# ADDENDUM # 1
## Highland View Point Sanitary Sewer Improvements
## City of Fayetteville, Georgia

| | |
|---|---|
| **Bids Due:** | September 10, 2015 at 2 p.m. |
| **Pre-bid Meeting** | N/A |
| **Cost of Plans & Specs:** | $150.00 |
| **Bid Number** | **N/A** |
| **ISE Project #:** | **1019.1503** |

Date: September 4, 2015

***PLEASE MAKE THE FOLLOWING CHANGES TO THE CONTRACT DOCUMENTS AND TECHNICIAL SPECIFICATIONS.***
***ALL DOCUMENTS ATTACHED:***

1. A revised Project Manual has been included as part of this Addendum to include construction Option 2 bid form, price and payment procedures, etc. Specific Specifications revised as part of this addendum are as follows: Advertisement for Bids, Table of Contract Documents, Contract Document B Bid / Tender Form, Contract Document D Construction Plans, Contract Document F Scope of Work, Contract Document G Construction Contract – Unit Price, Construction Document M Technical Specifications, Specification Section 01 10 00 Summary of Work, Specification Section 01 20 00 Price and Payment Procedures.

2.
    a. Question: The plans show two options for the project but the bid form appears to be only for option one should there be a form for option 2 also?
    b. Response: A bid form BF-2 has been added for Option 2. The specifications have been revised as listed in this addendum to include Option 2.

3.
    a. Question: What is the expected replacement/remedy for large, mature trees within the easement if they are removed?
    b. Response: Trees cleared and grubbed within the easement necessary for construction will not be replaced.

4.
    a. Question: Is there an alternate bmp other than silt fence that could be utilized across the downstream end of the channel, as the area indicated is open water?
    b. Response: Double row of silt fence shall be used. Silt fence shall be placed just outside open water in order to limit sediment in the open water.

5. A revised Specification Section Contract Document G Construction Contract has been included to state Unit Price in lieu of Lump Sum.

**END OF ADDENDUM NO. 1**

# Highland View Point
# Sanitary Sewer Improvements

Project #: 1019.1503

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August 12, 2015

## CITY OF FAYETTEVILLE
## FAYETTE COUNTY, GEORGIA

GEORGIA REGISTERED No. 29216 PROFESSIONAL ENGINEER CARY R. DIAL

8-12-2015


**Prepared by:**
**Integrated Science & Engineering, Inc.**
1039 Sullivan Road, Suite 200
Newnan, Georgia 30265

# ADVERTISEMENT FOR BIDS

The City of Fayetteville will accept sealed bids from qualified Contractors for furnishing all labor, equipment, materials and other things necessary to complete the **Highland View Point Sanitary Sewer Improvements.**

Bids will be received at the City of Fayetteville, 240 South Glynn Street, Fayetteville, Georgia 30214 until 2:00 PM local time, on Thursday, September 10, 2015, at which time the bids will be opened and read aloud. Bidding documents may be obtained from the City of Fayetteville Finance Department. Contact Ms. Carleetha Talmadge at 770-461-6029 for the bid package or questions regarding bid procedures. Bid packages cost $150 per set for a hard copy and $25 per set for an electronic copy.

The Highland View Point Sanitary Sewer Improvements project will include removing and installing approximately 105 LF of 8-inch ductile iron gravity sewer with steel casing and two pipe piers, connection to two existing manholes, earthwork to eliminate the storm culvert and provide storm drainage via graded swale with channel stabilization (BASE BID), or removing and installing approximately 105 LF of 8-inch ductile iron gravity sewer and connection to two existing manholes, earthwork to install two 42” RCP storm culverts and all associated appurtenances (ALTERNATE BID).

Questions of a technical nature should be submitted in writing to design engineer, Mr. Cary Dial, P.E. at Integrated Science & Engineering via e-mail: cdial@intse.com. The final date for any questions or clarifications should be no later than September 3, 2015.

# CITY OF FAYETTEVILLE, GEORGIA

# HIGHLAND VIEW POINT SANITARY SEWER IMPROVEMENTS

## TABLE OF CONTRACT DOCUMENTS

Advertisement for Bids

A. Bids/Instructions to Bidders

B. Bid/Tender Form

B1. Georgia Security and Immigration Compliance Act OCGA 13-10-90

B2. U.S. Citizen/Qualified Alien Affidavit

C. Contractor's Qualification Statement

D. Plans

E. Reserved

F. Scope of Work

G. Construction Contract – Lump Sum

H. General Conditions of the Contract

I. Bid Bond

J. Payment Bond

K. Performance Bond

L. Supplemental Conditions

M. Technical Specifications

# CONTRACT DOCUMENT A
# CITY OF FAYETTEVILLE, GEORGIA

## BIDS / INSTRUCTIONS TO BIDDERS

## BIDS

**(a)** Bids will be received by the City of Fayetteville (also referred to as the City and the Owner) from General Contractors, including work for all labor and materials to complete the work for the **Highland View Point Sanitary Sewer Improvements**.

**(b)** Bids will be received by Ms. Carleetha Talmadge, Finance Department, City of Fayetteville, 240 S. Glynn Street, Fayetteville, Georgia 30214, at or before 2:00 PM on Thursday, September 10, 2015.

**(c)** Bidding documents may be obtained from the City of Fayetteville Finance Department, 240 Glynn Street, Fayetteville, Georgia 30214. Bid packages (one (1) set of plans and specifications) cost $150 per set for a hard copy and $25 per set for an electronic copy.

**(d)** The project requires that the Contractor **substantially complete the work within forty five (45) calendar days from the Date of Commencement (DOC) and fully complete the work within seventy five (75) calendar days from the DOC**.

**(e)** No bid may be modified, withdrawn, or canceled for a period of 60 days after time designated for receipt of Bids or until notified by Owner, whichever is sooner.

**(f)** A bid bond in the amount of 5% of bid is required.

**(g)** The City of Fayetteville reserves right to reject any and all bids and to waive irregularities, technicalities, and informalities.

## INSTRUCTIONS TO BIDDER

The following instructions are given for the purpose of guiding bidders in properly preparing their bids or proposals. These directions have force and weight with the specifications and strict compliance is required with all the provisions herein contained. The "Project Manager" for this project shall be Mr. Chris Hindman, Director of Public Services, as designated by the City.

**(a)** **QUALIFICATIONS OF BIDDERS**: No bid will be accepted from, nor will any contract be awarded to, any person who is in arrears to The City of Fayetteville, upon any debt or contract, or who is a defaulter, as surety or otherwise, upon any obligation to said City, who has any pending or unresolved ordinance violations or who is deemed irresponsible or unreliable by the City of Fayetteville. The project shall be awarded to the lowest responsive and responsible bidder. All bidders must complete the Contractor's Qualification form. Submission of a Bid constitutes an acceptance of all Contract Documents.

**(b)** **PERSONAL INVESTIGATION**: Bidders shall satisfy themselves by personal investigation and by such other means as they may think necessary or desirable, as to the site conditions affecting the proposed work and the cost thereof. No information derived from maps,

plans, specifications, or from the Project Manager, or Integrated Science & Engineering, Inc. its employees or the City of Fayetteville or its employees shall relieve the contractor from any risk or from fulfilling all terms of the contract documents, or from obtaining facts from personal investigation. Furthermore, the bidder shall thoroughly review the plans and technical specifications and confirm to his satisfaction the quantities provided in the contract documents. Submission of a bid shall be deemed an acceptance of the site conditions, including substrate conditions and Bidders hereby waives all right to additional sums for any unforeseen sight conditions.

**(c)** **INCONSISTENCIES**: Any seeming inconsistency between different provisions of the contract documents, or any point requiring explanation must be inquired into by the bidder, in writing, at least **seven (7)** days prior to the time set for opening bids. After bids are opened, the bidders shall abide by the decision of the City of Fayetteville.

**(d)** **FORMS OF BIDS**: Each bid and its accompanying statements must be made on the blanks provided therefore and found herewith. The forms must be submitted in good order and with all the blanks filled in. The forms must be enclosed in a sealed envelope when submitted to The City of Fayetteville and must show the name of the bidder and a statement as to its contents. The bid must be signed by one duly authorized to do so, and in case signed by a deputy or subordinate, the principal's properly written authority to such deputy or subordinate must accompany the bid. No bid will be accepted, for any reason whatsoever, which is not submitted to the City of Fayetteville as stated above, within the specified time. No qualified bid shall be accepted. If a qualified bid is inadvertently accepted, Bidder hereby waives any qualifications contained in its bid.

**(e)** **BID BOND**: A bid bond in the amount of 5% of the bid amount shall accompany each bid as evidence of the good faith and responsibility of the bidder. This bond shall be retained by the payee as liquidated damages should the bidder refuse or fail to enter into a contract with the payee for the execution of the work embraced in the bid, in the event the bid of the bidder is accepted.

The above bond shall be a guarantee that the bidder will, if necessary, promptly execute a satisfactory contract and furnish payment and performance bonds as required by the Contract Documents. As soon as a satisfactory contract has been executed and the bonds furnished and accepted, the check or bond accompanying the bid of the successful bidder will be returned to him. The certified or other checks or bid bonds of the unsuccessful bidders will be returned to them upon the acceptance of the bid of the successful bidder. Provided that the successful bidder shall not enter into, execute, and deliver such a contract and furnish the required bonds within five **(5) days** after receiving notice of award, the certified or other check or bid bond and the proceeds thereof shall immediately become the property of the City of Fayetteville as liquidated damages.

**(f)** **FILLING IN BIDS**: All prices must be written in words in the bid and also stated in numerical figures, and all bids must fully cover all items for which bids are herein asked and no other. Bidders are required to state the names and places of residence of all persons interested herein, and if no other person is interested, the bidder shall distinctly state such a fact and shall state that the bid is in all respects fair and without collusion or fraud. Where more than one person is interested, it is required that all persons so interested or their legal representative make all verification and subscribe to the bid. No bids purporting to qualify or amend any term covenant or condition shall be accepted. Any such qualification or amendments shall be highlighted and listed conspicuously on a separate piece of paper titled "Qualifications and/or

Modifications". Failure of bidder to highlight and list such Qualifications and/or Modification shall be, and bidder hereby agrees is a waiver of such Qualifications and/or Modifications.

**(g)** **CAUSES FOR REJECTION**: No bid will be canvassed, considered or accepted which in the opinion of the City of Fayetteville is informal or unbalanced, or contains inadequate or unreasonable prices for any items; each item must carry its own proportion of the cost as nearly as is practicable. Any alteration, erasure, or failure to contain bids for all items called for in the schedule shall render the bid voidable by the Owner. Qualified bids shall be rejected.

**(h)** **REJECTION OF BIDS**: The City of Fayetteville reserves the right to reject any bid, if the evidence submitted by the bidder, or if the investigation of such bidder fails to satisfy the City of Fayetteville that such bidder is properly qualified to carry out the obligations and to complete the work contemplated therein. Any or all bids will be rejected, if there is reason to believe that collusion exists among bidders. Bids will be considered irregular and may be rejected, if they show serious omissions, alterations in form, additions not called for, conditions or unauthorized alternates, or irregularities of any kind. The City of Fayetteville reserves the right to reject any or all bids and to waive any and all irregularities as may be deemed best for the interests of the City of Fayetteville.

**(i)** **WITHDRAWAL OF BIDS**: Any bidder may, without prejudice to himself, withdraw his bid at any time prior to the expiration of the time during which bids may be submitted. Such request for withdrawal must be in writing and signed in the same manner and by the same person who signed the bid. After expiration of the period of receiving bids, no bid can be withdrawn, modified, or explained except as authorized by the City Manager.

**(j)** **CONTRACT**: The bidder to whom award is made shall execute the General Contract and General Conditions thereto and shall prosecute the work and maintain the same in good repair until final acceptance by the proper authorities, and shall furnish good and sufficient bonds as hereinafter specified, within five (5) days after receiving such contract for execution. If the bidder to whom the first award is made fails to execute said Contract Documents, the award may be annulled and the contract let to the next higher bidder who is reliable and responsible in the opinion of the City of Fayetteville. Such bidder shall fulfill every stipulation embraced herein as if he were the original party to whom award was made. The Contract and General Conditions thereto are not negotiable.

**(k)** **ENFORCEMENT OF SPECIFICATIONS**: Copies of the specifications will be placed in the hands of the City of Fayetteville's employees as well as all the agents of the Project Manager employed on the work, who shall enforce each and every requirement of the contract. Such agents of the City shall have no authority to vary form such requirements.

**(l)** **COPIES OF PLANS AND SPECIFICATIONS**: Copies of the specifications, details, contract and bonds are on file in the office of the City of Fayetteville and may be examined by the bidders. The Contractor who is awarded the job shall be furnished up to five (5) copies of the Contract Documents as are reasonably necessary for the execution of the Work. Additional copies will be furnished, upon request, at the ENGINEER's cost of reproduction paid by the Contractor.

**(m)** **PAYMENT AND PERFORMANCE BONDS**: The successful bidder shall furnish payment bond and a performance bond written by a Corporate Surety Company holding a Certificate of Authority from the Secretary of the Treasury of the United States as acceptable

sureties on federal bonds, each in the amount equal to the total amount payable by the term of the contract, executed and issued by a Resident Agent licensed by and having an office in the State of Georgia, representing such Corporate Surety, to be approved by the City of Fayetteville conditioned for the due and faithful performance of the work and warranty, and providing, in addition to all other conditions, that if the contractor, or his or its subcontractors, fail to duly pay for any labor, materials, team hire, sustenance provisions, provender, or other supplies used or consumed by such Contractor, or his or its subcontractor(s), in performance of the work contracted to be done, the Surety will pay the same in the amount not exceeding the sum provided in such bonds, together with interest at the rate of 8% annum from the date payment is due, and that they shall indemnify and save harmless the City of Fayetteville to the extent of any and all payments in connection with carrying out of said contract which the City of Fayetteville may be required to make under the law. The amount of the Payment Bond shall equal 110% of the contract amount and the amount of the Performance Bond shall equal 100% of the contract amount.

The Contractor is required at all times to have a valid payment and performance bond in force covering the work being performed. A failure to have such bonds in force at any time shall constitute a default on the part of the Contractor. A bond written by a surety which becomes disqualified to do business in the State of Georgia, shall automatically constitute a failure on the part of the Contractor to meet the above requirements.

In the event the Contract Amount is increased by duly authorized change order then Contractor shall immediately increase the penal amount of all Payment and Performance bonds in proportion to the increase in the Contract Amount.

**(n)** **GENERAL**: Bidders shall completely fill out and submit the bid, the Contractor's Qualification Statement, Bid Bond, Georgia Security and Immigration Compliance Form, and the US Citizen/Qualified Alien form. For federally funded projects, bidders shall also submit the completed DBE Goals Form and the Federal Aid Certification.

Bidders are invited to be present at the time of opening of bids.

The City of Fayetteville reserves the right to reject any or all bids or any part of any bid.

**(o)** **TECHNICAL SPECIFICATIONS**: Attached hereto as Contract Document M.

**(p)** **SCOPE OF WORK**: The Highland View Point Sanitary Sewer Improvements project will include removing and installing approximately 105 LF of 8-inch ductile iron gravity sewer with steel casing and two pipe piers, connection to two existing manholes, earthwork to eliminate the storm culvert and provide storm drainage via graded swale with channel stabilization, and all associated appurtenances.

**(q)** **LOCATION OF WORK**: This project is located within Lakemont subdivision off Redwine Road southwest of downtown Fayetteville. Access to site will be via existing sanitary sewer easement off the cul-de-sac of Highland View Point. A detailed location map is shown on the plans.

**(r)** **INSURANCE**: The bidder's attention is directed to the insurance requirements set out in the General Conditions to General Contract. The Contractor will be required to furnish a Certificate of Insurance to the Owner prior to execution of the contract by the Owner.

**(s)** **BIDDING**: Bidders shall provide cost data as requested for each item on the Bid Form. Lump sum prices shall include all work and materials required by the Contract Documents.

**(t)** **BASIS OF PAYMENT**: Payment shall be made in accordance with the price data stipulated in the Bid Form. Items shall be paid on the percent complete based upon a breakdown of items in the Bid and materials delivered to the job site.

**(u)** **ACCEPTANCE PERIOD**: The bidder shall hold his bid good for acceptance by the Owner for a period not less that 120 calendar days following the date of the bid opening.

**(v)** **METHOD OF AWARD**: If a Contract is awarded, it will be awarded to the lowest reliable bidder whose Proposal shall have met all the prescribed requirements.

**(w)** **BASIS FOR BID AND CONTRACT**: The price basis for bids and for the contract shall be in accordance with the amounts shown on the Bid Form for all of the work indicated on the Scope of Work drawings and specifications complete in place, tested, approved, and ready for service. No additional amount shall be paid by the Owner unless it is extra work approved and authorized by change order all as described in the General Conditions.

**(x)** **RESERVED**

**(y)** **BID OPENING PROCEDURE**: Bid opening procedures shall be in accordance with the City of Fayetteville Purchasing Policy.

**(z)** **DISPOSITION OF LATE BIDS AND LATE NO-BIDS**: Late bids and late no-bids will be retained unopened until after the bid is awarded; then returned to sender by certified mail with a letter as to why the bid is being returned.

**(aa)** **DISSEMINATING BID INFORMATION**: Upon request, the following information may be provided to the public:

1. Prior to bid opening:
    a. Name and address of bidders to whom plans and specifications were mailed.
    b. Name and address of anyone picking up plans and specifications to extent such records are maintained.
    c. The City will not release the names of Bidders who have submitted bids.

2. After the bid opening:
    a. Name of bidder and bid prices are posted and available for public inspection. (Please be advised that no bid prices will be given out over the phone.)

3. At all times, the City shall disclose such information as may be required by the Georgia Open Records Law as the same may be amended.

**(bb)** **EVALUATION**: After reviewing all bids and noting all considerations, evaluation of the lowest responsive and responsible bidders should be made.

**(cc)** **PRESENTING RECOMMENDATIONS**: Upon determination of recommendation for award, the City Manager shall add this item to the agenda for the next Council meeting. A formal

bid tabulation, including the recommendation for award, should be typed for the Council's review. Bids are awarded only by action of the governing body at an open meeting.

After the award is made, all bidders are to be notified by mail of the successful bidder and payment and performance bonds and 4 copies of executed General Contracts and General Conditions shall be promptly submitted to the City. All un-awarded bids shall be returned promptly. If the City and successful Contractor proceed with the Work without executing the attached General Contract and General Conditions then Contractor agrees that the attached General Contract and General Conditions shall be deemed executed and shall bind the parties.

All bids will remain on file at City Hall for a period of 30 days, at which time they will be retained for 4 years. The actual bid documents are public property and are available for review subject to Georgia's open records laws. The review of bids is subject to availability of employees for security purposes. It is best to make an appointment. The bid documents must remain in the employees' sight at all times. Copies are to be made and paid for, per Georgia's open records law. No comments are to be made regarding a bid or vendor. No statement is to be made as to who may or may not be awarded a bid. A simple statement that all bids will be studied and a recommendation made from this department is sufficient.

The receiving, handling and awarding of bids is extremely important work, and therefore, each person involved is to be sure this policy is understood and followed exactly. Any problems encountered should be brought to the attention of the City Manager immediately.

# CONTRACT DOCUMENT B
# CITY OF FAYETTEVILLE, GEORGIA

## BID / TENDER FORM

**Owner:** The City of Fayetteville, Georgia
240 South Glynn Street
Fayetteville, GA 30214
Attn: Mr. Mike Bush, Finance Director

Bidder's Name and Address:

_____

_____

_____

Georgia **Utility** Contractor License Number:

_____

**Due Date:** _____

**BASE BID: OPTION 1**

Bidder agrees to the scope of construction as shown on Bid Form BF-1:

Gentlemen:

Pursuant to and in compliance with the Bid/Instructions to Bidder and the Contract Documents relating to the construction of:

**HIGHLAND VIEW POINT SANITARY SEWER IMPROVEMENTS**

the undersigned, having become thoroughly familiar with the terms and conditions affecting the performance and costs of the work at the places where the work is to be completed in accordance with the Contract Documents, and having fully inspected the site and all particulars, hereby proposes and agrees to **substantially complete the work within forty five (45) calendar days and fully complete the work within seventy five (75) calendar days from the Date of Commencement** and in strict accordance with the Contract Documents A through M, including furnishing any and all labor and materials and to do all of the work in accordance with the Contract Documents for sum of

_____ Dollars,

($_____) hereinafter referred to as the Base Bid;

**ALTERNATE BID: OPTION 2**

Bidder agrees to the scope of construction as shown on Bid Form BF-2:

**Alternate Bid Amount:** _____

_____ ($_____)
(words and figures)

The undersigned, as Bidder hereby declares that the only persons interested in this Bid are named herein, that no other person has any interest in this Bid or in the Contract Documents to which this Bid pertains, that this Bid is made without connection or arrangement with any other person and that this Bid is in every respect fair, and is submitted in good faith and without collusion or fraud.

The Bidder further declares that he has satisfied himself fully relating to all matters and conditions with respect to the work to which this Bid pertains.

The bidder proposes and agrees, if this Bid should be accepted, to execute, without modification, all Contract Documents and deliver all required bonds immediately.
All in full and complete accordance with all terms and conditions set forth in and covered by the Contract Documents.

