strong enough to support their own weight and retain their size and shape when suspended vertically from a firm grasp on the upper 10 percent of the section.

Remove reinforcing mesh, if any, prior to installation.

Contractor must provide a loader to unload and place sod. Installation shall not be performed over the weekend except in rare instances when mutually agreed upon by both Contractor and Jones County, as irrigation needs may be difficult to provide. Prep work can be performed over the weekend. Installation shall be performed during daylight hours only.

Sod is to be installed with smooth, tight joints. The sod shall be placed on the prepared surface with the edges in close contact and alternate courses staggered. The sod shall be tamped or rolled and the edges or ends of any voids shall be top dressed. The entire sodded area shall be rolled so that it is of uniform appearance, true to established grade and of even surface without depressions or mounds with a professional appearance.

Contractor shall guarantee that the sod after proper installation, along with timely irrigation and adequate fertilization, will grow in and properly cover sodded area within agreed time frame, or contractor shall replace and replant at no additional cost to the County. This would include disease and unwanted infestations.

E. Work Hours

Contractor must utilize sufficient manpower to ensure each field requiring sod installation was started on a Monday is completed by Friday of the same week.

Contractor will be responsible for locating and adjusting irrigation heads and lines prior to and during the execution of this work. The County also will be responsible for locating all other utilities prior to beginning the work. The Contractor will be responsible for payment of any repair work necessary if previously marked/located items are damaged by the Contractor.

At a pre-determined gate or point of entry, Jones County will allow contractor to

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lock/secure the jobsite in conjunction with the County's lock during the extent of the project. This will be communicated and agreed upon prior to the start of any project, and the Contractor must remove their locks at the completion of each project.

F. Irrigation

Watering quantities and schedules shall be communicated and mutually agreed upon by Contractor and staff daily to ensure proper irrigation. Post planting irrigation of any area within the bounds of the loop road will be the responsibility of the Contractor until all onsite installations are completed and accepted by the County.

G. General Requirements

- A. References Interested bidders should include three references with a copy of their bid. Failure to submit three references either at the time of bid or upon request will be grounds to deem the bidder non-responsive. These references should demonstrate the Contractor's ability to perform on demand services of a similar size and scope.
- B. There shall be at least one person, in a position of responsibility, representing the Contractor on site at all times that is capable of translating from English to languages used by the work force.
- C. Contractor's references must demonstrate a minimum of 5 years' experience sodding athletic fields and laser grading.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

Under this heading shall be included designing, furnishing, constructing, adjusting, and maintenance of all concrete formwork required for the reinforced concrete shown on the Plans in accordance with the requirements of these Specifications.

1.02 GENERAL

Forms shall be constructed to conform to the shape, form, line and grade indicated on the Contract Drawings, or required by approved equipment, shall be mortar tight, and shall be maintained sufficiently rigid to prevent deformation under load. Forms shall conform to ACI 347.

Proper provision shall be made for all openings, offsets, sinkages, recesses, anchorage, reglets, chamfers, blocking and other features of the work as indicated and required to be incorporated in the concrete work. Formwork required to provide openings in the concrete to accommodate mechanical and electrical work shall be provided under this Section and all cutting, repairing and patching of forms or concrete required to permit such installations shall also be done under this Section.

When other work is indicated to be anchored in the concrete, all such items shall be accurately set in place and securely supported in the form before concrete is placed.

Formwork shall be constructed so that the final concrete surfaces will conform to the specified tolerances and also to the requirements of the Article entitled, in Section 03100. There shall be provisions for adjustment of forms as concrete is placed, and the forms shall be adjusted as necessary as the placement work proceeds.

1.03 DESIGN

The Contractor shall be completely responsible for the design and structural safety of the Formwork, shoring and bracing, and shall include in the design of the forms, a reasonable factor of safety. Design shall include consideration of all dead and live loads, which will be exerted on the formwork during its period of use and shall be in accordance with ACI 347. The following minimum design loads shall be used in the design of forms and formwork:

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A. Vertical Loads

Vertical loads shall include dead loads consisting of the weight of formwork and the weight of freshly placed concrete and all live loads including the weight of workmen, equipment, materials, runways and impact.

B. Horizontal Loads

Horizontal loading shall include but not be limited to, wind, cable tension, inclined supports, placement of concrete, and starting and stopping of equipment. Wall forms shall be designed in accordance with American National Standard A58.1, "Minimum Design Loads for Buildings and Other Structures," or those required by local building codes, whichever is greatest. Bracing for wall forms shall be designed for a minimum horizontal load of 100 pounds per linear foot of wall, applied at the top.