# BID FORM BF-1

| BASE BID: OPTION 1 | | | | | |
|---|---|---|---|---|---|
| ITEM NO. | DESCRIPTION | ESTIMATED QUANTITY | UNIT OF MEASURE | UNIT PRICE (FIGURES) | AMOUNT (FIGURES) |
| | **CONSTRUCTION ITEMS** | | | | |
| 1 | GENERAL CONDITIONS | 1 | LS | | |
| 2 | CLEARING AND GRUBBING | 1 | LS | | |
| 3 | EARTHWORK | 1 | LS | | |
| 4 | 8-INCH DIP PC 350 GRAVITY SEWER (EPOXY COATED) | 105 | LF | | |
| 5 | 16-INCH WELDED STEEL CASING | 70 | LF | | |
| 6 | AERIAL PIPE SUPPORTS | 2 | EA | | |
| 7 | CONNECTION TO EX. SSMH A2 VIA OUTSIDE DROP | 1 | EA | | |
| 8 | CONNECTION TO EX. SSMH A3 | 1 | EA | | |
| 9 | BYPASS PUMPING | 1 | LS | | |
| 10 | CHANNEL STABILIZATION (Ch-Rp) TYPE I RIP RAP WITH FILTER FABRIC | 120 | TONS | | |
| 11 | DEMOLITION COMPLETE | 1 | LS | | |
| 12 | EROSION CONTROL COMPLETE | 1 | LS | | |
| 13 | LANDSCAPE COMPLETE | 1 | LS | | |
| | **TOTAL (IN FIGURES)** | | | | |
| | **TOTAL (IN WORDS)** | | | | |

# BID FORM BF-2

| ALTERNATE BID: OPTION 2 | | | | | |
|---|---|---|---|---|---|
| ITEM NO. | DESCRIPTION | ESTIMATED QUANTITY | UNIT OF MEASURE | UNIT PRICE (FIGURES) | AMOUNT (FIGURES) |
| | **CONSTRUCTION ITEMS** | | | | |
| 1 | GENERAL CONDITIONS | 1 | LS | | |
| 2 | CLEARING AND GRUBBING | 1 | LS | | |
| 3 | EARTHWORK | 1 | LS | | |
| 4 | 8-INCH DIP PC 350 GRAVITY SEWER (EPOXY COATED) | 105 | LF | | |
| 5 | CONNECTION TO EX. SSMH A2 VIA OUTSIDE DROP | 1 | EA | | |
| 6 | CONNECTION TO EX. SSMH A3 | 1 | EA | | |
| 7 | BYPASS PUMPING | 1 | LS | | |
| 8 | 42-INCH RCP STORM SEWER | 48 | LF | | |
| 9 | CONCRETE HEADWALL | 2 | EA | | |
| 10 | TRENCH UNSUITABLE SOILS | 1 | LS | | |
| 11 | STORM DRAIN OUTLET PROTECTION (St) TYPE I RIP RAP | 54 | TONS | | |
| 12 | DEMOLITION COMPLETE | 1 | LS | | |
| 13 | EROSION CONTROL COMPLETE | 1 | LS | | |
| 14 | LANDSCAPE COMPLETE | 1 | LS | | |
| | **TOTAL (IN FIGURES)** | | | | |
| | **TOTAL (IN WORDS)** | | | | |

GENERAL

The undersigned has checked all of the above figures, and understands that the Owner will not be responsible for any errors or omissions on the part of the undersigned in Proposal. The undersigned agrees to be firmly bound unto Owner to perform all Work required by the Contract documents for the above stated amount(s).

In submitting this Proposal, it is understood that the right is reserved by the Owner to reject any or all bids and waive all informalities in connection herewith.

The undersigned declares that the person or persons signing this Proposal is/are fully authorized to sign on behalf of the firm listed and to fully bind the firm listed to all the Proposal's conditions and provisions thereof.

It is agreed that no person or persons or company other than the firm listed below or as otherwise indicated has any interest whatsoever in this Proposal or the Contract that may be entered into as a result of this Proposal and that in all respects the Proposal is legal and firm, submitted in good faith without collusion or fraud.

It is agreed that the undersigned has complied or will comply with all requirements of local, state, and national laws, and that no legal requirement had been or will be violated in making or accepting this Proposal, in awarding the contract to him and/or in the prosecution of the work required.

The undersigned agrees to commence actual physical work on the site with adequate force and equipment within **seven (7) calendar days** of the Date of Commencement or Notice to Proceed from the Owner.

For and in consideration of the sum of $1.00, the receipt of which is hereby acknowledged, the undersigned agrees that this proposal may not be revoked or withdrawn after the time set for the opening of bids but shall remain open for acceptance for a period of sixty **(60) calendar days** following such time.

If written notice of the acceptance of this bid is mailed or delivered to the undersigned after the date set for the opening of this bid, or any other time thereafter before it is withdrawn, the undersigned will execute and deliver to the Owner proof of insurance coverage, payment and performance bonds and all executed Contract Documents, all within five (5) calendar days after receipt of the Notice of Award for this bid.

Notice of Award, or request for additional information, may be addressed to the undersigned at the address set forth.

The names of all persons interested in the foregoing bid as principals are:

_____

_____

_____

(IMPORTANT NOTICE: If bidder or other interested person is a corporation, give legal name of corporation, state where incorporated, the name of president and secretary; if a partnership, give name of firm and names of all individual co-partners composing the firm; if bidder or other persons is an individual, give first and last names in full.)

Contract Documents Receipt: The receipt of the following Contract Documents is acknowledged.

A. BIDS/INSTRUCTIONS TO BIDDER
B. BID/TENDER FORM
B1. GEORGIA SECURITY AND IMMIGRATION COMPLIANCE ACT FORM
C. CONTRACTOR QUALIFICATIONS
D. PLANS
E. RESERVED
F. SCOPE OF WORK
G. GENERAL CONTRACT
H. GENERAL CONDITIONS
I. BID BOND
J. PAYMENT BOND
K. PERFORMANCE BOND
L. SUPPLEMENTAL CONDITIONS
M. TECHNICAL SPECIFICATIONS

RESPECTFULLY SUBMITTED:

Date of Bid _____
Firm Name _____
Business Address _____
_____
By _____
Telephone Number _____

SEAL, IF BIDDER IS A CORPORATION

Note: If bidder is a corporation, set forth the legal name of the corporation together with the signature of the officer or officers authorized to sign contracts on behalf of the corporation. If bidder is a partnership, set forth the names of the firm together with the signature of the partner or partners authorized to sign contracts on behalf of the partnership.

# CONTRACT DOCUMENT B1
# CITY OF FAYETTEVILLE, GEORGIA

## GEORGIA SECURITY AND IMMIGRATION COMPLIANCE ACT OCGA 13-10-90

TO ALL PROSPECTIVE VENDORS:

If you are providing service, or performing work to the City of Fayetteville, Georgia the applicable Georgia Security and Immigration Compliance documents found here must be completed, signed, notarized and submitted with your bid proposal.

1) The City of Fayetteville, Georgia shall comply with the Georgia Security and Immigration Compliance Act OCGA 13-10-90 et. seq.

2) In order to insure compliance CONTRACTOR agrees to comply with all of the contractor requirements of the "Georgia Security and Immigration Compliance Act" of 2006 as codified in O.C.G.A. Sections 13-10-90 and 13-10-91 and regulated in Chapter 300-10-1 of the Rules and Regulations of the State of Georgia, "Public Employers, Their Contractors and Subcontractors Required to Verify New Employee Work Eligibility Through a Federal Work Authorization Program," accessed at http://www.dol.state.ga.us, as further set forth below.

   A. Contractor Agreement to Verify the Work Eligibility of its New Hires through the U.S Department of Homeland Security's "Employment Eligibility Verification (EEV) / Basic Pilot Program." CONTRACTOR agrees to verify the work eligibility of all of CONTRACTOR'S newly hired employees through the U.S. Department of Homeland Security's Employment Eligibility Verification (EEV) / Basic Pilot Program, accessed through the Internet at https://www.vis-dhs.com/EmployerRegistration, in accordance with the provisions and timeline found in O.C.G.A. 13-10-91 and Rule 300-10-1-.02 of the Rules and Regulations of the State of Georgia. As of July 1, 2007, the verification requirement applies to contractors and subcontractors with five-hundred (500) or more employees.

   B. Contracts Affected by the "Georgia Security and Immigration Compliance Act." CONTRACTOR agrees that the contractor and subcontractor requirements of the "Georgia Security and Immigration Compliance Act" of 2006 apply to contracts for, or in connection with, the physical performance of services within the State of Georgia.

   C. Timeline for Application of the Worker Eligibility Verification Requirements to Contractors and Subcontractors. CONTRACTOR agrees that the following Georgia Security and Immigration Compliance Act contract compliance dates apply to this contract, pursuant to O.C.G.A. 13-10-91:

On or after July 1, 2007, to public employers, contractors, or subcontractors of 500 or more employees;

On or after July 1, 2008, to public employers, contractors, or subcontractors of 100 or more employees; and

On or after July 1, 2009, to all other public employers, their contractors, and subcontractors.

The prospective CONTRACTOR must initial one of the sections below:

☐ Contractor has 500 or more employees [CONTRACTOR must register with the Employment Eligibility Verification/Basic Pilot Program and begin work eligibility verification on July 1, 2007, and execute and send to DEPARTMENT a "Contractor Affidavit and Agreement" attesting to registration with the EEV / Basic Pilot Program];

☐ Contractor has 100-499 employees [CONTRACTOR must register with the Employment Eligibility Verification/Basic Pilot Program and begin work eligibility verification by July 1, 2008];

or

☐ Contractor has 99 or fewer employees [CONTRACTOR must begin work eligibility verification by July 1, 2009].

3) In the event that the contractor employs or contracts with any subcontractor in connection with a covered contract the contractor will secure from the subcontractor attestation of the subcontractor's compliance with O.C.G.A. § 13-10-90 et seq. and Georgia Department of Labor Rule 300-10-1-.02 by the subcontractor's execution of the subcontractor affidavit shown in Georgia Department of Labor Rule 300-10-1-.02 or a substantially similar affidavit.

4) Contractor agrees that, in the event the (insert your company's name) _____ _____ employs or contracts with any sub-contractor in connection with the covered contract to require "Georgia Security and Immigration Compliance Act" Compliance of its Subcontractors Connected with this Contract. CONTRACTOR agrees to require O.C.G.A. Sections 13-10-90 and 13-10-91 compliance in all written agreements with any subcontractor employed by CONTRACTOR to provide services connected with this contract, as required pursuant to O.C.G.A. 13-10-91., that the (insert company's name) _____ _____will secure from each sub-contractor the employee-number applicable to the sub-contractor.

CONTRACTOR agrees to obtain from any subcontractor that is employed by CONTRACTOR to provide services connected with this contract, the subcontractor's indication of the employee-number category applicable to the subcontractor.

5) Contractor agrees to provide the City of Fayetteville, Georgia with and secure all affidavits from any subcontractor engaged to perform services under this Contract an executed the "Subcontractor Affidavit," as required pursuant to O.C.G.A. 13-10-91 and Rule 300-10-1-.08 of the Rules and Regulations of the State of Georgia, which rule can be accessed at http://www.dol.state.ga.us.

CONTRACTOR agrees to maintain all records of the subcontractor's compliance with O.C.G.A. Sections 13-10-90 and 13-10-91 and Chapter 300-10-1 of the Rules and Regulations of the State of Georgia.

## CONTRACTOR AFFIDAVIT AND AGREEMENT

By executing this affidavit, the undersigned contractor verifies its compliance with O.C.G.A. 13 1 0-91, stating affirmatively that the individual, firm, or corporation which is contracting with(name of public employer) has registered with and is participating in a federal work authorization program* [any of the electronic verification of work authorization programs operated by the United States Department of Homeland Security or any equivalent federal work authorization program operated by the United States Department of Homeland Security to verify information of newly hired employees, pursuant to the Immigration Reform and Control Act of 1986 (IRCA), P.L. 99-6031, in accordance with the applicability provisions and deadlines established in O.C.G.A. 13-10-91. The undersigned further agrees that, should it employ or contract with any subcontractor(s) in connection with the physical performance of services pursuant to this contract with the City of Fayetteville, contractor will secure from such subcontractor(s) similar verification of compliance with O.C.G.A. 13- 10-91 on the Subcontractor Affidavit provided in Rule 300- 10-01 -.08 or a substantially similar form. Contractor further agrees to maintain records of such compliance and provide a copy of each such verification to the (name of the public employer) at the time the subcontractor(s) is retained to perform such service.

_____
EEV / Basic Pilot Program* User Identification Number

_____ _____
BY: Authorized Officer or Agent Date
(Contractor Name)

_____
Title of Authorized Officer or Agent of Contractor

_____
Printed Name of Authorized Officer or Agent

SUBSCRIBED AND SWORN BEFORE ME ON THIS

THE _____DAY OF, 20____

_____
Notary Public
My Commission Expires: _____

*As of the effective date of O.C.G.A. 13-10-91, the applicable federal work authorization program is the "EEV / Basic Pilot Program" operated by the U. S. Citizenship and Immigration Services Bureau of the U.S. Department of Homeland Security, in conjunction with the Social Security Administration (SSA).

**Authority O.C.G.A.** 13-10-91

## SUBCONTRACTOR AFFIDAVIT

Contractors shall use the following affidavit form, or an affidavit form that is substantially similar to that provided below, to document a subcontractor's compliance with the requirements of O.C.G.A. 13-10-91:

By executing this affidavit, the undersigned subcontractor verifies its compliance with O.C.G.A. 13-10-91, stating affirmatively that the individual, firm or corporation which is engaged in the physical performance of services under a contract with (name of contractor) _____ _____ on behalf of the City of Fayetteville has registered with and is participating in a federal work authorization program* [any of the electronic verification of work authorization programs operated by the United States Department of Homeland Security or any equivalent federal work authorization program operated by the United States Department of Homeland Security to verify information of newly hired employees, pursuant to the Immigration Reform and Control Act of 1986 (IRCA), P.L. 99-6031, in accordance with the applicability provisions and deadlines established in O.C.G.A. 13-10-91.

_____
EEV / Basic Pilot Program* User Identification Number

_____ _____
BY: Authorized Officer or Agent Date
(Contractor Name)

_____
Title of Authorized Officer or Agent of Contractor

_____
Printed Name of Authorized Officer or Agent

SUBSCRIBED AND SWORN BEFORE ME ON THIS

THE _____DAY OF, 20____

_____
Notary Public
My Commission Expires: _____

*As of the effective date of O.C.G.A. 13-10-91, the applicable federal work authorization program is the "EEV / Basic Pilot Program" operated by the U. S. Citizenship and Immigration Services Bureau of the U.S. Department of Homeland Security, in conjunction with the Social Security Administration (SSA).

**Authority O.C.G.A.** 13-10-91

**CONTRACT DOCUMENT B2**
**CITY OF FAYETTEVILLE, GEORGIA**

## U. S. CITIZEN/QUALIFIED ALIEN AFFIDAVIT

By executing this affidavit under oath, as an applicant for a City of Fayetteville, Georgia Business License or Occupational Tax Certificate, Alcohol License, contracts or other public benefit as referenced in O.C.G.A. Section 50-36-1, I am stating the following with respect to my application for a City of Fayetteville Business License or Georgia Occupational Tax Certificate, Alcohol License, Taxi Permit or other public benefit (CIRCLE ONE) for:

_____
(Name of natural person applying on behalf of individual, business, corporation, partnership, or other private entity)

1) _____ I am a United States Citizen

**OR**

2) _____ I am a legal permanent resident 18 years of age or older, or I am an otherwise qualified alien or non-immigrant under the Federal Immigration and Nationality Act, 18 years of age or older and lawfully present in the United States.*

In making the above representation under oath, I understand that any person who knowingly and willfully makes a false, fictitious, or fraudulent statement or representation in an affidavit shall be guilty of a violation of Code Section 16-10-20 of the Official Code of Georgia.

Signature of Applicant: Date:

_____ _____

Printed Name:

_____

SUBSCRIBED AND SWORN
BEFORE ME ON THIS THE
____ DAY OF _____, 20__

*_____
Alien Registration Number for Non-Citizens

_____
Notary Public
My Commission Expires: _____

*Note: O.C.G.A. 50-36-1(e)(2) requires that aliens under the Federal Immigration and Nationality Act, Title 8 U.S.C., as amended, provide their alien registration number. Because legal permanent residents are included in the Federal definition of "alien", legal permanent residents must also provide their alien registration number. Qualified aliens that do not have an alien registration number may supply another identifying number.

**CONTRACT DOCUMENT C**
**CITY OF FAYETTEVILLE, GEORGIA**

## CONTRACTOR'S QUALIFICATION STATEMENT

The Undersigned certifies under oath that the information provided herein is true and correct:

TO: Mayor and Council Members
City of Fayetteville
240 S. Glynn Street
Fayetteville, Georgia 30214

FROM: Corporation [ ]

LEGAL NAME: Partnership [ ]

REGISTERED ADDRESS IN GEORGIA: Individual [ ]

PRINCIPAL OFFICE IN GEORGIA: Joint Venture [ ]

Other [ ]

NAME OF PROJECT:

**HIGHLAND VIEW POINT SANITARY SEWER IMPROVEMENTS**

TYPE OF WORK

_____ General Construction _____HVAC

_____ Plumbing _____ Electrical

_____ Other _____
(please specify)

Primary Contact Person
Name: _____
Address: _____
Telephone: _____
Fax: _____
Title: _____

## A ORGANIZATION

1. How long have you been in business as a Contractor?

2. How may years has your organization been operating under its present business name?

   (a) List all former names.

3. If your organization is a corporation, answer the following:

   (a) Date of incorporation:

   (b) State of incorporation:

   (c) President's name:

   (d) Vice-president's name(s):

   (e) Secretary' name:

   (f) Treasurer's name:

4. If your organization is a partnership, answer the following:

   (a) Date of organization:

   (b) Type of partnership (if applicable):

   (c) Name(s) of general partner(s):

   (d) State and County of organization

5. If your organization is individually owned, answer the following:

   (a) Date of organization:

   (b) Name of owner:

7. If the form of your organization is other than those listed above, describe it and name the principals:

## B LICENSING

1. List all trade categories in which your organization is legally qualified to do business and indicate registration or license numbers, if applicable.

## C EXPERIENCE

1. List the categories of work that your organization normally performs with its own forces.

2. Claims and Suits. (If the answer to any of the questions below is yes, please attach details.)

   (a) Has your organization ever failed to complete any public work awarded to you?

   (b) Are there any judgments, claims, arbitration proceedings or suits pending or outstanding against your organization or its officers?

   (c) Has your organization filed any law suits or requested arbitration with regard to construction contracts within the last five years?

3. Within the last five years, has any officer or principal of your organization ever been an officer or principal of another organization when it failed to complete a public works construction contract? (If the answer is yes, please attach details.)

4. On a separate sheet, list all public works projects performed in the last three years, describing the type of and the public entities for who the work was done.

   (a) State total worth of work in progress sand under contract.

5. On a separate sheet, list the construction experience and present commitments of the key individuals of your organization.

## D REFERENCES

1. Trade References (subcontractors):

2. Bank References:

3. Customer/Client References:

**E FINANCING** (The Bidder is hereby notified that the City reserves the right to require that the Bidder submit the following upon request.)

1. Financial Statement

(a) Attach a financial statement, preferably audited, including your organization's latest balance sheet and income statement showing the following items:

Current Assets (e.g., cash, joint venture accounts, accounts receivable, notes receivable, accrued income, deposits, materials inventory and prepaid expenses):

Net Fixed Assets:

Other Assets:

Current Liabilities (e.g., accounts payable, notes payable, accrued expenses, provision for income taxes, advances, accrued salaries and accrued payroll taxes):

(b) Name and address of firm preparing attached financial statement, and date thereof:

(c) Is the attached financial statement for the identical organization named on page one?

(d) If not, explain the relationship and financial responsibility of the organization whose financial statement is provided (e.g., parent-subsidiary).

2. Will the organization whose financial statement is attached, if different from the Contractor, act as a guarantor of the contract for construction?

Dated at _____ this _____ day of _____, 2010.

Name of Organization:

By:

Title:

_____

being duly sworn deposes and says that he information provided herein is true and sufficiently complete so as not to be misleading.

Subscribed and sworn before me this _____ day of _____, 2010.

_____

Notary Public:

My Commission Expires:

NOTE: The Contract will be awarded to the lowest responsive and responsible bidder. Many factors, such as experience, expertise, capacity, etc., are considered in determining whether a bidder is responsible. The City will reject the bids of all unqualified bidders.

# CONTRACT DOCUMENT D
# CITY OF FAYETTEVILLE, GEORGIA

## CONSTRUCTION PLANS

INDEX OF DRAWINGS


| Drawing No. | Title | Date (Revision Date if Applicable) |
|---|---|---|
| G100 | Cover | 8/12/15 |
| G101 | General Notes | 8/12/15 |
| C100 | Existing Conditions Plan & Profile | 8/12/15 |
| C200 | Site and Utility Plan & Profile Option 1 | 8/12/15 |
| C210 | Site and Utility Plan & Profile Option 2 | 8/12/15 |
| C500 | Three Phase ES&PC Plan Option 1 | 8/12/15 |
| C510 | Three Phase ES&PC Plan Option 2 | 8/12/15 |
| C600 | Erosion Control Details | 8/12/15 |
| C601 | Erosion Control Details | 8/12/15 |
| C700 | Construction Details | 8/12/15 |
| C701 | Construction Details | 8/12/15 |

# CONTRACT DOCUMENT F
# CITY OF FAYETTEVILLE, GEORGIA

## SCOPE OF WORK

The Highland View Point Sanitary Sewer Improvements project will include removing and installing approximately 105 LF of 8-inch ductile iron gravity sewer with steel casing, connection to two existing manholes, and all associated appurtenances. Including Option 1 earthwork to eliminate the storm culvert and provide storm drainage via graded swale with channel stabilization and two pipe piers, or Option 2 removal and replacement of storm culvert with double 42-inch reinforced concrete pipe and concrete headwalls.