Lateral pressure of concrete containing no pozzolans or admixtures, having a slump of 4 inches or less, made with Type I cement weighing 150 pounds per cubic foot, and normal internal vibration shall be calculated on the basis of

$$p = 150h$$

where "p" is the lateral pressure in pounds per square foot and "h" is the height of fresh concrete above the point considered in feet. Adjustment shall be made in design of forms for concrete having characteristics different from those described above or for external vibration of forms.

C. Submittal

The Contractor will not be required to submit shop drawings or design calculations for approval. However, in the event that the Engineer requests the design calculations on any part of the formwork, the Contractor shall submit such calculations for review. Such design calculations found not to be in accordance with the criteria specified herein or the failure to provide such calculations upon request from the Engineer shall be cause for all concreting operations to be suspended until design requirements are completed. Review of design calculations or the absence of review will in no respect relieve the Contractor of the responsibility for formwork design or the liability, which may result from improper design or the absence thereof.

PART 2 PRODUCTS

2.01 MATERIALS

Forms for concrete surfaces, which will be exposed, shall be faced with steel and/or plywood. This shall include walls, floors, ceilings, surfaces of tanks, buildings and the like, which will be exposed in the final, work and shall include those surfaces below water lines. Plywood, if used, for lining forms shall be exterior type with B Grade or better surface to contact the concrete. Thickness shall be 5/8-inch except that 3/8-inch plywood may be used for curved surfaces. Plywood sheets shall be of uniform length and width. Joints between sheets shall be smooth and as nearly perfect as practicable, and no patching of plywood linings shall be permitted. Minor imperfections in plywood linings shall be corrected with plastic wood sanded smooth.

If steel forms are used, the Contractor shall be responsible for so advising all interested and/or affected subcontractors and suppliers and each shall be responsible for any extra work involved on that account.

2.02 FORM TIES

The type of form ties proposed to be used shall be submitted to the Engineer before installation. They shall be of a type which will leave no metal closer than 1-1/2 inches to the surface of the finished concrete after the ends are removed, and shall be embedded steel or iron rods. They shall be so designed and made that the ends can be readily removed from the concrete. Holes shall then be reamed and filled with patching mortar and struck off flush with concrete surface. See also the requirements in the Article in Section 03300 entitled, "Finishing."

PART 3 EXECUTION

3.01 CONSTRUCTION

Forms shall be constructed and maintained so as to insure that after removal of forms the finished concrete members will have true surfaces free of offset, waviness or bulges, and will conform accurately to the indicated shapes, dimensions, lines, elevations, and positions. Form surfaces that will be in contact with concrete shall be thoroughly cleaned before each use.

Studs and wales shall be spaced to prevent deflection of form material. Forms and joints shall be sufficiently tight to prevent leakage of grout and cement paste during placing of concrete. Forms placed on successive units for continuous surfaces shall be fitted to accurate alignment to assure smooth completed

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surfaces free from irregularities. Forms shall be readily removable without impact, shock, or damage to the concrete.

Unless otherwise shown, do not chamfer corners at construction joints, contraction joints or corners adjoining future construction. Provide 3/4-inch by 3/4-inch chamfers at all exposed corners of columns, beams, pilasters, and other exposed corners subject to damage if not chamfered. Unlined forms may be used for concrete work not exposed to view in the final work. Forms shall be coated with a non-staining mineral oil or other suitable compound. All forms shall be built so as to be removable without injury to the concrete. Slab and beam forms shall be cambered 1/4-inch for each 10 feet of span. In general, form lumber shall be new and/or free from defects affecting its purpose or use. Reuse of forms will be dependent on their ability to produce the finish specified.

Forms shall have openings provided for cleaning of concrete on which new concrete is to be placed, and shall be built so that after cleaning and before placing concrete they can be securely closed to conform to the form surface. Such openings shall be spaced in wall forms at intervals to ensure complete removal of all sawdust, dirt, wood, and other debris before placing of new concrete.

Forms shall have temporary openings to facilitate placing and compacting concrete as specified in the Article in Section 03300 entitled, "Placing Concrete."