Notwithstanding the foregoing, the undersigned Contractor agrees to perform all work required to complete the project in accordance with the plans and technical specifications and Contract Documents as determined by the Engineer. Contractor agrees if any work is required in order to carry complete the project in accordance with industry standard and/or the plans but is not referenced in the technical specifications, plans or this scope of work, such work is hereby incorporated into the scope of work by this reference. The Contractor agrees that the scope of work to be performed by the Contractor includes all work required to complete the project in accordance with industry standard and the Contract Documents.

# CONTRACT DOCUMENT G
# CITY OF FAYETTEVILLE, GEORGIA

## CONSTRUCTION CONTRACT – UNIT PRICE

Owner: City of Fayetteville
Address: 240 S. Glynn Street
Fayetteville, Ga. 30214

Project Manager: Mr. Chris Hindman, Director of Public Services
Telephone No.: 770-461-6029

Contractor: _____
Address: _____
_____

Project Manager: _____
Telephone No.: _____

Project: **HIGHLAND VIEW POINT SANITARY SEWER IMPROVEMENTS**

Engineer Name: Integrated Science & Engineering, Inc.
Address: 1039 Sullivan Road, Suite 200
Newnan, GA 30265

Contact Person: Mr. Cary Dial, P.E.
678-552-2106

This Agreement made this ___ day of _____, 2015, between the City of Fayetteville, Georgia (hereafter "Owner") and _____ (hereafter "Contractor") in consideration for the agreements herein contained the parties agree as follows:

## ARTICLE 1 CONTRACT DOCUMENTS/RESOLUTION OF CONFLICTS

Contract Document(s) shall mean and includes Contract Documents A through M listed as follows: A. Bids/Instructions to Bidder, B. Bid/Tender Form, B1. Georgia Security and Immigration Compliance Act Form, B2. U.S. Citizen/Qualified Alien Affidavit, C. Contractor Qualifications, D. Plans, E. Reserved, F. Scope of Work, G. General Contract, H. General Conditions, I. Bid Bond, J. Payment Bond, K. Performance Bond, L. Supplemental Conditions, M. Technical Specifications and including all other documents listed in this Agreement and Modifications issued after execution of this Agreement; these are hereby incorporated as part of this Agreement as if fully restated herein. The Contract Documents represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. Contractor hereby acknowledges receipt of all Contract Documents.

In the event there is any actual or perceived conflicts between and word, term, paragraph, section, or provision of the Contract documents then such conflict shall be resolve by applying the word, term, paragraph, section, or provision of the higher ranking document. The Contract Documents shall rank in the following order with number 1 being the highest ranking document and the remaining documents descending in rank therefrom:

1.) Fully Executed Change Order Forms
2.) Plans – Contract Document D
3.) Technical Specifications – Contract Document M
4.) General Contract – Contract Document G
5.) Supplemental Conditions – Contract Document L
6.) Federal Requisition Provisions – N/A
7.) Georgia Security and Immigration Compliance Act Form – Contract Document B1
8.) U.S. Citizen/Qualified Alien Affidavit – Contract Document B2
9.) General Conditions to the Contract – Contract Document H
10.) Scope of Work – Contract Document F
11.) Payment Bond – Contract Document J
12.) Performance Bond – Contract Document K
13.) Bids/Instructions to Bidder – Contract Document A
14.) Bid/Tender Form – Contract Document B
15.) Bid Bond – Contract Document I
16.) Contractor Qualifications – Contract Document C

## ARTICLE 2 SCOPE OF WORK

The Contractor shall provide all labor, supervision, and materials, and everything of every sort which may be necessary for completion in a good and workmanlike manner of the Work included in the Contract Documents (Work) and as may be described in Contract Document F and according to the true intent and meaning of the plans and technical specifications, whether the same may or may not be particularly described

therein, provided the same may be reasonably inferred therefrom. All Work indicated or described in the plans or technical specifications shall be covered by this contract to the same extent as if described in both.

## ARTICLE 3 MEETINGS, DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

**1.** The Engineer or his designee shall hold a mandatory preconstruction meeting. Failure to attend said meeting shall constitute a breach of this Contract. The Engineer or his designee shall, at his option, schedule such meeting as he feels is necessary to complete the Work in an orderly, safe and efficient manner. All meetings called by the Engineer or his designee are mandatory.

**2.** The date of commencement of the Work shall be the date stated in the Notice to Proceed which shall be delivered to the Contractor by facsimile, certified mail or hand delivery.

**3.** The Contract Time shall be measured from the Date of Commencement.

**4.** The Contractor shall achieve Substantial Completion of the entire Work not later than **forty five (45)** calendar days from the Date of Commencement and complete the project within **seventy five (75)** calendar days, subject to adjustments of this Contract Time as provided in the Contact Documents.

## ARTICLE 4 CONTRACT AMOUNT

**UNIT PRICE**

The Owner shall pay the Contractor in monthly progress payments, provided all conditions precedent are performed, the Contract Sum for the Contractor's performance of the Contract. The Contract Sum shall be:
_____ Dollars ($ _____).

## ARTICLE 5 PAYMENT PROCEDURE

**UNIT PRICE**

**(a) Progress Payments**

**1.** Based upon Applications for Payment submitted to the Engineer or Owner by the Contractor and approval thereof by the Engineer, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

**2**. The Owner shall make payment to the Contractor not later than the 30th day of the month immediately following the month in which the application is received. if an Application for Payment, is received no later than the 25th of the month. If an Application for Payment is received by the Engineer after the 25th day of the month, said application will be treated as if received in the next month payment shall be made by the 30th day of the following month (i.e. roughly two months after receipt of the pay application).

**3.** Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form and supported by such data to substantiate its accuracy as the Engineer may require.

**4.** Applications for Payment shall indicate the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

**5.** Subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

- **a.** Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of Contract Sum allocated to that portion of the Work in the schedule of values, less retainage if applicable;
- **b.** Subtract the aggregate of previous payments made by the Owner; and
- **c.** Subtract amounts, if any, for which the Engineer has charged to Contractor for failure to perform.

**(b) FINAL PAYMENT**

Final payment, constituting the entire unpaid balance of the Contract Sum less amounts, if any, for which the Engineer has charged to Contractor for failure to perform, shall be made by the Owner to the Contractor when:

1. the Contractor has fully performed all obligations under the Contract Documents;
2. a final Certificate for Payment has been issued by the Engineer.
3. a contractor's affidavit is received.
4. final lien waivers are received from all subcontractors.

## ARTICLE 6 TERMINATION OR SUSPENSION

SEE GENERAL CONDITIONS (CONTRACT DOCUMENT H).

## ARTICLE 7 MISCELLANEOUS PROVISIONS

This Agreement along with the contract documents constitutes the entire agreement of the parties. This Agreement may not be modified or amended except in writing signed by the parties

and in accordance with the Contract Documents. No contemporaneous or future oral representation may be relied upon by either party. No term, word, covenant, condition, provision or obligation contain in this Agreement may be waived unless so waived in writing signed by the waiving party. The Agreement shall be governed by the substantive and procedural law of the State of Georgia.

This Agreement is entered into as of the day and year first written above and is executed in at least three original copies, of which one is to be delivered to the Contractor, one to the Engineer for use in the administration of the Contract, and the remainder to the Owner.

**OWNER:**

**CITY OF FAYETTEVILLE, GEORGIA**

_____ [SEAL]
**BY:**
**ITS:**

Address for Notices:
Attn: Director of Public Services
240 S. Glynn St.
Fayetteville, GA 30214

With copy to:

David Winkle
Nelson Mullins Riley & Scarbrough LLP
201 17th Street NW, Suite 1700
Atlanta, GA 30363

**CONTRACTOR:**

_____ [SEAL]
**BY:**
**ITS:**

**Address for Notices:**
_____
_____
_____
_____

# CONTRACT DOCUMENT H
# CITY OF FAYETTEVILLE, GEORGIA

## GENERAL CONDITIONS OF THE CONTRACT

## TABLE OF ARTICLES

1. DEFINITIONS

2. CONSTRUCTION AND INTENT OF CONTRACT DOCUMENTS/OWNERSHIP OF CONTRACT DOCUMENTS

3. RIGHTS AND OBLIGATIONS OF OWNER

4. RIGHTS AND OBLIGATIONS OF CONTRACTOR

5. SHOP DRAWINGS, SUBMITTALS, PRODUCT DATA AND SAMPLES

6. INDEMNIFICATION

7. ENGINEER'S DUTIES

8. CLAIMS AND DISPUTES

9. CONTRACTORS

10. RESERVED

11. CHANGES IN THE WORK

12. TIME

13. PAYMENTS AND COMPLETION

14. PROTECTION OF PERSONS AND PROPERTY

15. INSURANCE AND BONDS

16. UNCOVERING AND CORRECTION OF WORK

17. LIQUIDATED DAMAGES

18. MISCELLANEOUS PROVISIONS

19. TERMINATION

## ARTICLE 1: DEFINITIONS

### (a) CONTRACT DOCUMENTS

The Contract Documents form the Contract for Construction. The Contract Documents represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Engineer and Owner, (2) between the Owner and or Sub-Contractor, (3) between the Owner and Engineer or (4) between any persons or entities other than the Owner and Contractor.

### (b) THE WORK

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

### (c) THE PROJECT

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner or by separate Owners.

### (d) THE PLANS

The Plans are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

### (e) THE TECHNICAL SPECIFICATIONS

The Technical Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

### (f) THE PROJECT MANUAL-RESERVED

### (g) OWNER

The Owner is the City of Fayetteville, Georgia.

### (h) CONTRACTOR

The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number.

### (i) DAY

The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

**(j) CLAIM**

A claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, extension of time or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. Claims must be initiated by written notice. The responsibility to substantiate Claims shall rest with the party making the Claim.

**(k) ENGINEER**

Unless otherwise expressly stated in the Contract Documents, the Engineer shall be the City of Fayetteville Director of Public Services and/or his designee.

**(l) SUBSTANTIAL COMPLETION**

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

## ARTICLE 2: CONSTRUCTION AND INTENT OF CONTRACT DOCUMENTS/OWNERSHIP OF CONTRACT DOCUMENTS

**(a)** The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance of any act by the Owner shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

**(b)** RESERVED

**(c)** Unless otherwise stated in the Contract Documents, words which have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

**(d)** Terms capitalized in these General Conditions include those, which are (1) specifically defined and (2) the titles of numbered articles and identified references to Paragraphs, Subparagraphs and Clauses in the documents.

**(e)** In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

**(f)** The Contract Documents shall be signed by the Owner and Contractor. If either the Owner or Contractor or both do not sign all the Contract Documents, the Engineer shall identify such unsigned Documents upon request.

**(g)** Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

**(h)** The Contractor may retain one record set of Plans and Specifications. Neither the Contractor nor any Sub-Contractor or material or equipment supplier shall own or claim a copyright in the Plans, Specifications and other documents prepared by the Engineer or the Engineer's consultants, and unless otherwise indicated the Engineer and the Engineer's consultants shall be deemed the authors of them and will retain all common law, statutory and other reserved rights, in addition to the copyrights.

## ARTICLE 3: RIGHTS AND OBLIGATIONS OF OWNER

### (a) OBLIGATIONS

Contractor shall pay for necessary approvals, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

Unless otherwise provided in the Contract Documents, the Contractor will be furnished, free of charge, such copies of Plans as are reasonably necessary for execution of the Work.

### (b) OWNER'S RIGHT TO STOP WORK

If the Contractor fails to correct Work which is not in accordance with the requirements of the Contract Documents or persistently fails to carry out Work in accordance with the Contract Documents, the Owner, or its designee, may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Owner or any other person or entity.

### (c) OWNER'S RIGHT TO CARRY OUT THE WORK

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a seven-day period after receipt of written notice from the Owner, or its designee, to commence and continue correction of such default or neglect with diligence and promptness, the Owner may after such seven-day period give the Contractor a second written notice to correct such deficiencies within a three-day period. If the Contractor within such three-day period after receipt of such second notice fails to commence and continue to correct any deficiencies, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's

expenses and compensation for the Engineer's additional services made necessary by such default, neglect or failure. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

## ARTICLE 4: RIGHTS AND OBLIGATIONS OF CONTRACTOR

**(a)** The Contractor shall perform the Work in accordance with the Contract Documents.

**(b)** The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Engineer in the Engineer's administration of the Contract, or by tests, inspections or approvals required or performed by persons other than the Contractor.

**(c)** Before starting each portion of the Work, Contractor shall carefully study and compare the various Plans and other Contract Documents relative to that portion of the Work, as well as all the Contract Documents and, shall take field measurements of any existing conditions related to that portion of the Work and shall observe any conditions at the site affecting it. These obligations are for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents. Any errors, inconsistencies or omissions discovered by the Contractor shall be reported promptly to the Engineer as a request for information in such form as the Engineer may require. Failure to report such errors and omissions shall be deemed a waiver and Contractor hereby assumes the risk of liability resulting therefrom.

**(d)** If the Contactor believes that additional cost or time is involved because of clarifications or instructions issued by the Engineer in response to the Contractor's notices or requests for information pursuant to this Article, the Contractor shall make request for extension of time as provided in Article 8. If the Contractor fails to perform the obligations of this Article, the Owner shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations.

**(e)** The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and shall not proceed with that portion of the Work without further written instructions from the Owner.

**(f)** The Contractor hereby indemnifies and holds harmless the Owner from and against the acts and omissions of the Contractor's employees, Contractors and their

agents and employees, and other persons or entities performing portions of the Work for or on behalf of the Contractor.

**(g)** The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

**(h)** The Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

**(i)** The Contactor may make substitutions only with the consent of the Owner, after evaluation by the Engineer and in accordance with a properly executed Change Order.

**(j)** The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Contract. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them. A person who is deemed to be unfit by the Owner, in its sole discretion, shall not be permitted to work on the project upon written notice from Owner.

**(k)** Without limiting any warranties that arise or are implied under Georgia Law, Contractor warrants to the Owner that materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects and that the Work will conform to the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective in Owner's sole discretion.

**(l)** The Contractor shall pay all applicable sales, consumer, use and similar taxes for the Work.

**(m)** The Contractor shall comply with and give notices required by laws, ordinances, rules, regulations and lawful orders of public authorities applicable to performance of the Work.

**(n)** If the Contractor performs Work, knowing it to be contrary to laws, statutes, ordinances, building codes, and rules and regulations, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to its correction.

**(o)** The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct. Unless otherwise provided in the Contract Documents:

**1.** allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all requires taxes, less applicable trade discounts;

**2.** Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances;

**3.** whenever costs are less than allowances the Contract Sum shall be adjusted down accordingly.

**(p)** Materials and equipment under an allowance shall be selected by the Contractor in sufficient time to avoid delays in the Work.

**(q)** The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

**(r)** The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Engineer's approval, Contractor's construction schedule for the Work. The schedule shall not exceed the Project Completion Date under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

**(s)** The Contractor shall maintain at the site a copy of all Contract Documents and approved Shop Drawings, Product Data, Samples and similar required submittals.

**(t)** The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

**(u)** The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly.

**(v)** The Contractor shall not damage or endanger a portion of the Work or fully or partially completed work of others by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by others except with written consent of the Owner.

**(w)** The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove from and about the Project waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials. If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the cost thereof shall be charged to the Contractor.

**(x)** The Contractor shall provide the Owner and Engineer access to the Work in preparation and progress wherever located.

## ARTICLE 5: SHOP DRAWINGS, PRODUCT DATA AND SAMPLES (RESERVED)

## ARTICLE 6: INDEMNIFICATION

**(a)** To the fullest extent permitted by law, the Contractor hereby indemnifies and holds harmless the Owner, Engineer, Engineer's consultants, Owner's attorney, and the agents and employees of any of them ("Indemnified Parties") from and against claims, damages, losses and expenses, including but not limited to actual attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property caused in part or in whole by the negligent acts or omissions of the Contractor, anyone directly or indirectly employed by Contractor or anyone for whose acts Contractor may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Owner acknowledges that the work required hereby may require working in and around vehicular traffic and such work is inherently dangerous. Contractor hereby, to the fullest extent permitted by law, indemnifies and holds harmless the Owner, Engineer, Engineer's consultants, Owner's attorney, and the agents and employees of any of them from and against claims, damages, losses and expenses resulting from any accident, injury or damage cause to any employee, subcontractor of Contractor, or unrelated third party caused by a vehicle or vehicular traffic in the vicinity of the project site. Further, Contractor indemnifies the Indemnified Parties from and against any third party claims for damages or for injury resulting from the description or interferences with vehicular or pedestrian traffic in the performance of the Work. Notwithstanding the foregoing, this indemnity shall not extend to cover any liabilities or damages caused by the sole negligence of Owner or the other indemnified parties.

**(b)** In claims against any person or entity indemnified under this Paragraph by an employee of the Contractor, a subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Subparagraph (a) above shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

## ARTICLE 7: ENGINEER'S DUTIES

**(a)** If the employment of the Engineer is terminated, the Owner shall employ a new Engineer and whose status under the Contract Documents shall be that of the former Engineer.

**(b)** The Engineer will provide administration of the Contract as described in the Contract Documents, and will be an Owner's representative (1) during construction, (2) until final payment is due and (3) with the Owner's concurrence, from time to time during the one-year period for correction of Work. The Engineer will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents and under Georgia law.

**(c)** The Engineer, as a representative of the Owner, will visit the site at intervals appropriate to the stage of the Owner's operations (1) to become generally familiar with and to keep the Owner informed about the progress and quality of the portion of the Work completed, (2) to endeavor to guard the Owner against defects and deficiencies in the Work, and (3) to determine in general if the Work is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. The Engineer will neither have control over or charge of, nor be responsible for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents.

**(d)** The Engineer will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Engineer will not have control over or charge of and will not be responsible for acts or omissions of the Contractors, or their agents or employees, or any other persons or entities performing portions of the Work.

**(e)** Based on the Engineer's evaluations of the Contractor's Applications for Payment, the Engineer will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

**(f)** The Engineer will have authority to reject Work that does not conform to the Contract Documents. Whenever the Engineer considers it necessary or advisable, the Engineer will have authority to require inspection or testing of the Work without regard to whether such Work is fabricated, installed or completed.

**(g)** The Engineer will review and approve or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples, if any, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Engineer's action will be taken with such reasonable promptness as to cause no delay in the Work or in the activities of the Contractor, or Owner, while allowing sufficient time in the Engineer's professional judgment to permit adequate review. Approval of submittals shall not be

deemed an approval of such work as built. The Engineer's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Engineer, of any construction means, methods, techniques, sequences or procedures. The Engineer's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

**(h)** The Engineer will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work.

**(i)** The Engineer will conduct inspections to determine the date or dates of Substantial Completion and the date of Project Completion, will receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract Documents and assembled by the Owner, and will issue a final Certificate for Payment upon compliance with the requirements of the Contract Documents.

**(j)** The Engineer will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Engineer's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If no agreement is made concerning the time within which interpretations required of the Engineer shall be furnished in compliance with this Paragraph, then delay shall not be recognized on account of failure by the Engineer to furnish such interpretations until 15 days after written request is made for them.

**(k)** Interpretations and decisions of the Engineer will be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings.

**(l)** The Engineer's decisions on matters relating to Contractor's performance will be final unless Owner serves a written notice of objection within seven (7) days.

## ARTICLE 8: CLAIMS AND DISPUTES

**(a)** Claims by the Contractor must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the Contractor first recognizes the condition giving rise to the Claim, whichever is earlier. Claims must be initiated by written notice to the Engineer and the Owner.

**(b)** Pending final resolution of a Claim, except as otherwise agreed in writing, the Contractor shall proceed diligently with performance of the Work and the Owner shall continue to make payments in accordance with the Contract Documents.

**(c)** RESERVED

**(d)** Claims for Additional Cost. If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before

proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property. All claims for additional cost shall be submitted within seven (7) calendar days of the event that Contractor believes gave use to its right to additional cost stating in such claim the amount and basis therefore with particularity. Further, Contractor shall state the reason such additional cost is merited. Such Claim shall be submitted to the Engineer for initial decision.

**(e)** All claims for an increase in contract time shall be submitted within seven (7) calendar days of the event that Contractor believes gave use to its right to stating in such claim the reason such increase in Contract Time is merited. Such Claim shall be submitted to the Engineer for initial decision.

**(f)** All other claims. All claims not enumerated herein, arising out of or in any manner relating to the work required by the Contract Documents shall be submitted to the Engineer for initial decision.

**(g)** Decision of Engineer. All Claims shall be referred to the Engineer for decision. A decision by the Engineer shall be required as a condition precedent to litigation of any Claims between the Contractor and Owner. The Engineer will not decide disputes between the Owner and persons or entities other than the Contractor.