3.02 REMOVAL OF FORMS

Removal shall be in a manner to ensure complete safety of the structure after the following conditions have been met. Where the structure as a whole is supported, forms for walls, columns, beam sides, and similar vertical structural members may be removed after 72 hours except when curing requirements exceed this time. Supporting forms or shoring shall not be removed until structural members have acquired sufficient strength to support safely their own weight and any construction and/or storage load to which they may be subjected, but in no case shall they be removed before expiration of 7 days, nor shall forms used for curing be removed before expiration of curing period except as specified in Section 03300. Care shall be taken to avoid spalling concrete surfaces or damaging concrete edges.

Tie-rods to be entirely removed from the wall shall be loosened 24 hours after concrete is placed, and form ties, except for a sufficient number to hold forms in place, may be removed at that time. Ties wholly withdrawn from wall shall be pulled toward the face that will be concealed from view in the permanent work.

3.03 TOLERANCES

The Contractor shall set and maintain forms to insure completed work within the following tolerance limits:

A. Variations From the Plumb
Columns, piers and walls:

1/4 inch in any 10 feet of length and
1 inch maximum for entire length.

Corner columns, control joint lines and any other conspicuous lines:

1/4 inch in any 20 feet of length and
1/2 inch maximum for entire length.

B. Variations from Plan Levels or Grades.
Slabs, ceilings, decks and beams:

1/4 inch in any 10 feet of length
3/8 inch in any bay or any 20 feet of length,
3/4 inch maximum for entire length

Exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines:

1/4 inch in any bay or in any 20 feet of length,
1/2 inch maximum for entire length.

C. Variation of Distances.

Between walls, columns, partitions and beams:

1/4 inch per 10 feet of distance but not more than
1/2 inch in any one bay, and not more than
1 inch total variation.

D. Variations in Opening Sizes and Locations.
Sleeves, floor openings and wall openings:

Minus 1/4 inch, plus 1/2 inch.

E. Variations in Cross—Sectional Dimensions and Thickness.

Columns, beams, slabs, decks and walls:
Minus 1/4 inch, plus 1/2 inch.

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F. Variation in Plan Lines.

Building lines, structure lines:
1 inch from established plan position.

G. Variations in Footing and Foundation Dimensions.

Dimensions in plan:

Minus 1/2 inch. Plus 2 inches (concrete only) or plus 3 inches when earth formed.
Misplacement or eccentricity:

2 percent of member width in the direction of misplacement but not more than 2 inches (concrete only).

Thickness:

Minus 5 percent of specified thickness.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

Under this heading shall be enforced the furnishing and placing of all reinforcing steel for concrete construction, as specified in Section 03300, and accessories for reinforcing steel.

1.02 SHOP DRAWINGS

The Contractor shall submit Shop drawings and setting diagrams in accordance with the General Conditions. Shop drawings shall be identified with reference thereon to sheet and detail numbers from the Contract Drawings, and shall show bar sizes and lengths, complete bending details and locations of all bars.

1.03 TESTING

Reinforcing steel shall be tested in accordance with the General Conditions and ASTM Specification A615. All tests required by ASTM A615 shall be made at the mill by the manufacturer and certified test results shall be furnished to the Engineer. Certification shall also show that representative samples were tested under Bend Test Requirements and deformations were measured and that material conformed to requirements in ASTM A615. Steel which does not conform to all requirements shall not be shipped. The Engineer may request additional samples for further testing either before or after delivery.

PART 2 PRODUCTS

2.01 REINFORCING STEEL

Reinforcing steel, except as otherwise specified, shall conform to the requirements of ASTM Designation A615 Grade 60. Where welding will be required, steel shall be provided that is suitable for welding and such steel shall be identified and supplier shall certify that it is suitable for welding and such steel shall be identified and supplier shall certify that it is suitable for welding. Also, provide a mill report or other chemical analysis of bars to be welded.

2.02 WELDED WIRE FABRIC REINFORCEMENT

Welded wire fabric reinforcement, if any, shall comply with the requirements of ASTM Designation A185.

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2.03 BAR SUPPORTS AND SPACERS

Bar supports and spacers shall be of steel and of suitable design and strength to hold reinforcement accurately in place before and during the placing of Concrete. Hy-chairs shall be welded steel construction. Bar supports shall have galvanized legs where they bear against forms and the formed surface will be exposed in the finished work.

2.04 TIE WIRE

Tie wire shall be No. 16 gauge annealed wire.

2.05 MARKING

All bars shall be tagged and marked as to location, conforming to the setting diagram, to facilitate placing of the reinforcing steel. Tags and markings shall be weather resistant.

2.06 FABRICATION

All bars shall be bent cold to the dimensions required, before placing. Diameter of hooks and bends shall be as shown in ACI Manual 315. Bars with kinks or bends not shown on the drawings will not be permitted in the work.

PART 3 EXECUTION

3.01 PLACING

All reinforcement shall be accurately placed to the dimensions shown on the plans, and securely held in place by bar supports, chairs, spacers, or wire and tied with wire at all cross points, in a manner that will provide the required concrete covering. Ends of top bars shall be tied down so as to prevent the ends from being displaced upwards during concrete placement. Parallel bars may be wired together at splices provided that the work is otherwise in accordance with ACI 315. Bars shall be maintained in the same plane at splices so that cover is uniform. Splices shall not be welded.

Exposed reinforcing steel shall be sufficient cause for the rejection of all concrete in which the exposed bar occurs.

Except as otherwise shown or specified, the clear distance between parallel reinforcing bars, including lapped splices, shall be not less than one inch or the nominal diameter of the bar if bars are larger than one inch. Slab and beam steel shall not be placed until columns and walls below have been concreted. In all cases, bars shall be free from dry or partially set mortar.

Where not otherwise shown or specified, bars in tension shall be lapped 36 diameters, bars in compression 24 diameters, but in no case less than 12 inches. Bars to take negative bending moment shall, be full length. Stirrups shall be accurately spaced and securely wired to the reinforcement.

Welded wire fabric reinforcement shall be lapped one mesh plus two inches and laced with 16-gauge wire. End laps shall be offset in adjacent widths.

Reinforcement for slabs, tank bottoms, and similar, shall be supported by means as devised by the Contractor. Supports shall be adequate and solid. Provide cross rods for forming mats where one-way reinforcement is otherwise required.

Reinforcement in slabs on the ground and for lower mats of reinforcement in footings and heavy slabs shall be supported on hy-chairs spaced not more than 3'-0" on centers both ways. Where indicated on the drawings, and/or where appropriate, provide "Standee" supports as shown in Chapter 32 of the Concrete Reinforcing Steel Institute "Manual of Standard Practice". Hy-chairs and other supports shall be set on concrete blocks with their tops set flush with the subgrade surface.

Welded wire fabric in slabs shall be supported similarly. Do not attempt to set mesh by raising it through fresh concrete.

Slab, joist, and beam bottom bars shall be supported and held by metal spacers placed not more than 5'-0" apart, with not less than two supports for any bars. Top steel shall be supported on continuous lines of No. 5 bars up ends of bars and hy-chairs spaced not more than 5'-0" apart with not less than two supports for any bar. The No. 5 bars shall be supported on hy-chairs spaced about 3'-0" on centers. Bent up ends of bars shall be similarly supported on No. 5 bars and hy-chairs, and adequately tied down to prevent movement.

Wall reinforcement shall be securely wired to metal chairs so that the chair will come in proper contact with the form face. Chairs shall be spaced so that there will be at least one chair to each 8 square feet of reinforcing mat. Column reinforcement shall be secured to the forms at top and bottom and at several intermediate points as may be necessary depending on the stiffness of the reinforcement. Note requirement hereinbefore for galvanized legs for chairs.

Unless otherwise shown on the drawings, bars shall be located to have the following minimum concrete covering:

| | |
|------------------------------|----------------------------------|
| In slabs on grade & footings | 3" on underside 2" on topside |
| All other | 2" |

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3.02 TEMPERATURE REINFORCEMENT

Slabs laid on the ground, except sidewalks, shall be reinforced with No. 4 bars 16 inches on center each way, except as otherwise noted on the drawings. Sidewalks will not be reinforced unless so shown on the drawings. Other slabs shall have No. 4 bars 18 inches on center at right angles to the principle reinforcement except as noted on the Plans.

3.03 INSPECTION

No concrete shall be placed in any section until all the steel in that section has been inspected by the Engineer.

Where there is delay in depositing concrete, and before concrete is placed on concrete previously placed, reinforcement shall be re-inspected and cleaned of all cement, mortar and any foreign material.

3.04 WELDING

Welding of reinforcing steel shall be done as shown on the Plans. Do not weld, reinforcing bars within the lengths of bends in each respective bar. All welding of reinforcing steel shall be in accordance with the requirements of AWS Publication D12.1, "Recommended Practice for Welding Reinforced Concrete". Note that this publication requires a chemical analysis of the bars which are to be welded and also requires welder qualification in accordance with AWS procedures.