**(h)** The Engineer will review Claims and within ten days of the receipt of the Claim and take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Engineer is unable to resolve the Claim if the Engineer lacks sufficient information to evaluate the merits of the Claim or if the Engineer concludes that, in the Engineer's sole discretion, it would be inappropriate for the Engineer to resolve the Claim.

**(i)** The Engineer will approve or reject Claims by written decision, which shall state the reasons therefore and which shall notify the parties of any change in the Contract Sum or Contract Time or both. The approval or rejection of a Claim by the Engineer shall be final and binding on the parties but subject to Paragraph J below.

**(j)** If either party is unsatisfied with the decision of the Engineer then such party may appeal the decision to the Superior Court of Fayette County, Georgia, provided, such appeal is filed no later than seven (7) calendar days after the Engineer delivers his decision. Parties hereby expressly waive any right to file an action seeking any legal or equitable remedy or declaration of rights after the passage of seven (7) calendar days.

**(k)** Upon receipt of a Claim against the Contactor or at any time thereafter, the Engineer or the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Engineer or the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

**(l)** If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines prior to resolution of the Claim by the Engineer.

## ARTICLE 9: CONTRACTORS AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

**(a)** Unless otherwise stated in the Contract Documents the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Engineer the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work.

**(b)** The Contactor shall not contract with a proposed person or entity to whom the Owner or Engineer has made an objection. The Contractor shall not contract with anyone to whom the Owner has made an objection.

**(c)** The Contractor shall file a Notice of Commencement in the Fayette County, Georgia Superior Court in accordance with O.C.G.A. § 36-91-92.

## ARTICLE 10: RESERVED

## ARTICLE 11: CHANGES IN THE WORK, CHANGES TO THE CONTRACT & EXTRA WORK

The Owner may, at its sole discretion, either before the commencement or during the construction of the Work or any portion thereof, order any extra work to be done and make any changes and alterations, which it may deem expedient, whether such changes increase or diminish the Work. The additional cost and time required to do the extra work, if any, shall be provided by the Contractor to the Owner in writing before such work commences. No change or alteration shall be made in the Work, except upon written order of the Owner on a Change Order form (EJCDC Standard Change Order Form) and no request for extra work orders will be granted without prior execution of a Change Order form (EJCDC Standard Change Order Form). The amount to be paid by the Owner or allowed by the Owner by virtue of such change or alteration shall be stated in the Change Order Form. But should the Owner and Contractor disagree as to amount to be paid or allowed for such changes or alterations, the Contractor shall proceed to perform the extra work, if the Owner so directs in writing, and the determination of the quantities involved and the prices for same, shall be made after the extra work is completed. All orders for additional work exceeding the contract price must be approved by the Mayor and Council of Owner. No claims for extra work will be allowed unless authority for same, in writing has been obtained from the Engineer with the authorization of the Owner. As a condition precedent to payment by Owner to Contractor for any extra work performed by this Contractor, it shall be the responsibility of this Contractor to submit to the Engineer any and all bills, requisitions, invoices or other form of payment request for the said extra work within forty-five (45) days of approval of the said extra

work by the Owner. Failure to comply with the above-specified time frame shall be deemed a waiver and Contractor agrees to forfeit any requirement for payment for the said extra work.

## ARTICLE 12: TIME

All work required by the Contract Documents shall be completed on such date stated in the General Contract (Contract Document G). Provided, however, the time required by the General Contract shall only be tolled by adverse weather pursuant to the following:

Completion time will not be extended for normal bad weather. The time for completion as stated in the Contract Documents includes due allowance for calendar days on which work cannot be performed. For the purpose of this Contract, the Contractor agrees that he may expect to lose calendar days due to weather in accordance with the following table:

| | | |
|---|---|---|
| Jan. 10 days | May 8 days | Sep. 7 days |
| Feb. 9 days | June 8 days | Oct. 6 days |
| Mar. 9 days | July 11 days | Nov. 7 days |
| Apr. 8 days | Aug. 9 days | Dec. 8 days |

Also, the Contractor agrees that the measure of extreme weather during the period covered by this Contract shall be the number of days in excess of those shown for each month in the table above, in which precipitation exceeded .10 inch and the average temperature failed to exceed 40 degrees F., averaged from the Georgia Experiment Station weather station in Griffin, Georgia. This is the same source of data used to determine normal weather losses. If the total accumulated number of calendar days lost to weather, from the start of work until the completion of project exceeds that total accumulated number to be expected for the same period from the table above, time for completion will be extended by the number of calendar days needed to include the excess number of calendar days lost. Request for extension in contract time shall be done as specified in change order request procedures.

## ARTICLE 13: PAYMENTS AND COMPLETION

The Owner agrees to pay the Contractor the Contract Sum as stated in Article 4 of the General Contract (Contract Document G), for the satisfactory performance and completion of the Work and of all the duties, obligations, and responsibilities of the Contractor under this Agreement. Requests/Requisitions for payment must be received by Owner no later than the 25$^{th}$ day of each month. Payments will be made approximately on the 15$^{th}$ day of the following month. The final payment shall be paid by the Owner within 6 months after the work is accepted by the Owner and inspecting Engineer to the Contractor, provided first, however, that the Contractor shall have fulfilled all the obligations to be performed by the Contractor under the Contract Documents. If the General Contract calls for a Lump Sum then all payments will be made per the mutually agreed Payment Schedule: The Contractor shall not imbalance its schedule of values nor shall artificially inflate any element thereof. The violation of this

provision by the Contractor shall constitute a material breach of this Contract. This payment schedule is for payment purposes only. It is not the intent of the payment schedule to represent a complete breakdown of Work, and the quantities listed may not represent the actual quantities required for a complete installation. If the General Contract calls for Unit Prices, then all payments will be made for units installed, provided, however, no payments will be made or shall be due in excess of the Contract Sum except to the extent a duly authorized and executed change order has increased the Contract Sum. The Contractor shall invoice for any approved extra work accomplished, over and above that for which payment is provided for in a Request for Payment. If within thirty (30) days after completion of said extra work, after which time he shall be deemed to have waived his right to payment for same. **Please remember to submit three (3) sets of original signatured payment request/requisition documents by the 25th of the month.**

All invoices shall be supported to the extent required by the Owner by two (2) signed original affidavits, or other evidence satisfactory to the Owner, showing that all labor and material bills, taxes, and all other indebtedness incurred by the Contractor for the Project have been paid in full up to the date of last payment received from the Owner. Contractor shall also submit two (2) signed originals "Conditional Release of Lien" on a form provided complaint with O.C.G.A. § 44-14-366 for the amount and period covered by the currently submitted invoice. RECEIPT OF FULL AND COMPLETE LIEN WAIVERS AS REQUIRED HEREIN SHALL BE A CONDITION PRECEDENT TO ANY PAYMENT TO CONTRACTOR. The Owner may at his discretion withhold payments due the Contractor until satisfactory evidence of payment of all the Contractor's obligations has been accomplished. A Partial Waiver of Lien and Contractor's Affidavit shall be provided with each request for payment, and a Final Waiver of Lien and Contactor's Affidavit shall be submitted with request for final payment. All Waivers of Lien and Owner's Affidavits shall be in a format acceptable to the Owner and shall acknowledge all backcharges (if any) applied to the Contract Sum.

No payment (final or otherwise) made under or in connection with this Agreement shall be conclusive evidence of the performance of the Work or of this Agreement, in whole or in part, and no such payment shall be construed to be an acceptance of defective, faulty or improper work or materials; nor shall it release the Contractor from any of its obligations under this Agreement; nor shall entrance and use by the Owner constitute acceptance of the Work or any part thereof.

Anything herein contained to the contrary notwithstanding, the Owner reserves the right to make payments directly to laborers, materialmen, Contractors, sub-Contractors, or any Contractors or sub-Contractors of any of them, for or on account of work performed or materials furnished under this Agreement. If such payments are made in good faith and upon reasonable evidence of their validity, the Owner shall have no liability in connection therewith and shall deduct such payments from any balance owed to the Contractor.

The Contractor shall, prior to the submission of the first draw, supply Owner the name, address and telephone and fax numbers of all suppliers furnishing or to furnish materials

for work covered hereby (see attached form). No payment shall be made to the Contractor until such information is furnished. The Owner reserves the right and is authorized by the Contractor to make all draw checks jointly payable to the Contractor and material suppliers or to Contractor's and sub-Contractor's of the Contractor.

## ARTICLE 14: PROTECTION OF PERSONS AND PROPERTY SAFETY PRECAUTIONS AND PROGRAMS

**(a)** The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract. The Contractor shall insure all work on the project site is performed in accordance with all State and Federal safety rules and regulations, specifically including all OSHA rules and regulations.

### SAFETY OF PERSONS AND PROPERTY

**(b)** The Owner shall take all necessary precautions for safety of, and shall provide protection to prevent damage, injury or loss to:

**1.** persons on the Project Site and other persons who may be affected by the Work thereon;

**2.** the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Owner or the Contractor or Sub-Contractors;

**3.** other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction; and

**4.** all personal property located on or adjacent to the Project Site.

**(c)** The Contractor shall give notices and comply with applicable laws, ordinances, rules, regulations and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

**(d)** The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

**(e)** When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

**(f)** The Contractor shall promptly remedy damage and loss to property caused in whole or in part by the Contractor, a Sub-Contractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible except damage or loss attributable to the sole negligence of the Owner or Engineer. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Article 6.

**(g)** The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contactor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Engineer.

**(h)** The Contractor shall not load or permit any part of the construction or site to be loaded so as to endanger its safety.

**(i)** **HAZARDOUS MATERIALS:** If reasonable precautions will be inadequate to prevent foreseeable damage, bodily injury or death to person resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Engineer in writing.

**(1)** The Contractor shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Owner and, in the event such material or substance is found to be present, to verity that it has been rendered harmless. Unless otherwise required by the Contract Documents, the Contractor shall furnish in writing to the Owner and Engineer the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Owner and the Engineer will promptly reply to the Contractor in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Contractor. If either the Owner or Engineer has an objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner and Engineer have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. The Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

**(2)** To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Contractors, Engineer, Engineer's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described herein and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) and provided that such damage, loss or expense is not due to the sole negligence of a party indemnified hereunder.

**(j)** **Drug Free Workplace:** Contractor shall maintain a drug free workplace.

## ARTICLE 15: INSURANCE AND BONDS

**(a)** In addition to the indemnification provided by Contractor in the Contract Documents, the Contractor hereby agrees to perform the Work as an independent Contractor, and not as a subcontractor, agent or employee of the City of Fayetteville.

**(b)** The Contractor shall not begin work under the Contract until after he has obtained all of the minimum insurance herein described and such insurance has been approved by the City of Fayetteville. The Contractor shall require the same insurance required hereby of subcontractors insuring such portion of the work for subcontractor is responsible to Contractor. The Contractor shall not permit any subcontractor to begin work until such insurance has been obtained and approved.

**(c)** Proof of insurance coverage must be submitted for approval as specified in these documents.

**(d)** The Contractor shall procure and maintain at his expense during the life of the Contract the following minimum insurance:

1. Worker's Compensation Insurance for statutory obligations imposed by Worker's Compensation or Occupational Disease Laws, including, where applicable, the United States Longshoremen's and Harbor Worker's Act, the Federal Employers' Liability Act, and the Jones Act, with a minimum limit of $100,000.00 per accident.

2. Comprehensive Automobile Liability Insurance with the following minimum limits of liability:

| Contract Amount | Insurance Liability |
|---|---|
| $5,000,000.00 or less | $1,000,000.00 Combined Single Limit<br>Bodily Injury and Property Damage Liability<br>- each occurrence. |
| Over $5,000,000.00 | $3,000,000.00 Combined Single Limit<br>Bodily Injury and Property Damage Liability<br>- each occurrence. |

This insurance is to apply to all owned, non-owned, and hired automobiles and other vehicles used by the Contractor in the performance of the work. The City of Fayetteville, its employees, agents and designee's under the Contract Documents shall be named insured on all policies and all policies will obligate the insurance company as of the date of the occurrence.

3. Comprehensive General Liability, Contractual Liability, and Products/Completed Operations Liability, Owners and Contractors Protective Liability; and Personal Injury Liability Insurance covering all operations required to complete the work, including coverage for damage caused by explosion, collapse or structural injury,

and damage to underground utilities with the following minimum limits of liability:

| Contract Amount | Insurance Liability |
|---|---|
| $1,000,000.00 or less | $1,000,000.00 Combined Single Limit Bodily Injury and Property Damage Liability - each occurrence. |
| Over $1,000,000.00 | $5,000,000.00 Combined Single Limit Bodily and Property Damage Liability – each occurrence. |

The Products/Completed Operations Liability Insurance shall be provided for a period of at least one year after completion of the work.

The Contractual Liability Insurance Coverage insure the performance of the contractual obligations assumed by the Contractor by acceptance of this Contract, including specifically, but without limitation thereto, the above-mentioned agreement, included herein. All insurance shall be on an "occurrence basis" and shall be project specific coverage.

4. Property Insurance**.** Unless otherwise provided, the Contractor shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made.

   a. Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Engineer's and Owner's services and expenses required as a result of such insured loss.

   b. The insurance required hereby shall have a deductible, if at all, not higher than $1,000.00. Contractor shall be solely responsible for payment the deductible on any and all claims made and paid.

c. This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

d. Boiler and Machinery Insurance. The Contractor shall purchase and maintain boiler and machinery insurance by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractors and Sub-Contractors in the Work, all of whom shall be named insureds.

e. Loss of Use Insurance. The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Contractor waives all rights of action against the Owner for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

f. Before an exposure to loss may occur, the Contractor shall file with the Owner a copy of each policy that includes insurance coverages required by this Paragraph 5. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Owner.

g. Waivers of Subrogation. The Contractor waives all rights of subrogation and rights against Owner and any of its Contractors, agents and employees, and (2) the Engineer, Engineer's consultants, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Paragraph D or other property insurance applicable to the Work.

h. A loss inured under Contractor's property insurance shall be adjusted by the Contractor as fiduciary and made payable to the Owner subject to requirements of any applicable mortgagee clause. The Owner shall pay Contractors their just shares of insurance proceeds received by the Owner, and by appropriate agreements, written where legally required for validity, shall require Contractors to make payments to their Sub-Contractors in similar manner.

6. All insurance coverages required by this Article shall name the City of Fayetteville, Georgia, its agents, employees and designees under the Contract Documents as insured parties under such policies. Further, all property and general liability insurance policy shall be issued specific to the project, not a general policy covering Contractor on multiple projects.

7. Owner's Liability Insurance: The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

8. Project Management Protective Liability Insurance: RESERVED

**(e) PERFORMANCE BOND AND PAYMENT BOND**

The Contractor shall furnish a payment and a performance bond, each in penal amount equal to the Contract Sum and covering the faithful performance of the Contract and payment of obligations arising hereunder as stipulated in the Contract Documents and as required by Georgia law. In the event the Contract Amount is increased by duly authorized change order then Contractor shall immediately increase the penal amount of all Payment and Performance bonds in proportion to the increase in the Contract Amount. Payment and Performance Bonds must be provided in the form of Contract Documents J and K.

## ARTICLE 16 : UNCOVERING AND CORRECTION OF WORK

**(a)** If a portion of the Work is covered contrary to the Engineer's request or to requirements specifically expressed in the Contract Documents, it must, if required in writing by the Engineer, be uncovered for the Engineer's examination and be replaced, if ordered by the Engineer, at the Contractor's expense without change in the Contract Time.

**(b) CORRECTION OF WORK**

The Contractor shall promptly correct Work rejected by the Engineer or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections and compensation for the Engineer's services and expenses made necessary thereby, shall be at the Contractor's expense.

**(c) AFTER PROJECT COMPLETION**

If, within one year after the date of Project Completion of the Work or designated portion thereof or after the date for commencement of warranties, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period (or longer applicable period) for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner, the Owner may correct it in accordance with Article 3.

**(d) ACCEPTANCE OF NONCONFORMING WORK**

If the Owner prefers to accept Work, which is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

## ARTICLE 17: LIQUIDATED DAMAGES

**(a)** Without limiting any other remedy provided Owner in the Contract Documents or at law, in the event Contractor breaches any term, covenant or provision of the Contract Documents, and such the Contractor has not begun to correct or cure the breach within seven (7) days of written notice thereof from Owner, then Owner shall be entitled to collect liquidated damages in accordance with Section 108.08 of the current GDOT Standard Specifications.

**(b)** Contractor and Owner, covenant, agree and warrant that actual damages in the event of breach are difficult to estimate, that this Article 17 is intended to provide for damages not a penalty and that the per day amount stated herein is a reasonable estimate of the probable loss upon breach.

**(c)** Liquidated damages shall be based on the Substantial Completion Date if a Substantial Completion Date is established in lieu of or along with a Final Completion Date.

## ARTICLE 18: MISCELLANEOUS PROVISIONS

### (a) GOVERNING LAW/FORUM

The Contract Documents shall be governed by the substantive and procedural laws of the State of Georgia. Owner and Contractor hereby agree, covenant and warrant that the Superior Court of Fayette County, Georgia shall have sole personal and subject matter jurisdiction over any claims arising out of the Contract Documents or the Work required thereby. Parties hereby waive all objections based upon inconvenience of said forum.

### (b) SUCCESSORS AND ASSIGNS

The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to the other party hereto and to partners, successors, assigns and legal representatives of such other party in respect to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Subparagraph herein, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract. The Owner may, without consent of the Contractor, assign the Contract to an institutional lender providing construction financing for the Project. In such event, the lender shall assume the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

**(c) WRITTEN NOTICE**

Written notice shall be deemed to have been duly served if delivered in person to the individual or a member of the firm or entity or to an officer of the corporation for which it was intended, or if delivered at or sent by registered or certified mail to the address shown adjacent to the signature line hereof or at any other address listed as an address of the Owner or Contractor in the Contract Documents.

**(d) RIGHTS AND REMEDIES**

Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

No action or failure to act by the Owner or Engineer shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

**(e) TESTS AND INSPECTIONS**

Tests, inspections and approvals of portions of the Work required by the Contract Documents or by laws, ordinances, rules, regulations or orders of public authorities having jurisdiction shall be made at an appropriate time. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals.

**(f) NONDISCRIMINATION**

(1) The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, sexual preference, disability or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, sexual orientation, sexual preference, disability or national origin. Such action shall include, but not be limited to the following: Employment, upgrading, demotion, or transfer, recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the contracting officer setting forth the provisions of this nondiscrimination clause.

(2) The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, sexual preference, disability or national origin.

(3) This Nondiscriminating clause must be incorporated into any subcontract executed by Contractor for the performance of any one or more portion of the Work.

## ARTICLE 19: TERMINATION

**(a)** In the event Contractor fails to comply or becomes disabled from complying with the provisions of the Contract Documents as to character or time of performance, and the failure is not corrected within seven (7) calendar days after written request is made by Owner or Engineer to Contractor, or if such default cannot be remedied within such period and Subcontractor does not within said seven (7) day period commence and continue such act or acts as shall be necessary to remedy such default or neglect with diligence and promptness, Owner may take over and complete the performance of the work of the Contract Documents at the expense of Contractor, or without taking over the work, Contractor may furnish the necessary materials and/or employ the workmen necessary to remedy the situation at the expense of the Contractor. If Owner takes over the work pursuant to this paragraph, it is specifically agreed that Owner may take possession either in whole or in part of the premises and of all materials of Contractor at the site for the purpose of completing the work, and Contractor shall not be entitled to receive any further payments until the Work is completed and finally accepted. Upon completion and final acceptance of the work, Owner will determine the total expenses incurred and accrued in completion and/or correcting the work (including without limitation additional overhead and legal expenses incurred and accrued by Owner to effect such takeover and to complete the work, plus a mark-up for profit in the amount of 10% on the cost of the work performed by Owner's forces). If the balance of the Contract price unpaid at the time the work is taken over exceeds such total expense, the amount of such excess shall be paid to Owner from Contractor immediately upon demand. Improper termination under section 18(a) shall be deemed proper termination under section 18(b) of the Contract.

**(b)** The performance of Work under the Contract Documents may be terminated at the convenience of the Owner for any reason, or for no reason, in whole or in part, at any time, by written notice. In event of a termination for convenience, the Contractor will stop work and follow the Owner's instructions for winding down the job. In such event, the Contractor will be entitled to payment for work actually performed, provided such work conforms to the Contract Documents, as of the date of the notice of termination and has been incorporated in the Work. The Contractor shall not be entitled to payment for uncompleted work or anticipated profits or unabsorbed overhead or any other damages or costs resulting from termination pursuant to Section 18(b).

WHEREFOR, the undersigned parties has set their hand and seal this the ___ day of _____, 20___.