END OF SECTION

PART 1 GENERAL

1.01 SUMMARY

This section consists of furnishing all labor, equipment and material to complete cast-in-place concrete as shown on the drawings and specified in the following paragraphs.

1.02 SUBMITTALS

- A. Mix Design: Submit mix designs prepared in accordance with ACI 211.1 and 318 for approval prior to placing any concrete.
- B. Manufacturers Data: Submit for curing materials to be used.
- C. Suppliers/Manufacturer certifications; Submit for all concrete components and stool reinforcing.
- D. Test Reports: Submit for all cylinder tests. Shop Drawings: Submit for steel reinforcing.

PART 2 PRODUCTS

2.01 PORTLAND CEMENT

Conform to ASTM C150, Type 1.

2.02 WATER

Shall be potable and free of acids, alkalis, oil, and organic or other deleterious materials.

2.03 CONCRETE AGGREGATES

- A. GENERAL: Shall conform to ASTN C33. Local aggregates not complying with this standard may be used provided it can be shown by testing or a record of past performance that these aggregates produce concrete of adequate strength and durability. Use largest practicable aggregate size for each condition of placement subject to limitations stipulated in paragraph 3.3 of ACI 318.
- B. Fine Aggregate: Clean, washed sand of hard, sound, uncoated grains.

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- C. Coarse Aggregate: Clean, washed, sound, and crushed to a maximum size of 1 ½”.

2.04 CONCRETE ADMIXTURES

- A. GENERAL: Only admixtures specified and acceptable to the Engineer prior to use shall be included in mix designs.
- B. Water Reducing Agent: A water reducing agent conforming to ASTM C494 may be used. The following are acceptable:
 - 1. Pozzoloth – Masters Builders Company
 - 2. Plastocrete – Sika Chemical Company
 - 3. WRDA – Grace Construction Materials
- C. Air Entrainment: All concrete shall entrain from two to four percent air, whether batched with, or without other admixtures. One of the following, conforming to ASTM C260, may be used:
 - 1. MB-VR – Masters Builders Company
 - 2. Sika Aer – Sika Chemical Company
 - 3. Darex Aer – Grace Construction Materials

2.05 STEEL REINFORCEMENT

Shall be deformed bars, grade 60 or welded wire fabric. Shall be free from runt, dirt, or any foreign coating.

2.06 CURING MATERIALS

- A. Chemical curing: Shall be a liquid, membrane forming compound that conforms to ASTM C309 Class B as approved by the engineer.
- B. Impervious Membrane Sheeting: Shall be a minimum of 4 mil polyethylene sheeting used in accordance with ASTM C171.

2.07 CONCRETE PROPERTIES FOR APPLICABLE COMPRESSIVE STRENGTHS

| <u>28 Day Compressive Strength (f's, psi)</u> | <u>Maximum Water-Cement Ratio by Weight (lb/lb)</u> | <u>Minimum Cement Content (lbs/cubic yard)</u> |
|---|---|--|
| 5000 | 0.4* | 611 |
| 4000 | 0.45 | 564 |
| 3000 | 0.50 | 470 |
| 2000 | .65 | 376 |

*The optimum water-cement ratio tot mix design in excess of 4000 psi 28 day compressive strength shall be determined by various mix designs but not to exceed 0.40.

- A. Slump Limits: Concrete, when placed, shall have a slump within the following limits as measured in accordance with ASTM C143:
 - 1. Walls, beams, columns
 - 2. Footings, caissons
 - 3. Pavement, slabs

2.08 CEMENT GROUT AND DRYPACK

- A. Cement Grout: Shall be one part Portland cement, 2 1/2 parts fine aggregate, and sufficient water for the mixture to flow under its own weight.
- B. Drypack: Shall be one part Portland cement, 2 parts fine aggregate, and enough water to hydrate the cement (stiff mix). Do not mix more than can be used in 30 minutes.

PART 3 EXECUTIONS

3.01 BATCHING AND MIXING CONCRETE

- A. Concrete shall be ready mixed concrete conforming to ASTM C94. Plant and truck mixers are subject to examination by the Engineer. Load tickets shall include all required information and be legible, showing quantities of all constituents in the batch, and bearing the signature of the plant inspector or bonded weight master. Submit copies of all load tickets to the Engineer.

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- B. Mix concrete at least 10 minutes, 5 minutes of which is at the job, after the last addition of the water. Retempering in the truck is prohibited. All concrete in the truck longer than 1 1/2 hours after the water has been added or any that has become harsh or nonplastic, shall be rejected.

3.02 FORMS

Shall conform to the shape, lines, and dimensions of members called for on the plane. They shall be clean, tight fitting, and braced to produce correctly aligned concrete. Flexible forms shall be used on all curved lines having a radius of less than 200 feet.

3.03 PLACING REINFORCEMENT

Bars shall be accurately bent and placed, securely supported, and fastened to prevent movement. Splices shall be lapped 30 bar diameters and a minimum of 12". They shall also be staggered. Minimum clearance shall be maintained in accordance with ACI standards. Reinforcement shall not be cut using a torch.

3.04 WATERSTOPS

Where shown on the drawings, waterstops shall be installed to provide watertight concrete. Waterstops shall be extruded flat strips either having a hollow center bulb or a barbell cross-section. All intersections shall be welded together to form a continuous seal.

3.05 FASTENING DEVICES, SLEEVES, AND INSERTS

Install all items required to be cast in the concrete prior to pouring.

3.06 PLACING THE CONCRETE

- A. Prior to placing the concrete standing water, mud and foreign matter shall be removed from all forms, excavations, and existing concrete surfaces. Surfaces to be poured against shall be lightly wetted. The Engineer must approve the formwork and reinforcements prior to concrete placement.
- B. The concrete shall be placed using suitable equipment as close as possible to its final location and in such a manner as to prevent segregation of the aggregate. Any free vertical drop shall not exceed 4 feet.
- C. Vibration: All concrete shall be consolidated using mechanical vibrating equipment. Vibration shall be transmitted directly to the concrete and not through the forms. The contractor shall provide back-up units in case of mechanical failure.

3.07 CURING

GENERAL

Concrete shall be kept moist for seven days after placement. Vertical forms may be left in place. Other surfaces exposed to the air shall be cured by either using a chemical curing compound or impervious membrane sheeting.

- A. Chemical curing: Apply curing compound as soon as surface water has disappeared from the concrete surfaces. Apply compound in accordance with the manufacturer's recommendations.
- B. Impervious Membrane Sheeting: The entire exposed surface shall be wetted thoroughly with a fine spray of water and then covered with sheeting. Overlap 12" when a continuous sheet is not used.

3.08 FINISHING

- A. Unexposed Surfaces: Form tie holes, deep depressions, rock pockets, honeycombs, etc. shall be cleaned out, flushed with water, dry packed, cured, and then honed to a final correct surface.
- B. Exposed Surfaces: Hone down fins, ridges, and high spots with abrasive stone or power grinder while concrete is green. Treat items under previous paragraph with same procedure listed there. Rub entire surface for a final sand finish surface.
- C. Exposed Edges: Shall have, a 3/4" chamfer except as shown on the drawings.
- D. Slabs, Sidewalks, Etc.: Shall be floated and then receive a steel trowel finish except as noted on the drawings. Surfaces exposed to the weather or requiring a slip resistant surface shall receive a broom finish.

3.09 CONTROL JOINTS

- A. Construction joints: Shall be formed using galvanized metal keyway or job-built wood forms with keyway.
- B. Sawed joints: Shall be flawed within 24-hours of placing the concrete.
- C. Expansion Joints: Shall be located where new concrete is to be placed up to existing concrete and as shown on the drawing.

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- D. **GENERAL:** Joints shall be located so that the maximum area between shall not exceed 600 square feet. Length to width ratios shall not exceed 2 to 1. Refer to the drawings for a specific joint pattern.

3.10 TESTING

- A. A professional, independent testing laboratory, approved by the Engineer, shall perform all testing. The contractor shall bear all costs of sampling and testing of concrete.
- B. The Engineer shall receive S copies of each report in timely manner after each procedure.
- C. **Concrete Compression Cylinders:** One set of five cylinders for each 50 cubic yards or fraction thereof for each day's placement of each mix design. The slump, temperature and air content shall also be recorded for each set. Test two cylinders at age seven days, two cylinders at twenty-eight days and hold one in reserve for testing at 56 days if previous test indicate a deficiency.

3.11 DEFFECTIVE WORK

Concrete not conforming with the plans and specifications, not formed as shown on the plans, has a defective surface, or lacks the required strength shall be removed from the job site at the Contractor's expense or replaced as directed by the Engineer.

END OF SECTION



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