**OWNER:**

**CITY OF FAYETTEVILLE, GEORGIA**

_____ [SEAL]
**BY:**
**ITS:**

Address for Notices:
Attn: Director of Public Services
240 S. Glynn St.
Fayetteville, GA 30214

With copy to:

David Winkle
Nelson Mullins Riley & Scarbrough LLP
201 17th Street NW, Suite 1700
Atlanta, GA 30363

**CONTRACTOR:**

_____ [SEAL]
**BY:**
**ITS:**

**Address for Notices:**
_____
_____
_____
_____

**CONTRACT DOCUMENT I**
**CITY OF FAYETTEVILLE, GEORGIA**

**BID BOND**

**KNOW ALL MEN BY THESE PRESENTS**, that we

Contractor Name:
Address:
Telephone No.:

as Principal, hereinafter called the Principal, and

Surety:
Address in Georgia:
Telephone No.:

a corporation duly organized under the laws of the State of Georgia as Surety, hereinafter called the Surety, are held and firmly bound unto:

City of Fayetteville, Georgia
240 S. Glynn Street
Fayetteville, Georgia 30214

as Obligee, hereinafter called the Obligee, in the sum of _____

_____Dollars ($_____),
for the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for:

PROJECT NAME: **HIGHLAND VIEW POINT SANITARY SEWER IMPROVEMENTS**

NOW, THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a Contract with the Obligee in accordance with the terms of the Obligee's Bid Package, and give such bond or bonds as may be specified in the Bid Package or Contract Documents with a Surety authorized to do business in the State of Georgia for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof, or in the event of the failure of the Principal to enter such Contract and give

such bond or bonds, if the Principal shall pay to the Obligee the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the Obligee may in good faith contract with another party to perform the Work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed and sealed this _____ day of _____, 2011.

_____(Seal)
(Principal)

_____
(Witness)

_____(Seal)
(Title)

_____(Seal)
(Surety)

_____
(Witness)

_____(Seal)
(Title)

**CONTRACT DOCUMENT J**
**CITY OF FAYETTEVILLE, GEORGIA**

# PAYMENT BOND

**KNOW ALL MEN BY THESE PRESENTS** that

_____ [insert name of contractor](hereinafter called the "Principal") and

_____[insert name of surety] (hereinafter called the "Surety"), are held and firmly bound unto **the City of Fayetteville, Georgia** (hereinafter called the "Owner"), its successors and assigns as obligee, in the penal sum of _____ [contract amount], lawful money of the United States of America, of the payment of which the Principal and the Surety bond themselves, their administrators, executors, successors, and assigns, jointly and severally, firmly by these presents.

**WHEREAS**, the Principal has entered, or is about to enter, into a certain written contract, containing contract documents A through M, with the Owner, dated _____ [insert date of contract], which is incorporated herein by reference in its entirety (hereinafter called the "Construction Contract"), for the construction of a project known as **HIGHLAND VIEW POINT SANITARY SEWER IMPROVEMENTS**, as more particularly described in the Construction Contract (hereinafter called the "Project").

**NOW, THEREFORE**, the condition of this obligation is such that if the Principal shall promptly make payment to all persons working on or supplying labor or materials under the Construction Contract, and any amendments thereto, with regard to labor or materials furnished and used in the Project, and with regard to labor or materials furnished but not so used, then this obligation shall be void; but otherwise it shall remain in full force and effect.

1. A "Claimant" shall be defined herein as any subcontractor, person, party, partnership, corporation or other entity furnishing labor, services, or materials used, or reasonably required for use, in the performance of the Construction Contract, without regard to whether such labor, services, or materials were sold, leased, or rented, and without regard to whether such Claimant is or is not in privity of contract with the Principal or any subcontractor performing work on the Project, including, but not limited to, the following labor, services, or materials: water, gas, power, light, heat, oil, gasoline, telephone service, or rental of equipment directly applicable to the Construction Contract.

2. In the event a Claimant files a claim against the Owner, of the property of the Owner, and the Principal fails or refuses to satisfy or discharge it promptly, the Surety shall

satisfy or discharge the claim promptly upon written notice from the Owner, either by bond or as otherwise provided in the Construction Contract.

3. The Surety hereby waives notice of any and all modifications, omissions additions, changes, alterations, extensions of time, changes in payment terms, and any other amendment in or about the Construction Contract and agrees that the obligations undertaken by this Bond shall not be impaired in any manner by reason of any such modifications, omissions, additions, changes, alternates, extensions of time, changes in payment terms, and amendments.

4. The Surety hereby agrees that this Bond shall be deemed amended automatically and immediately, without formal or separate amendments hereto, upon any amendment or modification to the Construction Contract, so as to bind the Principal and Surety, jointly and severally, to the full payment of any Claimant under the Construction Contract, as amended or modified, provided only that the Surety shall not be liable for more than the penal sum of the Bond, as specified in the first paragraph hereof.

5. This Bond is made for the use and benefit of all persons, firms, and corporations who or which may furnish any materials or perform any labor for or on account of the construction to be performed or supplied under the Construction Contract, and any amendments thereto, and they and each of them may sue hereon.

6. No action may be maintained on this Bond after one (1) year from the date the last service, labor, or materials were provided under the Construction Contract by the Claimant prosecuting said action.

7. This Bond is intended to comply with O.C.G.A. § 36-91-70, and shall be interpreted so as to comply with the minimum requirements thereof. However, in the event the express language of this Bond extends protection to the Owner beyond that contemplated by O.C.G.A. § 36-91-70, or any other statutory law applicable to this Project, then the additional protection shall be enforced in favor of the Owner, whether or not such protection is found in the applicable statutes.

**IN WITNESS WHEREOF**, the Principal and Surety have hereunto affixed their corporate seals and caused this obligation to be signed by their duly authorized representatives this _____ day of _____, 20___.

Attest: [Principal]

_____ _____

Title

Attest: Surety

_____ _____

Title

**CONTRACT DOCUMENT K**
**CITY OF FAYETTEVILLE, GEORGIA**

**PERFORMANCE BOND**

**KNOW ALL MEN BY THESE PRESENTS** _____ [name of CONTRACTOR] (hereinafter called the "Principal") and _____ [name of SURETY] (hereinafter called the "Surety"), are held and firmly bound unto the **City of Fayetteville, Georgia** (hereinafter called the "Owner"), and their successors and assigns, in the penal sum of _____ Dollars ($_____) [insert contract price], lawful money of the United States of America, for the payment of which the Principal and the Surety bind themselves, their administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

**WHEREAS**, the Principal has entered, or is about to enter, into a certain written contract, containing Contract Documents A through M, with the Owner, dated _____ which is incorporated herein by reference in its entirety (hereinafter called the "Construction Contract", for the **Highland View Point Sanitary Sewer Improvements,** more particularly described in the Construction Contract (hereinafter called the "Project"); and

**NOW, THEREFORE**, the conditions of this obligation are as follows, that if the Principal shall fully and completely perform all the undertakings, covenants, terms, conditions, warranties, and guarantees contained in the Constriction Contract, including all modifications, amendments, changes, deletions, additions, and alterations thereto that may hereafter be made, then this obligation shall be void; otherwise, it shall remain in full force.

Whenever the Principal shall be, and declared by the Owner to be in default under the Construction Contract, the Surety shall promptly remedy the default as follows:

1) Complete the Construction Contract in accordance with the terms and conditions; or

2) Obtain a bid or bids for completing the Construction Contact in accordance with its terms and conditions, and upon determination by the Surety and the Owner of the lowest responsible and responsible bidder, arrange for a contract between such bidder and Owner and make available as the work progresses (even though there should be a default or succession of defaults under the Construction Contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the penal sum set forth in the first paragraph hereof, as may be adjusted, and the Surety shall make available and pay to the Owner the balance of the contract price, or any portion thereof. The term "balance of the contract price", as used in

this paragraph, shall mean the total amount payable by the Owner to the Contractor under the Construction Contract, and any amendments thereto, less the amount paid by the Owner to the Contractor; or, at the option of the Owner.

3) Allow Owner to compute the work and reimburse the Owner for all reasonable costs incurred in completing the work.

In addition to performing as required in the above paragraphs, the Surety shall indemnify and hold harmless the Owner from any and all losses, liability and damages, claims, judgments, liens, costs, and fees of every description, including reasonable attorney's fees, litigation costs and expert witness fees, which the Owner may incur, sustain, or suffer by reason of the failure or default on the part of the Principal in the performance of any of all of the terms, provisions, and requirements of the Construction Contract, including any and all amendments and modifications thereto, or incurred by the Owner in making good any such failure of performance on the part of the Principal.

The Surety shall commence performance of its obligations and undertakings under this Bond promptly and without delay, after written notice from the Owner to the Surety.

The Surety hereby waives notice of any and all modifications, omissions, additions, changes, alternations, extensions of time, changes in payment terms, and any other amendments in or about the Construction Contract, and agrees that the obligations undertaken by this bond shall not be impaired in any manner by reason of any such modifications, omissions, additions, changes, alterations, extensions of tie, changes in payment terms, and amendments.

The Surety hereby agrees that his Bond shall be deemed amended automatically and immediately, without formal or separate amendments hereto, upon any amendment to the Construction Contract, so as to bind the Principal and the Surety to the full and faithful performance of the Construction Contract as to amended or modified, and so as to increase the penal sum to the adjusted Contract Price of the Construction Contract.

No right of action shall accrue on this Bond to or for the use of any person, entity, or corporation other than the Owner and any other obligee named herein, or their executors, administrators, successors or assigns.

This Bond is intended to comply with O.C.G.A. § 36-91-50, and shall be interpreted so as to comply with the minimum requirements thereof. However, in the event the express language of this Bond extends protection to the Owner beyond that contemplated by O.C.G.A. § 36-91-50, or any other statutory law applicable to this Project, then the additional protection shall be enforced in favor of the Owner, whether or not such protection is found in the applicable statutes.

**IN WITNESS WHEREOF** the undersigned have caused this instrument to be executed and their respective corporate seals to be affixed and attested by their duly authorized representatives this _____ day of _____, 20___.

_____ (SEAL)
Principal

By: _____

Attest:

_____
Secretary

_____ (SEAL)

By: _____

_____
Secretary

[Attach Power of Attorney]

# CONTRACT DOCUMENT L
# CITY OF FAYETTEVILLE, GEORGIA

## SUPPLEMENTAL CONDITIONS

The following Supplemental Conditions are in addition to the standards and specifications set forth within the Project Manual, referenced specifications and construction plans.

### 1. Pre-Construction Conference

A preconstruction conference shall be held prior to commencement of work. Attendees shall include but not be limited to the Sponsor, the Project Engineer, the Contractor and the Owner.

END OF SECTION

# CONTRACT DOCUMENT M
# CITY OF FAYETTEVILLE, GEORGIA

## TECHNICAL SPECIFICATIONS

The *GDOT Standard Specifications Construction of Transportation Systems, 2001 Edition*, is the primary reference document for construction standards and specification. It is used primarily for the materials and construction and excludes measurement and payment. Measurement and payment for this project will be in Lump Sum in accordance with the contract documents and Schedule of Values provided with the Bid Form.

The following supplemental specification sections provide additional information intended to supplement the information obtained in the Contract Documents and GDOT Standard Specifications:

| | |
|---|---|
| 01 10 00 | SUMMARY OF WORK |
| 01 20 00 | PRICE AND PAYMENT PROCEDURES |
| 01 30 00 | ADMINISTRATIVE REQUIREMENTS |
| 01 33 00 | SUBMITTAL PROCEDURES |
| 01 40 00 | QUALITY REQUIREMENTS |
| 01 45 29 | TESTING LABORATORY SERVICES |
| 01 55 26 | TRAFFIC CONTROL |
| 01 60 00 | PRODUCT REQUIREMENTS |
| 01 70 00 | EXECUTION AND CLOSEOUT REQUIREMENTS |
| 01 75 16 | START-UP PROCEDURES |
| 02 41 00 | DEMOLITION |
| 03 31 00 | CAST-IN-PLACE CONCRETE |
| 31 10 00 | SITE CLEARING |
| 31 20 00 | EARTH MOVING |
| 31 23 16 | TRENCH EXCAVATION AND BACKFILL |
| 33 05 13 | MANHOLES AND STRUCTURES |
| 33 31 00 | SANITARY SEWERAGE PIPING |
| 33 31 14 | TEMPORARY BYPASS PUMPING SYSTEM |
| 33 40 00 | STORM DRAINAGE PIPING |

END OF SECTION

(Notwithstanding the foregoing, the undersigned Contractor agrees to perform all work required to complete the project in accordance with the plans as determined by the Engineer. Contractor agrees if any work is required in order to carry out the project in accordance with industry standard and/or the plans but is not referenced in the specifications such work is hereby incorporated into the specifications by this reference. The Contractor agrees that the work to be performed by the Contractor includes all work required to complete the project in accordance with industry standard, the plans and the technical specifications.)

# SECTION 01 10 00

## SUMMARY OF WORK

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Location of Work

B. Scope of Work

C. Substantial Completion requirements

D. Final Completion requirements

G. Contractor use of premises

H. Owner Occupancy

I. Protection of Owner, agents of the Owner, workmen, and the public

I. Project Utility Sources

### 1.02 PROJECT LOCATION

This project is located within Lakemont subdivision off Redwine Road southwest of downtown Fayetteville. Access to site will be via existing sanitary sewer easement off the cul-de-sac of Highland View Point. A detailed location map is shown on the plans.

### 1.03 SCOPE OF WORK

A. Demolition

There will be demolition of 105 LF of 8-inch ductile iron pipe, 48” CMP Culvert, and two concrete headwalls.

B. Major Components New Construction includes: The Highland View Point Sanitary Sewer Improvements project will include removing and installing approximately 105 LF of 8-inch ductile iron gravity sewer with steel casing, connection to two existing manholes, and all associated appurtenances. Including Option 1 earthwork to eliminate the storm culvert and provide storm drainage via graded swale with channel stabilization and two pipe piers, or Option 2 removal and replacement of storm culvert with double 42-inch reinforced concrete pipe and concrete headwalls.

## 1.04 SUBSTANTIAL COMPLETION REQUIREMENTS

Project to be substantially complete within 45 days of the "Notice to Proceed"

## 1.05 FINAL COMPLETION REQUIREMENTS

Project to be final complete within 30 days beyond Substantial Completion.

Complete with all "punch list" items identified with the establishment of substantial completion, sodding to have been planted, be final complete in all respects, and comply with additional final completion requirements as specified in the General and Supplementary Conditions.

## 1.06 CONTRACTOR'S USE OF PREMISES

A. Limit the use of the OWNER's property to the areas indicated on the Drawings. Do not disturb the OWNER's or adjacent properties beyond the areas indicated on the Drawings. The CONTRACTOR shall:

1. Allow for OWNER and ENGINEER occupancy.

2. Keep driveways and entrances clear and clean. Do not use these areas for parking and/or material storage. Schedule deliveries to minimize on-site storage of materials and equipment. On-site storage of materials and equipment shall be limited to areas within the future lake bed or in designated parking lot allowed by Sequoia Golf.

B. Coordinate the use of the premises with the ENGINEER.

C. CONTRACTOR shall assume full responsibility for security of all its and all of its subcontractors stored materials and equipment either on or off-site.

D. Immediately move any stored items, which interfere with the operations of the OWNER and other contractors as directed by the OWNER.

E. Obtain and pay for additional storage and/or work areas as needed to complete the Work required by this Contract.

## 1.07 OWNER OCCUPANCY

A. The Owner will occupy the site during the entire period of construction.

B. Cooperate with Owner to minimize conflict, and to facilitate Owner's operations.

C. Schedule the Work to accommodate this requirement.

### 1.08 PROTECTION OF THE OWNER, AGENTS OF THE OWNER, WORKMEN AND THE PUBLIC

The Contractor and the Superintendent are requested to carefully read the Articles of the General Conditions relating to protection of the Owner, agents of the Owner, workmen, and the public, such as Insurance, Indemnity, Licenses, Permits, Compliance with Laws, Ordinances and Regulations, Safety Warning Signs and Barricades, Public Conveniences, Sanitary Provisions, etc. This request is made to stress the importance of safe prosecution of the work, and does not imply that the Contractor and his Superintendent should not be completely familiar with all Articles of the General Conditions and all other provisions of the Contract Documents. Under the terms and Conditions of the Contract, the Engineer shall not be required to act as Safety Engineer or Safety Supervisor since such responsibility remains solely with the Contractor, who, in the prosecution of his work, is bound by the requirements of "Safety and Health Regulations for Construction Occupational Safety and Health Administration, U.S. Government Department of Labor" and other authorities having jurisdiction. It is recommended the Contractor seek the advice of the Safety Inspector for his Insurance Carrier in regard to job safety, and that he observe all precautions and safety provisions as outlined in the "Manual of Accident Prevention in Construction"' as published by the Associated General Contractors of America, to the extent that such provisions are not inconsistent with applicable laws or regulations.

## PART 2 EQUIPMENT - (NOT USED)

## PART 3 EXECUTION - (NOT USED)

**END OF SECTION**

# SECTION 01 20 00

## PRICE AND PAYMENT PROCEDURES

## PART 1 GENERAL

### 1.01 SUMMARY

This section contains procedures for measuring work performed by the contractor and subsequent payment of that work. It also contains descriptions related to measurement and payment.

### 1.02 SECTION INCLUDES

A. Descriptions

B. Lump Sum Payment Items

C. Unit Price Payment Items

D. Cash Allowances

E. Testing and Inspection Allowances

F. Schedule of Values

G. Application for Payment

H. Change Procedures

I. Defect Assessment

### 1.03 DESCRIPTIONS

A. 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.

B. 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.

C. 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.

D. Measurement of an item of work will be by the unit indicated in the Bid.

E. Final payment quantities shall be determined from in-place quantities. The precision of final payment quantities shall match the precision shown for that item in the Bid.

F. Payment will include all necessary and incidental related work not specified to be included in any other item of work listed in the Bid.

G. 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.

H. Payment of lump sum items shall be based upon progress of the Work as developed through proper updating of the construction Schedule. Estimates of percent complete established by the Engineer and Contractor shall be the basis by which earned value will be calculated and payments will be authorized.

I. Payment of unit price items 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 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.

## 1.04 LUMP SUM ITEMS (NOT USED)

## 1.05 UNIT PRICE ITEMS (BASE BID)

1. General Conditions. General Conditions shall include but is not limited to; Payment & Performance Bonds, Builders Risk Insurance, Owners/Contractors Protective Insurance, Workers Comprehensive Insurance, Pre-Construction Photographs & Video, Project Mobilization, Permit Fees, Stake Out Surveying, Schedule of Values, Project Schedule, and Initiation of Shop Drawings.

   A. Measurement: Measurement shall be by demonstration to Owner and Engineer that above items have been accomplished.

   B. Payment: Payment shall be in full when measurement has been demonstrated less retainage as required by the contract documents. Amount may not exceed 6% of the total contract amount.

2. Clearing and Grubbing as required per the contract documents shall include all equipment, material and labor required to access site as indicated on drawings.

   A. Measurement: Shall be in accordance with the accepted Schedule of Values.

   B. Payment shall be in full when clearing and grubbing has been completed.

3. Earthwork per the contract documents shall include all equipment, material and labor required to build drainage swale as indicated on drawings. Shall include haul off of any excess excavated material.

A. Measurement: Shall be in accordance with the accepted Schedule of Values.

B. Payment shall be in full when earthwork has been completed.

4. 8-inch DIP PC 350 Gravity Sewer

A. Measurement: The actual number of linear feet of pipe installation as directed by the ENGINEER.

B. Payment will be made based on multiplying the actual number of linear feet of pipe times the unit price identified in the Bid Schedule.

5. 16-inch Welded Steel Casing

A. Measurement: The actual number of linear feet of welded steel casing installed as directed by the ENGINEER.

B. Payment will be made based on multiplying the actual number of linear feet of welded steel casing times the unit price identified in the Bid Schedule.

6. Aerial Pipe Supports

A. Measurement: The actual number of aerial pipe supports installed as directed by the ENGINEER.

B. Payment will be made based on multiplying the actual number of aerial pipe supports installed times the unit price identified in the Bid Schedule.

7. Connection to Ex. SSMH A2 via Outside Drop

A. Measurement: The actual number of outside drop connections installed as directed by the ENGINEER. Shall include repair of existing manhole penetrations.

B. Payment will be made based on multiplying the actual number of outside drop connections installed times the unit price identified in the Bid Schedule.

8. Connection to Ex. SSMH A3

A. Measurement: The actual number of connections installed as directed by the ENGINEER.

B. Payment will be made based on multiplying the actual number of connections installed times the unit price identified in the Bid Schedule.

9. Bypass Pumping per the contract documents shall include all equipment and labor required to perform bypass pumping for the duration of making the tie-in to existing sewer. There shall be no sewer service interruptions.

A. Measurement: Shall be in accordance with the accepted Schedule of Values.

B. Payment shall be in full when bypass pumping has been completed.

10. Channel Stabilization (Ch-Rp) Type I Rip Rap

A. Measurement: The actual number of tons installed as directed by the ENGINEER.

B. Payment will be made based on multiplying the actual number of tons installed times the unit price identified in the Bid Schedule.

11. Demolition Complete per the contract documents shall include all equipment and labor required to demolish, remove, and dispose from project site all items required to complete project scope.

    A. Measurement: Shall be in accordance with the accepted Schedule of Values.

    B. Payment shall be in full when demolition, removal, and disposal of all necessary items from project site have been completed.

12. Erosion Control Complete per the contract documents shall include all equipment, material and labor required to provide erosion control for the duration of the project.

    A. Measurement: Shall be in accordance with the accepted Schedule of Values.

    B. Payment shall be in full when erosion control has been completed.

13. Landscape Complete per the contract documents shall include all equipment, material and labor required to return all landscaping to original condition.

    A. Measurement: Shall be in accordance with the accepted Schedule of Values.

    B. Payment shall be in full when landscaping has been completed.

## 1.06 UNIT PRICE ITEMS (ALTERNATE BID)

1. General Conditions. General Conditions shall include but is not limited to; Payment & Performance Bonds, Builders Risk Insurance, Owners/Contractors Protective Insurance, Workers Comprehensive Insurance, Pre-Construction Photographs & Video, Project Mobilization, Permit Fees, Stake Out Surveying, Schedule of Values, Project Schedule, and Initiation of Shop Drawings.

    A. Measurement: Measurement shall be by demonstration to Owner and Engineer that above items have been accomplished.

    B. Payment: Payment shall be in full when measurement has been demonstrated less retainage as required by the contract documents. Amount may not exceed 6% of the total contract amount.

2. Clearing and Grubbing as required per the contract documents shall include all equipment, material and labor required to access site as indicated on drawings.

    A. Measurement: Shall be in accordance with the accepted Schedule of Values.

    B. Payment shall be in full when clearing and grubbing has been completed.

3. Earthwork per the contract documents shall include all equipment, material and labor required to install concrete culverts and headwalls as indicated on drawings. Shall include haul off of any excess excavated material.

    A. Measurement: Shall be in accordance with the accepted Schedule of Values.

    B. Payment shall be in full when earthwork has been completed.

4. 8-inch DIP PC 350 Gravity Sewer

   A. Measurement: The actual number of linear feet of pipe installation as directed by the ENGINEER.

   B. Payment will be made based on multiplying the actual number of linear feet of pipe times the unit price identified in the Bid Schedule.

5. Connection to Ex. SSMH A2 via Outside Drop

   A. Measurement: The actual number of outside drop connections installed as directed by the ENGINEER. Shall include repair of existing manhole penetrations.

   B. Payment will be made based on multiplying the actual number of outside drop connections installed times the unit price identified in the Bid Schedule.

6. Connection to Ex. SSMH A3

   A. Measurement: The actual number of connections installed as directed by the ENGINEER.

   B. Payment will be made based on multiplying the actual number of connections installed times the unit price identified in the Bid Schedule.

7. Bypass Pumping per the contract documents shall include all equipment and labor required to perform bypass pumping for the duration of making the tie-in to existing sewer. There shall be no sewer service interruptions.

   A. Measurement: Shall be in accordance with the accepted Schedule of Values.

   B. Payment shall be in full when bypass pumping has been completed.

8. 42-inch RCP Storm Sewer

   A. Measurement: The actual number of linear feet of pipe installation as directed by the ENGINEER.

   B. Payment will be made based on multiplying the actual number of linear feet of pipe times the unit price identified in the Bid Schedule.

9. Concrete Headwall

   A. Measurement: The actual number of concrete headwalls installed as directed by the ENGINEER.

   B. Payment will be made based on multiplying the actual number of concrete headwalls installed times the unit price identified in the Bid Schedule.

10. Trench Unsuitable Soils per the contract documents shall include all gravel used for stabilization of unsuitable soils to the limits as directed by the ENGINEER as required for the construction as shown on the Contract Documents and the placement of suitable structural fill material in the excavation. To include placement of fabric as directed by the engineer. Shall include all equipment, material and labor required.

    A. Measurement: Shall be in accordance with the accepted Schedule of Values.

B. Payment shall be in full when Unsuitable Soils removal and replacement with suitable structural fill has been completed.

11. Storm Drain Outlet Protection (St) Type I Rip Rap

A. Measurement: The actual number of tons installed as directed by the ENGINEER.

B. Payment will be made based on multiplying the actual number of tons installed times the unit price identified in the Bid Schedule.

12. Demolition Complete per the contract documents shall include all equipment and labor required to demolish, remove, and dispose from project site all items required to complete project scope.

A. Measurement: Shall be in accordance with the accepted Schedule of Values.

B. Payment shall be in full when demolition, removal, and disposal of all necessary items from project site have been completed.

13. Erosion Control Complete per the contract documents shall include all equipment, material and labor required to provide erosion control for the duration of the project.

A. Measurement: Shall be in accordance with the accepted Schedule of Values.

B. Payment shall be in full when erosion control has been completed.

14. Landscape Complete per the contract documents shall include all equipment, material and labor required to return all landscaping to original condition.

A. Measurement: Shall be in accordance with the accepted Schedule of Values.

B. Payment shall be in full when landscaping has been completed.

## 1.07 CASH ALLOWANCES (NOT USED)

## 1.08 TESTING AND INSPECTION ALLOWANCES (NOT USED)

## 1.09 SCHEDULE OF VALUES

A. Submit printed schedule on EJCDC C-620 or Contractor's standard form or electronic media printout will be considered for this use.

B. Submit Schedule of Values within 20 days after date established in Notice to Proceed.

C. Format: Use Table of Contents of this Project Manual. Identify each line item with number and title of major Specification Section. Also identify site mobilization, and bonds and insurance.

D. Include in each line item amount of allowances as specified in this Section. For unit cost allowances, identify quantities taken from Contract Documents multiplied by unit cost to achieve total for each item.

E. Include within each line item, direct proportional amount of Contractor's overhead and profit.

F. Revise schedule to list approved Change Orders with each Application for Payment.

## 1.10 EXISTING CONDITIONS PHOTOGRAPHS AND VIDEO

A. Contractor shall provide to Owner complete and detailed photographs and video of entire project site, indicating existing site conditions. Contractor to submit with Schedule of Values.

## 1.11 APPLICATION FOR PAYMENT

A. For each item, provide a column for listing each of the following:

1. Item Number.
2. Description of work
3. Scheduled Values.
4. Previous Applications.
5. Work in Place and Stored Material under this Application.
6. Authorized Change Orders.
7. Total Completed and Stored to Date of Application.
8. Percentage of Completion.
9. Balance to Finish.
10. Retainage.
11. Construction Photographs.

B. Submittal Procedures

1. Submit six (6) copies of each Application for Payment.
2. Submit and updated construction schedule with each application for Payment.
3. Payment Period: Submit on the 25$^{th}$ of each month.
4. Submit with transmittal letter as specified for Submittals in Section 01 33 00.
5. Submit waivers showing that suppliers and sub-contractors have been paid the amount due from the previous invoice.
6. The first application will be processed after owner agreement with the construction schedule.

C. Substantiating Data for Progress Payments

1. When the Engineer requires substantiating data, submit suitable information with a cover letter identifying:

   a. Project.

   b. Application for Payment number and date.

   c. Detailed list of enclosures.

   d. For stored products:

      1) Item number and identification as shown on the Application for Payment.

      2) Description of specific material

      3) Invoices for stored products

2. Submit one copy of data and cover letter for each copy of the Application for Payment.

3. Maintain an updated set of drawings to be used as record drawings in accordance with Section 01 70 00. Exhibit the updated record drawings for review by the Engineer.

## 1.12 CHANGE PROCEDURES

A. Submittals: Submit name of individual who is authorized to receive change documents and is responsible for informing others in Contractor's employ or Subcontractors of changes to the Work.

B. Carefully study and compare Contract Documents before proceeding with fabrication and installation of Work. Promptly advise Engineer of any error, inconsistency, omission, or apparent discrepancy.

C. Requests for Interpretation (RFI) and Clarifications: Allot time in construction scheduling for liaison with Engineer; establish procedures for handling queries and clarifications.

1. Use CSI Form 13.2A - Request for Interpretation or Contractor’s standard for requesting interpretations.

2. Engineer may respond with a direct answer on the Request for Interpretation form.

D. Engineer will advise of minor changes in the Work not involving adjustment to Contract Sum/Price or Contract Time by issuing supplemental instructions in Section 00 94 39 Field Order.

E. Engineer may issue Notice of Change in Section 00 94 49 Work Change Directive including a detailed description of proposed change with supplementary or revised Drawings and Specifications, a change in Contract Time for executing the change.

Contractor will prepare and submit estimate within <___7____> days.

F. Contractor may propose changes by submitting a request for change to Engineer, describing proposed change and its full effect on the Work. Include a statement describing reason for the change and the effect on Contract Sum/Price and Contract Time with full documentation.

G. Execution of Change Orders: Engineer will issue Change Orders for signatures of parties as provided in Conditions of the Contract in Section 00 94 63 Change Order.

H. Correlation of Contractor Submittals:

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

2. Promptly revise Progress Schedules to reflect change in Contract Time, revise subschedules to adjust times for other items of Work affected by the change, and resubmit.

3. Promptly enter changes in Record Documents.

## 1.13 DEFECT ASSESSMENT

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

B. If, in the opinion of Engineer, it is not practical to remove and replace the Work, Engineer will direct appropriate remedy or adjust payment.

C. The defective Work may remain, but unit sum/price will be adjusted to new sum/price at discretion of Engineer and Owner.

D. Defective Work will be partially repaired according to instructions of Engineer and Owner, and unit sum/price will be adjusted to new sum/price at discretion of Engineer and Owner.

E. Individual Specification Sections may modify these options or may identify specific formula or percentage sum/price reduction.

F. Authority of Engineer and Owner to assess defects and identify payment adjustments is final.

G. Nonpayment for Rejected Products: Payment will not be made for rejected products for any of the following reasons:

1. Products wasted or disposed of in a manner that is not acceptable.

2. Products determined as unacceptable before or after placement.

3. Products not completely unloaded from transporting vehicle.

4. Products placed beyond lines and levels of the required Work.

5. Products remaining on hand after completion of the Work.

6. Loading, hauling, and disposing of rejected products.

## PART 2 PRODUCTS (NOT USED)

## PART 3 EXECUTION (NOT USED)

**END OF SECTION**

# SECTION 01 30 00

## ADMINISTRATIVE REQUIREMENTS

## PART 1 GENERAL

### 1.1 SECTION INCLUDES

A. Contractor coordination requirements.

B. Preconstruction meeting.

C. Progress meetings.

D. Preinstallation meetings.

E. Closeout meeting.

F. Alteration procedures.

### 1.2 CONTRACTOR COORDINATION REQUIREMENTS

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

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

C. Coordinate space requirements, supports, and installation of mechanical and electrical Work indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit as closely as practical; place runs parallel with lines of building. Use spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

1. Coordination Drawings: Prepare as required to coordinate all portions of Work. Show relationship and integration of different construction elements that require coordination during fabrication or installation to fit in space provided or to function as intended. Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are important.

D. Coordination Meetings: In addition to other meetings specified in this Section, hold coordination meetings with personnel and Subcontractors to ensure coordination of Work.

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

F. After Owner's occupancy of premises, coordinate access to Site for correction of defective Work and Work not complying with Contract Documents, to minimize disruption of Owner's activities.

## 1.3 PRECONSTRUCTION MEETING

A. **Owner/Engineer** will schedule and preside over meeting after [**Notice of Award**].

B. Attendance Required: Engineer, Owner, [**Resident Project Representative,**] [**appropriate governmental agency representatives,**] [**Construction Manager,**] [**major Subcontractors,**] and Contractor.

C. Minimum Agenda:

1. [**Execution of Owner-Contractor Agreement.**]
2. Submission of executed bonds and insurance certificates.
3. Distribution of Contract Documents.
4. Submission of [**list of Subcontractors,**] list of products, schedule of values, and Progress Schedule.
5. Designation of personnel representing parties in Contract.
6. Communication procedures.
7. Procedures and processing of requests for interpretations, field decisions, submittals, substitutions, Applications for Payments, proposal request, Change Orders, and Contract closeout procedures.
8. Scheduling.
9. Critical Work sequencing.
10. Scheduling activities of [**Geotechnical Engineer, testing agencies, utilities verification, etc.**].

D. Owner will: Record minutes and email to participants within [**ten**] days after meeting.

## 1.4 PROGRESS MEETINGS

A. Contractor to schedule and administer meetings throughout progress of the Work at [**monthly**] intervals.

B. Attendance Required: Job superintendent, major [**Subcontractors**], suppliers, and [**Engineer,**] and [**Owner,**] as appropriate to agenda topics for each meeting.

C. Minimum Agenda:

1. Review minutes of previous meetings.
2. Review of Work progress.

3. Field observations, problems, and decisions.
4. Identification of problems impeding planned progress.
5. Review of submittal schedule and status of submittals.
6. Review of off-Site fabrication and delivery schedules.
7. Maintenance of Progress Schedule.
8. Corrective measures to regain projected schedules.
9. Planned progress during succeeding work period.
10. Coordination of projected progress.
11. Maintenance of quality and work standards.
12. Effect of proposed changes on Progress Schedule and coordination.
13. Other business relating to Work.

D. [**Contractor:**] Will record minutes and email to participants within [**five**] days after meeting.

## 1.5 PREINSTALLATION MEETINGS

A. When required in individual Specification Sections, convene preinstallation meetings at [**Project Site**] before starting Work of specific Section.

B. Require attendance of parties directly affecting, or affected by, Work of specific Section.

C. Notify Engineer [**four**] days in advance of meeting date.

D. Prepare agenda and preside over meeting:

1. Review conditions of installation, preparation, and installation procedures.
2. Review coordination with related Work.

## 1.6 CLOSEOUT MEETING

A. Contractor will schedule Project closeout meeting with sufficient time to prepare for requesting Substantial Completion. Preside over meeting and be responsible for minutes.

B. Attendance Required: [**Contractor**], [**Subcontractors**], [**Engineer**], [**Owner**], and others appropriate to agenda.

C. Notify Engineer [**five**] days in advance of meeting date.

D. Minimum Agenda:

1. Start-up of facilities and systems.
2. Operations and maintenance manuals.

3. Testing, adjusting, and balancing.
4. System demonstration and observation.
5. Operation and maintenance instructions for Owner's personnel.
6. Contractor's inspection of Work.
7. Contractor's preparation of an initial "punch list."
8. Procedure to request Engineer inspection to determine date of Substantial Completion.
9. Completion time for correcting deficiencies.
10. Inspections by authorities having jurisdiction.
11. Certificate of Occupancy and transfer of insurance responsibilities.
12. Partial release of retainage.
13. Final cleaning.
14. Preparation for final inspection.
15. Closeout Submittals:
    a. Project record documents.
    b. Operating and maintenance documents.
    c. Operating and maintenance materials.
    d. Affidavits.
16. Final Application for Payment.
17. Contractor's demobilization of Site.
18. Maintenance.

E. Engineer to record minutes and email to participants within [**five**] days after meeting.

# PART 2 PRODUCTS (Not Used)

# PART 3 EXECUTION

## 3.1 ALTERATION PROCEDURES

A. [**Designated areas of existing facilities**] [**Entire facility**] will be occupied for normal operations during progress of construction. Cooperate with Owner in scheduling operations to minimize conflict and to permit continuous usage.

1. Perform Work not to interfere with operations of occupied areas.

2. Keep utility and service outages to a minimum and perform only after written approval of Owner.

3. Clean Owner-occupied areas daily. Clean spillage, mud, and heavy collection of dust in Owner-occupied areas immediately.

B. Materials: As specified in product Sections; match existing products with new [**and salvaged**] products for patching and extending Work.

C. Employ [**skilled and experienced**] installer to perform alteration and renovation Work.

D. Cut, move, or remove items as necessary for access to alterations and renovation Work. Replace and restore at completion. Comply with Section 01 70 00 - Execution and Closeout Requirements.

E. Remove unsuitable material not marked for salvage, including rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished Work.

F. Remove debris and abandoned items from area and from concealed spaces.

G. Prepare surface and remove surface finishes to permit installation of new Work and finishes.

H. Remove, cut, and patch Work to minimize damage and to permit restoring products and finishes to [**original**] [**or**] [**specified**] condition.

I. Where new Work abuts or aligns with existing Work, provide smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.

J. When finished surfaces are cut so that smooth transition with new Work is not possible, terminate existing surface along straight line at natural line of division and submit recommendation to Engineer for review.

K. Finish surfaces as specified in individual product Sections.

**END OF SECTION**

# SECTION 01 33 00

## SUBMITTAL PROCEDURES

## PART 1 GENERAL

### 1.01 SCOPE

General procedures and requirements for submittals during the course of construction.

### 1.02 SECTION INCLUDES

A. Submittal Procedures.

B. Construction progress schedules.

C. Shop drawings.

D. Product data.

E. Samples

F. Miscellaneous Submittals.

G. Construction photographs / videos.

H. Resubmission requirements.

### 1.03 SUBMITTAL PROCEDURES

A. Sequentially number the transmittal forms. Resubmittals to have original number with an alphabetic suffix. (Example 1-A, 1-B, etc.)

B. Identify Project, Contractor, Subcontractor or supplier, pertinent Drawing sheet and detail number, and specification Section number, as appropriate.

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

D. Submit submittal to Engineer.

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

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

G. In scheduling, allow sufficient time for the Engineer's review following the receipt of the submittal.

## 1.04 CONSTRUCTION PROGRESS SCHEDULES

A. Submit 3 copies of initial progress schedule within 20 days after date of Owner-Contractor Agreement established in Notice to Proceed for Engineer review.

B. Revise and resubmit as required.

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

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

E. Indicate estimated percentage of completion for each item of work at each submission.

F. Indicate submittal dates required for shop drawings, product data, samples, and product delivery including those furnished by Owner and under Allowances.

## 1.05 SHOP DRAWINGS

A. Shop drawings shall include technical data, drawings, diagrams, procedure and methodology, performance curves, schedules, templates, patterns, test reports, calculations, instructions, measurements and similar information as applicable to the specific item for which the shop drawing is prepared. In addition to the number of copies required for return by the contractor submit 5 additional copies for Engineer.

B 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.

C. 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 Shop Drawings, Product Data and Samples 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 five 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 "**Revise and Resubmit**" must be revised to reflect required changes and the initial review procedure repeated.

5. The "**Rejected**" 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 "Revise and Resubmit" and "Rejected" 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.

D. 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.

E 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.

F 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 errors 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.

## 1.06 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. Include 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.

## 1.07 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.

## 1.08 MISCELLANEOUS SUBMITTALS

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, record 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.

## 1.09 PROGRESS PHOTOGRAPHS / VIDEOS

A. Provide photographs and video of entire site depicting existing conditions as indicated in 01 20 00 Price and Payment Procedures.

B. Provide photographs of site and construction throughout progress of Work produced by an experienced photographer, acceptable to the Engineer and Owner.

C. Construction Photographs: Take construction photographs prior to each application for payment of the work accomplished for that payment period and as follows:

1. Site clearing.
2. Excavations and installed underground utilities.
3. Foundations/subgrade.
4. Infrastructure installations.

5. Paving

6. Erosion control measures.

7. Equipment installations.

8. Final completion.

D. Aerial Photographs [**Required, Not Required**]

1. Provide aerial photographs from four cardinal views at project completion.

2. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.

E. Deliver photographs with each Application for Payment with transmittal letter specified in this Section. Final completion photographs are to be delivered with request for final payment. Delivery of photographs may be in printed or digital format. If printed, each photograph shall be a minimum of 4-inches by 6-inches in dimension and shall be labeled to describe the photograph subject, location and date. If provided digitally, the photographs shall be provided in JPEG format and accompanied with a PDF format document describing each photograph with subject, location and date.

F. Deliver prints with each Application for Payment with transmittal letter specified in this Section. Final prints are to be delivered with request for final payment.

### 1.10 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.

## PART 2 PRODUCTS (NOT USED)

## PART 3 EXECUTION (NOT USED)

**END OF SECTION**

# SECTION 01 40 00

## QUALITY REQUIREMENTS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Regulatory requirements.

B. Quality control.

C. Tolerances.

D. References standards.

E. Labeling.

F. Mock-up requirements.

G. Manufacturer's field services.

### 1.02 REGULATORY REQUIREMENTS

A. Permits: Unless otherwise noted in the bidding documents or specification section 01 10 00 Summary, the Contractor shall, without additional expense to the Owner, be responsible for obtaining all necessary licenses and permits, including building permits, etc.

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.

### 1.03 QUALITY CONTROL

A. Monitor quality control over suppliers, manufacturers, products, services, Site conditions, and workmanship, to produce Work of specified quality.

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

C. Perform Work using persons qualified to produce required and specified quality.

D. Products, materials, and equipment may be subject to inspection by Engineer [**and Owner**] at place of manufacture or fabrication. Such inspections shall not relieve Contractor of complying with requirements of Contract Documents.

E. Supervise performance of Work in such manner and by such means to ensure that

Work, whether completed or in progress, will not be subjected to harmful, dangerous, damaging, or otherwise deleterious exposure during construction period.

## 1.04 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' recommended tolerances and tolerance requirements in reference standards. When such tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

## 1.05 REFERENCE STANDARDS

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 that 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, and AGA or NSF approval or and ASME requirements 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 below.

F. STANDARD ORGANIZATIONS

1. 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 |
| NCWPB | National Certified Pipe Welding Bureau |
| NCPI | National Clay Pipe Institute |
| NSF | National Sanitation Foundation |
| PPI | Plastic Pipe Institute |
| Uni-Bell PVC | Pipe Association |

2. Materials

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

3. Painting and Surface Preparation

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

4. 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 |
| IEC | International Electrotechnical Commission |
| IESNA | Illuminating Engineering Society of North America |
| LPI | Lighting Protection Institute |
| NECA | National Electrical Contractors Association |
| NETA | International Electrical Testing Association |

5. Aluminum

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

6. 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 |

7. Welding

| | |
|---|---|
| ASME | American Society of Mechanical Engineers |
| AWS | American Welding Society |

8. 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 |

9. General Building Construction

| | |
|---|---|
| AHA | American Hardboard Association |
| AHAM | Association of Home Appliance Manufacturers |
| AITC | American Institute of Timber Construction |
| APA | American Parquet Association, Inc. |
| APA | American Plywood Association |

| | |
|---|---|
| BHMA | Builders Hardware Manufacturers Association |
| BIFMA | Business 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 |
| ISNATA | 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 | SBCCI 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 |

10. Roadways

| | |
|---|---|
| AREA | American Railway Engineering Association |
| DOT | Department of Transportation |
| SSRBC | Standard Specifications for Road and Bridge Construction, Georgia Department of Transportation |

11. Plumbing

| | |
|---|---|
| AGA | American Gas Association |
| NSF | National Sanitation Foundation |
| PDI | Plumbing Drainage Institute |
| SPC | SBCCI Standard Plumbing Code |

12. 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 | SBCCI Standard Mechanical Code |
| TEMA | Tubular Exchangers Manufacturers Association |

13. 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 |

## 1.06 LABELING

A. Attach label from agency approved by authorities having jurisdiction for products, assemblies, and systems required to be labeled by [**applicable code**].

B. Label Information: Include manufacturer's or fabricator's identification, approved agency identification, and the following information, as applicable, on each label:

1. Model number.
2. Serial number.
3. Performance characteristics.

C. Manufacturer's Nameplates, Trademarks, Logos, and Other Identifying Marks on Products: Not allowed on surfaces exposed to view in public areas, interior or exterior.

## 1.07 MOCK-UP REQUIREMENTS

A. Tests will be performed under provisions identified in this Section and identified in individual product Specification Sections.

B. Assemble and erect specified or indicated items with specified or indicated

attachment and anchorage devices, flashings, seals, and finishes.

C. Accepted mockups shall be comparison standard for remaining Work.

D. Where mockup has been accepted by Engineer and is specified in product Specification Sections to be removed, remove mockup and clear area when directed to do so by Architect/Engineer.

### 1.08 MANUFACTURER'S FIELD SERVICES

A. When specified in individual Specification Sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe Site conditions, conditions of surfaces and installation, quality of workmanship, startup of equipment, testing, adjusting, and balancing of equipment, commissioning, etc. as applicable, and to initiate instructions when necessary.

B. Report observations and Site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturer's written instructions.

## PART 2 PRODUCTS (NOT USED)

## PART 3 EXECUTION (NOT USED)

**END OF SECTION**

# SECTION 01 45 29

## TESTING LABORATORY SERVICES

## PART 1 GENERAL

### 1.01 SCOPE

A. This Section includes testing which the Owner 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 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.

### 1.02 SECTION INCLUDES

A. Selection of Testing Laboratory.

B. Laboratory Duties.

C. Payment for Testing Services.

D. Contractor Responsibilities.

E. Schedules for Testing.

F. Transporting Samples.

### 1.03 SELECTION OF TESTING LABORATORY

The testing laboratory or laboratories will be selected by the owner. The testing laboratory or laboratories will work for the owner.

### 1.04 LABORATORY DUTIES

A. Cooperate with the Owner, Engineer and Contractor.

B. Provide qualified personnel promptly on notice.

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 services.

E. Promptly submit three copies (two copies to the Engineer and one 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

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.

## 1.05 PAYMENT FOR TESTING SERVICES

A. The cost of testing services required by the Contract shall be paid for by the Owner. This includes concrete, soil, and asphalt. This cost may or may not be provided for as an allowance in the Bid Schedule.

B. The cost of additional testing services not specifically required in the Specifications, but requested by the Owner or Engineer, shall be paid for by the Owner.

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 for by the Owner.

D. The cost of retesting any item that fails to meet the requirements of these Specifications shall be paid for by the Contractor. Retesting shall be performed by the testing laboratory working for the Owner.

## 1.06 CONTRACTOR RESPONSIBILITIES

A. Contractor will be furnished contact information for the selected laboratory. Contractor will be required to schedule ALL testing.

B. Cooperate with laboratory personnel, provide access to Work and/or manufacturer's requirements.

C. Provide to the laboratory, representative samples, in required quantities, of materials to be tested.

D. Furnish copies of mill test reports.

E. Furnish required labor and facilities to:

1. Provide access to Work to be tested;
2. Obtain and handle samples at the site (if certified to do so);
3. Facilitate inspections and tests;
4. Build or furnish a holding box for concrete cylinders or other samples as required by the laboratory.

F. Notify the laboratory sufficiently in advance of operation to allow for the assignment of personnel and schedules of tests.

G. 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.

H. Copies of all correspondence between the Contractor and testing agencies shall be provided to the Engineer.

I. If the Contractor disagrees with the approved Engineers testing agency's methods or results during an onsite test, the Contractor may have another testing agency conduct an independent evaluation at the Contractor’s expense. After an independent evaluation is performed, the contractor will submit their results to the engineer for review.

## 1.07 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.

### 1.08 TRANSPORTING SAMPLES

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 EXECUTION (NOT USED)

**END OF SECTION**

# SECTION 01 55 26

## TRAFFIC CONTROL

## PART 1 GENERAL

### 1.01 SCOPE OF WORK

A. CONTRACTOR shall furnish all materials, equipment and labor for the installation and continuous maintenance of traffic control devices throughout the project.

B. This item of work shall include furnishing, installing, maintaining, relocating and removing all traffic control devices used to regulate, warn or direct traffic and pedestrians, if necessary, through the construction work zone.

C. Upon completion of work, warning devices are to be removed by the CONTRACTOR.

### 1.02 SAFETY

A. The CONTRACTOR shall furnish sufficient flaggers, signs, warning lights, channelization devices and other safety devices as may be necessary to properly protect, warn and safeguard the traveling public and protect onsite construction workers.

B. No work shall be started on any phase of the project until all appropriate traffic control devices are in place and in operation.

C. CONTRACTOR is to take all practical precautions needed to maintain traffic flow, and provide safety for workers and the general public.

D. The contractor is to immediately clear the roadway of all dirt and debris to maintain safe travel lanes.

E. When not relevant to the current phase of construction, traffic control devices shall be removed or covered so as not to be visible to traffic.

### 1.03 REFERENCES

A. Manual for Uniform Traffic Control Devices (MUTCD) (current edition).

B. Georgia Department of Transportation (Georgia DOT) Special Provisions Section 150.

C. Georgia Department of Transportation (Georgia DOT) Construction Standards and Details (current edition).

D. The Plans.

E. Applicable Supplemental Specifications.

F. Project Specifications.

# PART 2 PRODUCTS

## 2.01 TRAFFIC CONTROL DEVICES

A. Traffic Control Devices include, but are not limited to: signs and their supports, signals, pavement markings, barricades, channelizing devices, warning lights, arrowboards, flaggers, or any other device used for the purpose of regulating, warning or guiding traffic through the construction zone.

B. All Traffic Control Devices used on this project shall conform to the plans, Georgia DOT specifications, and the MUTCD.

C. Traffic Control Devices shall be in proper, acceptable condition when in use. Devices which are unclear, excessively weathered, damaged, or not correctly positioned shall be promptly restored to fully operational condition.

# PART 3 EXECUTION

## 3.01 PLAN AND EXECUTION

A. CONTRACTOR is responsible for preparing his/her own traffic control plan an instituting the plan in compliance with all applicable Georgia DOT requirements.

B. The CONTRACTOR shall be responsible for the proper location, installation, and arrangement of all traffic control devices and the use of traffic flaggers.

C. The contractor shall verify that construction warning signs, channeling devices and other devices guiding traffic are in agreement with the actual conditions in existence at any given time. Devices which are inconsistent or not applicable with current conditions shall be covered or removed. The purpose of this provision is to make sure that clear, correct and concise information is being provided to vehicular traffic without any conflicting information.

D. Construction signs referring to flagmen ahead or daytime lane closures during working hours shall be removed or covered during non-working hours.

E. The CONTRACTOR shall ensure all Traffic Control Devices are operational and visible 24 hours a day in all weather conditions. Provide additional inspections at regular intervals.

F. When traveling in lanes open to public traffic, the contractor's vehicles shall always move with and not against or across the flow of traffic. These vehicles shall enter or leave work areas in a manner which will not be hazardous to, or interfere with, traffic and shall not park or stop except within designated work areas. Personal vehicles shall not park within the right of way except in specific areas designated by the CITY.

G. Access shall be maintained at all times to individual parcels of property unless alternative arrangements have been agreed to in writing with the owner/tenant.

H. **Flaggers** shall be provided by the contractor as required to coordinate traffic flow. All traffic flaggers shall be certified from a Georgia DOT approved training program and shall have their certification card with them whenever they are providing flagging services. In addition to being certified, it is the contractor's responsibility to verify that flaggers are sufficiently experienced to handle traffic flagging under specific traffic conditions.

I. The CONTRACTOR shall arrange his operation to keep lane closures and other major traffic interruptions to an absolute minimum. Efforts should be made to avoid scheduling work that substantially impacts traffic flow in peak-hour volume times.

J. Pedestrian considerations - All existing pedestrian facilities, including access to transit stops, shall be maintained. Where pedestrian routes are closed, alternate routes shall be provided.

K. Worksite Traffic Control Supervisor - The Contractor shall designate a qualified individual as the Worksite Traffic Control Supervisor (WTCS) who shall be responsible for administering traffic control provisions. The Worksite Traffic Control Supervisor (WTCS) shall meet the requirements set forth in the Georgia DOT Special Provision Section 150.

L. Traffic Interruption Reports (TIR) are required to be filed with the Georgia DOT for all work that could potentially impact traffic flow on state roads. The report shall be filed by the contractor and must describe current and planned road closures, emergency road closures, and other road conditions including, but not limited to, travel lane closures, shoulder closures, traffic paces, and/or moving operations.

M. Traffic control devices and warning signs should be documented with video recordings as soon after installation as practicable and again after each major staging change to document the changes.

N. When any provisions of this Specification or the Plans do not meet the minimum requirements of the MUTCD, the MUTCD shall control.

**END OF SECTION**

# SECTION 01 60 00

## PRODUCT REQUIREMENTS

## PART 1 GENERAL

### 1.01 DESCRIPTION

These general equipment stipulations apply, in general, to all equipment and piping. They supplement the detailed equipment Specifications, but in case of conflict, the detailed equipment Specifications shall govern.

### 1.02 SECTION INCLUDES

A. Basic Product Requirements

B. Product Delivery Requirements

C. Product Storage and Handling Requirements

D. Adaptation and Location of Equipment.

E. Patent Royalties.

F. Workmanship and Materials

G. Lubrication and Lubrication Fittings.

H. Safety Gaurds.

I. Equipment Bases.

J. Seal Water Requirements.

K. Grouting Equipment Bases.

L. Control and Instrumentation Components.

M. Alignment of Motors and Equipment.

N. Welding and Brazing.

O. Special Tools and Accessories.

P. Spare Parts.

Q. Shop Priming.

R. Galvanizing.

S. Installation Check.

### 1.03 BASIC PRODUCT REQUIREMENTS

A. Provided Products

1. Provide products that comply with the Contract Documents which are undamaged and, unless otherwise indicated, new at the time of installation complete with accessories, trim, finish, safety guards and other devices and details needed for a complete installation and the intended use and effect.

B. Identification of Piping and Equipment

1. General: All equipment and piping specified to be painted shall be color coded as specified in Section 09 90 00 of these Specifications.

2. Equipment: All major items of equipment shall have an identification nameplate and dataplate.

a. Nameplates: The Contractor shall submit a suitable list of all items of major equipment to the Engineer, who will furnish the Contractor with an identification numbering system. The nameplates shall be of Type 304 stainless steel, No.6 finish, and not less than No. 16 gauge with indented stamped lettering. Nameplates shall be attached to equipment bases in easily visible and accessible locations. Nameplates shall be fastened in a permanent manner, arranged not to damage the equipment, with not less than four stainless steel fasteners.

b. Dataplates: Each item of mechanical equipment shall be provided with a stainless steel dataplate. Separate dataplates shall be provided for motors, engines and driven equipment. Dataplates shall include the following minimum information:

1. Name of equipment (from equipment specifications)

2 Manufacturer

3. Model designation

4. Serial number

5. Rated horsepower

6. Service factor

7. Electrical and insulation data

8 Speed (rpm)

9. Capacity and head (discharge pressure)

10 Net weight

11. Lettering shall be upper case, block style in size and spacing to suit the nameplate. The identification nameplates shall not be painted.

3. Valves: All valves shall be identified with a round brass disc, approximately 1-1/2-inches in diameter and not less than No. 14 gauge, coated with a clear lacquer. Discs shall be fastened to valves in a

permanent manner; attachment by chain to handwheels or other operators shall not be acceptable. Discs shall be stamped using indented numerals and/or letters with a valve number corresponding to its identification number in the valve schedule to be included in the operation and maintenance manual.

4. All pushbutton stations, switches, motor controllers, transmitters and other control equipment shall have identification nameplates of the engraved, laminated plastic type affixed to or adjacent to the switch, pushbutton station, etc.

5. All manufacturer's nameplates, identification nameplates and ASME code plates located on areas of equipment to be insulated shall be removed and reattached on uninsulated areas in a manner acceptable to the Engineer.

C. SAFETY SIGNS

1. Permanent safety signs shall be furnished and installed on all mechanical and electrical equipment where a hazard may exist. Signs shall be made in accordance with current OSHA requirements and shall be suitable for exterior use. Mounting details shall be in accordance with manufacturer's recommendations; location in accordance with governing agency regulations. Fasteners shall be stainless steel.

2. Safety signs shall be Safety signs shall be approximately 7-inches high by 10-inches wide, colored yellow 2 and black on minimum 0.080-inch aluminum stock.

3. Safety signs shall be furnished and will include, but not be limited to, the following:

a. The following sign shall be affixed to all equipment which may be started ~ automatically from a remote location:

| CAUTION<br><br>THIS EQUIPMENT MAY START AUTOMATICALLY BY REMOTE CONTROL |
|---|

b. The following sign shall be affixed to all electrical equipment or instrument panels, as applicable:

| CAUTION - SHOCK HAZARD<br><br>THIS EQUIPMENT IS POWERED BY MULTIPLE SOURCES<br><br>CONTACTS MAY BE ENERGIZED AFTER LOCAL POWER IS DISCONNECTED |
|---|

c. The following sign shall- be provided at all areas where oxygen or flammable materials are stored or used (colored red, white and black):

| DANGER |
|---|

| |
|---|
| NO SMOKING, MATCHES, OR OPEN FLAMES |

d. The following sign shall be affixed to all entrance hatches or access manways on covered tanks and vessels:

| |
|---|
| CAUTION<br><br>OXYGEN DEFICIENT OR TOXIC CONDITIONS MAY EXIST<br>FOLLOW PRESCRIBED PROCEDURES BEFORE ENTRY |

e. The following sign shall be provided at all compressor, vent, equipment blowoffs, blower room, etc.

| |
|---|
| CAUTION<br><br>NOISE AREA MAY CAUSE HEARING LOSS USE<br><br>PROPER EAR PROTECTION |

f. The following sign shall be provided in chemical feed rooms or storage areas.

| |
|---|
| CAUTION<br><br>CHEMICAL STORAGE AREA |

## 1.04 PRODUCT DELIVERY REQUIRMENTS

A. Arrange deliveries of Products in accordance with construction schedules, coordinate to avoid conflict with work and conditions at the site.

1. Deliver products to the site in undamaged condition, in manufacturer's original sealed containers or packaging, with identifying labels intact and legible, complete with instructions for handling, storing, unpacking, protecting, and installing.

2. Schedule delivery to reduce long term on-site storage prior to installation and/or operation. Under no circumstances shall equipment be delivered to the site more than one month prior to installation without written authorization from the Engineer.

3. Coordinate delivery with installation to ensure minimum holding time for items that are hazardous, flammable, easily damaged, or sensitive to deterioration.

4. Products delivered to the site shall be unloaded and placed in a manner that will not hamper the Contractor's normal construction operations, nor those of other contractors and subcontractors. Unloading shall not interfere with normal traffic flow.

5. Immediately on delivery, inspect shipments to assure compliance with requirements of Contract Documents and approved submittals, and that products are properly protected and undamaged.

B. Provide equipment and personnel to handle products by methods to prevent

soiling or damage to products or packaging.

## 1.05 PRODUCT STORAGE AND HANDLING REQUIREMENTS

A. Store and protect products in accordance with manufacturers' Instructions.

B. Store with seals and labels intact and legible.

C. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

D. For exterior storage of fabricated products, place on sloped supports above ground.

E. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

F. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

G. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

## 1.06 ADAPTATION AND LOCATION OF EQUIPMENT

No responsibility for alteration of a planned structure to accommodate other types of equipment will be assumed by the Owner. Equipment, which requires alteration of a structure or structures, will be considered only if the Contractor assumes all responsibility for making and coordinating all necessary alterations. Any and all such alterations, and associated engineering, drafting, detailing, and/or coordinating, shall be done at no additional cost to the Owner.

## 1.07 PATENT ROYALTIES

All royalties and fees for patents covering processes, materials, articles, apparatus, devices, or equipment shall be included in the Contract Prices Bid by the Contractor.

## 1.08 WORKMANSHIP AND MATERIALS

A. All equipment shall be designed, fabricated and assembled in accordance with the most modern engineering and shop practice. Individual parts shall be manufactured to standard sizes and gauges so that repair parts, furnished at any time, can be installed in the field. Like parts of duplicate units shall be interchangeable. Equipment shall be new and shall not have been in service at any time prior to delivery, except as required by tests.

B. Materials shall be suitable for service conditions. Iron castings shall be tough, close grained, gray iron free from blowholes, flaws or excessive shrinkage and shall conform to ASTM A 48, Class 30 minimum. Plugging of defective castings

shall not be permitted. Castings shall be annealed to remove internal stresses prior to machining and shall have the mark number and heat number cast on them.

C. Except where otherwise specified, structural and miscellaneous fabricated steel used in items of equipment shall conform to the Standards of the American Institute of Steel Construction. All structural members shall be considered as subject to shock or vibratory loads.

D. All replaceable or expendable elements such as filters, screens, drive belts, fuses, lamps, etc., shall be easily accessible and replaceable without need of dismantling equipment or piping. All such items shall be of a standard type that is readily available from multiple suppliers.

E. Threaded openings for drains or vents in pump volutes, compressor or fan scrolls, air receivers, and heat exchangers which are plugged during normal operation shall be provided with stainless steel plugs.

## 1.09 LUBRICATION AND LUBRICATION FITTINGS

A. Equipment shall be adequately lubricated by systems which require attention no more frequently than weekly during continuous operation. Lubrication systems shall not require attention during start-up or shutdown and shall not waste lubricants.

B. Lubricants of the type recommended by the equipment manufacturer shall be provided in sufficient quantity by the Contractor to fill all lubricant reservoirs and to replace all lubricants consumed during testing, start-up and initial operation. The Contractor shall provide to the Owner prior to Substantial Completion sufficient quantities of lubricants to lubricate all equipment for one year of normal service.

C. Where special run-in oil or storage lubricants are used, they shall be flushed out and replaced with the required service lubricant by the Manufacturer’s Technical Representative.

D. Tag each piece of equipment with a cloth tag showing proper type lubricant, period between lubrications, date of lubrication and worker's initials. Have space for 10 lubrication notations.

E. Except for rotating shaft couplings, all lubrication fittings shall be brought to the outside of all equipment so that they are readily accessible from the outside without the necessity of removing covers, plates, housings or guards. Fittings shall be accessible from safe, permanent platforms or walk areas. Fittings shall be of the bull-neck, check type for use with a portable high pressure grease gun. Connection from a remote fitting to the point of use shall be with minimum 3/16-inch Type 316 stainless steel tubing, securely mounted parallel to equipment lines and protected where exposed to damage.

## 1.10 SAFETY GUARDS

All belt or chain drives, fan blades, couplings and other moving or rotating parts shall be covered on all sides by a safety guard. Safety guards shall be fabricated from 16 USS gauge or heavier galvanized or aluminum-clad sheet steel or 1/2-inch mesh galvanized expanded metal. Each guard shall be designed for easy installation and removal. All supports and accessories shall be provided for each guard. Supports and accessories, including bolts, shall be galvanized. All safety guards in outdoor locations shall be designed to prevent the entrance of rain and dripping water. All safety guards shall comply with OSHA General Industry Standards, Part 1910, Subpart O, Machinery and Machine Guarding. Provide tachometer access on shaft ends.

## 1.11 EQUIPMENT BASES

A. Where shown on the Drawings, equipment shall be installed on a raised, reinforced concrete base. The base shall be a minimum of 4-inches in height and shall extend beyond the equipment baseplate a minimum of 2-inches on all sides.

B. Unless otherwise specified, a cast iron or welded steel baseplate shall be provided for each pump, fan and any other item of equipment which is to be installed on a concrete base. Each unit and drive assembly shall be supported on a single baseplate of neat design. Baseplates shall have pads for anchoring all components and adequate grout holes. Baseplates for pumps shall have a raised lip all around and a threaded drain connection. Baseplates shall be anchored to the concrete base with suitable anchor bolts and the space beneath filled with grout as specified in the grouting section.

C. On direct coupled equipment, motor and driven equipment shall be doweled to a common base with a minimum of two dowels each.

## 1.12 SEAL WATER REQUIREMENTS

Where seal water is provided for flushing of mechanical shaft sleeves or sealing of shaft seal packing, provide equipment with drip pans fitted with drains to contain the leakage and convey it to the nearest suitable floor drain. Route drain piping to minimize obstructions to the movement of personnel.

## 1.13 GROUTING EQUIPMENT BASES

After equipment installation and alignment is complete, grout all baseplates and pads full with non-shrink grout as specified in these Specifications.

## 1.14 CONTROL AND INSTRUMENTATION COMPONENTS

Control and instrumentation equipment furnished by the mechanical equipment manufacturer shall conform to the applicable requirements of Division 26.

## 1.15 ALIGNMENT OF MOTORS AND EQUIPMENT

A. In every case where a drive motor is connected to a driven piece of equipment by a flexible coupling, the coupling halves shall be disconnected and the alignment between the motor and the equipment checked and corrected. Machinery shall first be properly aligned and leveled by means of steel wedges and shims or jacking screws near anchor bolts. Anchor bolts shall be tightened against the shims on wedges or jacking screws and the equipment shall again be checked for level and alignment before placing grout. Wedges shall not be placed between machined surfaces.

B. In general, checking and correcting the alignment shall follow the procedures set up in the Standards of the Hydraulic Institute, Instructions for Installation, Operation, and Maintenance of Centrifugal Pumps. Equipment shall be properly leveled and brought into angular and parallel alignment.

C. Equipment and piping shall be installed in such a way that no strain is transmitted to the equipment by piping systems or adjacent equipment.

## 1.16 WELDING AND BRAZING

A. All welds shall be sound and free from embedded scale and slag. All butt welds shall be continuous, and where exposed to view, shall be ground smooth. All continuous welds shall be gas and liquid-tight. Welds in piping shall have full penetration and shall be smooth on the inside of the pipe. Intermittent welds shall have an effective length of at least 2-inches and shall be spaced not more than 6-inches apart.

B. All welding of steel and aluminum, including materials, welding techniques, general safety practices, appearance and quality of welds, and methods of correcting defective work, shall conform to the latest requirements of AWS Specifications. Structural steel welding shall conform to the requirements of the AWS Structural Welding Code. The general recommendations and requirements of the AWS Structural Welding Code shall also apply to welded aluminum structures. The welding process and welding operators shall meet qualification tests and welding performance tests in accordance with the latest provisions of ASME Boiler and Pressure Vessel Code, Section IX, Welding and Brazing Qualifications. Welding process and qualification procedures for welding of pipe shall conform to the latest requirements of ANSI B31.1, Section 327, Welding, and Section 328, Brazing and Soldering. The Contractor shall provide a Certified Welding Inspector (CWI), on-site, whenever welding operations are taking place.

C. Field welding practices shall conform to OSHA construction standards, Part 1926, Subpart J, Welding and Cutting. Shop welding practices shall conform to OSHA General Industry Standards, Part 1910, Subpart Q, Welding, Cutting, and Brazing.

D. Welding electrodes for structural steel shall conform to the standard recommendations of the AISC. Welding electrodes for stainless steel shall conform to applicable AWS Specifications and shall be as recommended by "Welded Austenitic Chromium-Nickel Stainless Steels, Techniques and

Properties", published by the International Nickel Company, New York, New York. Welding electrodes for aluminum shall conform to applicable AWS Specifications.

E. Each welder and welding operator must identify all welds with welder's assigned symbol.

F. Welders performing unsatisfactory work shall be removed from the welding process.

G. The Owner may inspect any weld by radiographic or other means. Welds not in accordance with the requirements specified herein shall be repaired or replaced at the Contractor's expense. Excessive porosity, nonmetallic inclusions, lack of fusion, incomplete penetration and cracking shall constitute grounds for rejection of welds.

## 1.17 SPECIAL TOOLS AND ACCESSORIES

Equipment requiring periodic repair and adjustment shall be furnished complete with all special tools, instruments and accessories required for proper maintenance. Special tools and accessories shall include those tools and accessories not normally available in an industrial hardware or mill supply house. Equipment requiring special devices for lifting or handling shall be furnished complete with those devices.

## 1.18 SPARE PARTS

A. Provide all spare parts as specified in the technical specifications and as recommended by the manufacturer.

B. Provide transportation, handling, storage, and protection of spare parts as required.

C. Tag spare parts and their containers to clearly identify them. Cross-reference all spare parts with their applicable specification section under which they are being provided.

D. All spare parts are to be interchangeable with and identical to the original parts incorporated into the Work.

E. Spare parts shall be identified and scheduled in Operation and Maintenance data.

F. An itemized and complete list of spare parts provided pursuant to the Contract Documents shall be prepared and submitted to the Engineer for review. The list shall be indexed sequentially by specification section.

G. Spare parts shall not be used or incorporated into the Work, and shall be provided to the Owner prior to substantial completion, when directed by the Engineer.

H. Contractor shall submit copies of the completed and signed Spare Parts Transfer Forms to the Engineer.

## 1.19 SHOP PRIMING

All equipment shall receive shop painting as specified in the technical specifications.

## 1.20 GALVANIZING

A. All galvanizing shall be done by the hot-dip process after fabrication in conformity with requirements of ASTM A 123, A 153, A 384 and A 385. Articles to be galvanized shall be pickled before galvanizing.

B. Where galvanized bolts are specified or required by the Drawings, cadmium or zinc plated bolts will be acceptable provided cadmium plating conforms to ASTM A 165, Type NS and zinc plating conforms to ASTM A 164, Type GS.

C. Areas of galvanizing damaged by welding or burning or otherwise damaged shall be thoroughly stripped and cleaned and recoated with zinc to the required thickness by the hot dip process.

D. Galvanized articles shall be free from uncoated spots, blisters, flux, black spots, dross, projections and other defects not consistent with acceptable galvanizing practice.

E. Zinc and cadmium plating shall be subject to visual examination to determine uniformity of coating. The Engineer may require that the coating uniformity be tested in accordance with ASTM A 239.

## 1.21 INSTALLATION CHECK

A. An experienced, competent and authorized manufacturer's technical representative shall visit the site of the Work and inspect, check and adjust, if necessary, and approve the equipment installation. In each case, the manufacturer's technical representative shall be present when the equipment is placed in operation and shall revisit the jobsite as often as necessary until all operations troubleshooting is complete and the equipment installation and operation are satisfactory in the opinion of the Engineer.

B. During this initial inspection, each piece of equipment is to be evaluated for non-dynamic, non-operational concerns. The focus shall be to confirm the readiness of a unit or system for initial operation of the equipment in a normal duty cycle for a period of 24 hours. To the maximum extent practical, the full capabilities of each piece of equipment, including remote operation, instrumented control schemes, alternate modes of operation, and emergency operation, should be available prior to physical checkout in order to facilitate and expedite the transition from physical checkout to functional testing.

C. Each manufacturer's technical representative shall perform the installation check and furnish to the Owner, through the Engineer, a Certificate of Proper Installation (CPI). The CPI is to be submitted in writing, on either the form provided by the Engineer or on the Manufacturer's letterhead, certifying the following:

1. The equipment has been properly installed and lubricated.
2. The equipment is in accurate alignment.
3. The equipment is free from any undue stress imposed by connecting piping or anchor bolts.
4. External wire terminations have been made correctly.
5. All safety devices to protect workers are properly installed.
6. All devices designed and intended to protect the equipment from damage due to system or component failure or problem (e.g., overload sensors, overcurrent sensors, vibration sensors) are properly installed, connected, and functioning.
7. The equipment is ready to be operated under full load conditions without violation of or voiding any aspect or detail of the manufacturer's warranty.

The Work described under these Specifications will not be accepted as complete until satisfactory installation certifications have been submitted in accordance with the requirements of this Section.

C. The Contractor shall properly coordinate the visits by the various manufacturer's technical representatives, particularly when a specific equipment item's operation is dependent upon the operation of other equipment.

D. All costs for this work shall be included in the Contractor's bid price, and no separate payment will be made.

## PART 2 PRODUCTS (NOT USED)

## PART 3 EXECUTION (NOT USED)

**END OF SECTION**

# SECTION 01 70 00

## EXECUTION AND CLOSEOUT REQUIREMENTS

## PART 1 GENERAL

### 1.1 SECTION INCLUDES

A. Field engineering.

B. Closeout procedures.

C. Starting of systems.

D. Project record documents.

E. Operation and maintenance data.

F. Spare parts and maintenance products.

G. Product warranties and product bonds.

H. Examination.

I. Execution.

J. Cutting and patching.

K. Protecting installed construction.

L. Final cleaning.

### 1.2 FIELD ENGINEERING

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 Owner. The Contractor shall assume all costs associated with rectifying work constructed in the wrong location.

B. Owner will locate and Contractor shall protect survey control and reference points. Promptly notify Engineer of discrepancies discovered.

C. Control datum for survey is established by Owner-provided survey indicated on Drawings.

D. Prior to beginning Work, verify and establish elevations of existing facilities to ensure that new Work will meet existing elevations in smooth and level alignment except where specifically detailed or indicated otherwise.

E. Verify setbacks and easements; confirm Drawing dimensions and elevations.

F. Provide field engineering services. Establish elevations, lines, and levels using recognized engineering survey practices.

G. Maintain complete and accurate log of control and survey Work as Work progresses.

H. Protect survey control points prior to starting Site Work; preserve permanent reference points during construction.

I. Promptly report to Engineer loss or destruction of reference point or relocation required because of changes in grades or other reasons.

J. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Engineer.

## 1.3 CLOSEOUT PROCEDURES

A. Prerequisites to Substantial Completion: Complete following items before requesting Certification of Substantial Completion, either for entire Work or for portions of Work:

1. Submit maintenance manuals, Project record documents, digital images of construction photographs, videos made during construction**,** and other similar final record data in compliance with this Section.

2. Complete facility startup, testing, adjusting, balancing of systems and equipment, demonstrations, and instructions to Owner's operating and maintenance personnel as specified in compliance with this Section.

3. Conduct inspection to establish basis for request that Work is substantially complete. Create comprehensive list (initial punch list) indicating items to be completed or corrected, value of incomplete or nonconforming Work, reason for being incomplete, and date of anticipated completion for each item. Include copy of list with request for Certificate of Substantial Completion.

4. Obtain and submit releases enabling Owner's full, unrestricted use of Project and access to services and utilities. Include certificate of occupancy, operating certificates, and similar releases from authorities having jurisdiction and utility companies.

5. Deliver tools, spare parts, extra stocks of material, and similar physical items to Owner.

6. Discontinue or change over and remove temporary facilities and services from Project Site, along with construction tools, mockups, and similar elements.

7. Perform final cleaning according to this Section.

B. Substantial Completion Inspection:

1. When Contractor considers Work to be substantially complete, submit to Engineer and/or Owner:

a. Written certificate that Work, or designated portion, is substantially complete.

b. List of items to be completed or corrected (initial punch list).

2. Within [**seven**] days after receipt of request for Substantial Completion, Engineer and/or Owner will make inspection to determine whether Work or designated portion is substantially complete.

3. Should Engineer and/or Owner determine that Work is not substantially complete:

a. Engineer and/or Owner will promptly notify Contractor in writing, stating reasons for its opinion.

b. Contractor shall remedy deficiencies in Work and send second written request for Substantial Completion to Engineer and/or Owner.

c. Engineer and/or Owner will reinspect Work.

d. Redo and Inspection of Deficient Work: Repeated until Work passes Engineer's and/or Owner's inspection.

4. When Engineer and/or Owner finds that Work is substantially complete, Engineer and/or Owner will:

a. Prepare Certificate of Substantial Completion on [**EJCDC C-625 - Certificate of Substantial Completion**] <_____>, accompanied by Contractor's list of items to be completed or corrected as verified and amended by Engineer and Owner (final punch list).

b. Submit Certificate to Owner and Contractor for their written acceptance of responsibilities assigned to them in Certificate.

5. After Work is substantially complete, Contractor shall:

a. Allow Owner occupancy of Project under provisions stated in Certificate of Substantial Completion.

b. Complete Work listed for completion or correction within time period stipulated.

6. Owner will occupy all of the Work as specified in Section 01 10 00 - Summary.

C. Prerequisites for Final Completion: Complete following items before requesting final acceptance and final payment.

1. When Contractor considers Work to be complete, submit written certification that:

a. Contract Documents have been reviewed.

b. Work has been examined for compliance with Contract Documents.

c. Work has been completed according to Contract Documents.

d. Work is completed and ready for final inspection.

2. Submittals: Submit following:

a. Final punch list indicating all items have been completed or corrected.

b. Final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.

c. Specified warranties, workmanship/maintenance bonds, maintenance agreements, and other similar documents.

d. Accounting statement for final changes to Contract Sum.

e. Operating and maintenance data, instructions to Owner's personnel: according to this Section.

f. Spare Parts and Maintenance Materials: according to this Section.

g. Record Drawings with annotations made by the contractor during construction of the work, and including As-Built coordinates and elevations on all structures, pipe inverts and key locations as required by Engineer.

h. The Contractor shall furnish the Owner with certified copies of paid invoices (or other proof) indicating Georgia Sales Tax paid on items for which the Owner is eligible for tax refunds. Tax refunded will be to the Owner, with none credited to the Contractor.

i. Retainage will not be paid until the above documents have been submitted and are satisfactory and acceptable to the Owner.

j. Contractor's affidavit of payment of debts and claims per Section 00 65 19.

k. Contractor affidavit of release of liens per Section 00 65 20.

l. Consent of surety to final payment per Section 00 65 21.

3. Perform final cleaning for Contractor-soiled areas according to this Section.

D. Final Completion Inspection:

1. Within [**seven**] days after receipt of request for final inspection, Engineer and/or Owner will make inspection to determine whether Work or designated portion is complete.

2. Should Engineer and/or Owner consider Work to be incomplete or defective:

a. Engineer and/or Owner will promptly notify Contractor in writing, listing incomplete or defective Work.

b. Contractor shall remedy stated deficiencies and send second written request to Engineer and/or Owner that Work is complete.

c. Engineer and/or Owner will reinspect Work.

d. Redo and Inspection of Deficient Work: Repeated until Work passes [**Engineer's**] [**Owner's**] inspection.

3. Final Payment: Upon Final Completion of the Work in accordance with the Contract Documents, the Contractor will be authorized to prepare a final estimate of the work and a Final Payment request. The Engineer will review the final payment request and will, if all items are satisfactory, recommend approval to the Owner. The Engineer will submit to the Owner the final estimate and the final payment request, together with a certification stating that the work is complete and in substantial conformance with these Contract Documents. The entire balance found to be due the Contractor including any retainages, except such sums as may be lawfully retained by the Owner, will be paid to the Contractor.

## 1.4 STARTING OF SYSTEMS

A. Coordinate schedule for startup of various equipment and systems.

B. Notify Engineer and/or Owner [**seven**] days prior to startup of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.

D. Verify that tests, meter readings, and electrical characteristics agree with those required by equipment or system manufacturer.

E. Verify that wiring and support components for equipment are complete and tested.

F. Execute startup under supervision of manufacturer's representative or Contractors' personnel according to manufacturer's instructions.

G. When specified in individual Specification Sections, require manufacturer to provide authorized representative who will be present at Site to inspect, check, and approve equipment or system installation prior to startup and will supervise placing equipment or system in operation.

H. Submit a written report according to Section 01 33 00 - Submittal Procedures that equipment or system has been properly installed and is functioning correctly.

## 1.5 PROJECT RECORD DOCUMENTS

A. Maintain on Site one set of the following record documents; record actual revisions to the Work:

1. Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other modifications to the Contract.
5. Reviewed Shop Drawings, product data, and Samples.
6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress, not less than weekly.

E. Specifications: Legibly mark and record, at each product Section, description of actual products installed, including the following:

1. Manufacturer's name and product model and number.
2. Product substitutions or alternates used.
3. Changes made by Addenda and modifications.

F. Record Drawings: Legibly mark each item to record actual construction as follows:

1. Include Contract modifications such as Addenda, supplementary instructions, change directives, field orders, minor changes in the Work, and change orders.
2. Include locations of concealed elements of the Work.
3. Identify depth of buried utility lines and provide dimensions showing distances from permanent facility components that are parallel to utilities.
4. Identify and locate existing buried or concealed items encountered during Project.
5. Field changes of dimension and detail.
6. Details not on original Drawings.

G. Submit marked-up paper copy documents to Engineer with claim for final Application for Payment.

H. Submit PDF electronic files of marked-up documents to Engineer with claim for final Application for Payment.

## 1.6 OPERATION AND MAINTENANCE DATA

A. Submit in PDF composite electronic indexed file.

B. Submit data bound in 8-1/2 x 11-inch text pages, three D side ring binders with durable covers.

C. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS," title of Project**,** and subject matter of binder when multiple binders are required.

D. Internally subdivide binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

E. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

F. Contents: Prepare table of contents for each volume, with each product or system description identified, typed on white paper, in three parts as follows:

1. Part 1: Directory, listing names, addresses, and telephone numbers of Engineer, Contractor, Subcontractors, and major equipment suppliers.

2. Part 2: Operation and maintenance instructions, arranged by Specification Section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Include the following:

   a. Significant design criteria.

   b. List of equipment.

   c. Parts list for each component.

   d. Operating instructions.

   e. Maintenance instructions for equipment and systems.

   f. Maintenance instructions for finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.

   g. Safety precautions to be taken when operating and maintaining or working near equipment.

3. Part 3: Project documents and certificates, including the following:

   a. Shop Drawings and product data.

   b. Air and water balance reports.

   c. Certificates.

   d. Copies of warranties and bonds.

## 1.7 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Furnish spare parts, maintenance, and extra products in quantities specified in individual Specification Sections.

## 1.8 PRODUCT WARRANTIES AND PRODUCT BONDS

A. Obtain warranties and bonds executed by responsible Subcontractors, suppliers, and manufacturers within ten days after completion of applicable item of Work.

B. Execute and assemble transferable warranty documents and bonds from Subcontractors, suppliers, and manufacturers.

C. Verify documents are in proper form, contain full information, and are notarized.

D. Co-execute submittals when required.

E. Include table of contents and assemble in three D side ring binder with durable cover.

F. Submit prior to final Application for Payment.

G. Time of Submittals:

1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within [**ten**] days after acceptance.

2. Make other submittals within [**ten**] days after date of Substantial Completion, prior to final Application for Payment.

3. For items of Work for which acceptance is delayed beyond Substantial Completion, submit within [**ten**] days after acceptance, listing date of acceptance as beginning of warranty or bond period.

H. The Contractor shall warrant and guarantee for a period of one year from the date of Substantial Completion of the Work, that the completed Work is free from all defects due to faulty products or workmanship. 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, adjustments or other work that may be made necessary by such defects, the Owner 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.

I. The Contractor shall not be obligated to make replacements which become necessary because of ordinary wear and tear, or as a result of gross negligence 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.

J. 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.

K. 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.

L. 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 Substantial Completion. 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.

M. In the event the Contractor fails to proceed to remedy the defects upon notification 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, and to hold the Contractor and the sureties on Contractor's bond liable for the cost and expense thereof.

N. 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.

O. 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.

# PART 2 PRODUCTS (NOT USED)

# PART 3 EXECUTION

## 3.1 EXAMINATION

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

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

C. Examine and verify specific conditions described in individual Specification Sections.

D. Verify that utility services are available with correct characteristics and in correct locations.

## 3.2 EXECUTION

A. Comply with manufacturer's installation instructions, performing each step in sequence. Maintain one set of manufacturer's installation instructions at Project Site during installation and until completion of construction.

B. When manufacturer's installation instructions conflict with Contract Documents, request clarification from Engineer before proceeding.

C. Verify that field measurements are as indicated on approved Shop Drawings or as instructed by manufacturer.

D. Secure Work true to line and level and within specified tolerances, or if not specified, industry-recognized tolerances.

E. Climatic Conditions and Project Status: Install each unit of Work under conditions to ensure best possible results in coordination with entire Project.

1. Isolate each unit of Work from incompatible Work as necessary to prevent deterioration.

2. Coordinate enclosure of Work with required inspections and tests to minimize necessity of uncovering Work for those purposes.

F. Adjust operating products and equipment to ensure smooth and unhindered operation.

G. Clean and perform maintenance on installed Work as frequently as necessary through remainder of construction period. Lubricate operable components as recommended by manufacturer.

## 3.4 CUTTING AND PATCHING

A. Employ skilled installers to perform cutting and patching.

B. Execute cutting, fitting, and patching including excavation and fill to complete Work and to:

1. Fit the several parts together, to integrate with other Work.

2. Uncover Work to install or correct ill-timed Work.

3. Remove and replace defective and nonconforming Work.

4. Remove samples of installed Work for testing.

5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.

C. Execute Work by methods to avoid damage to other Work and to provide proper surfaces to receive patching and finishing.

D. Cut masonry and concrete materials using masonry saw or core drill.

E. Restore Work with new products according to requirements of Contract Documents.

F. Fit Work tight to pipes, sleeves, ducts, conduits, and other penetrations through surfaces.

G. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for assembly, refinish entire unit.

H. Identify hazardous substances or conditions exposed during the Work to Engineer for decision or remedy.

## 3.5 PROTECTING INSTALLED CONSTRUCTION

A. Protect installed Work and provide special protection where specified in individual Specification Sections.

B. Provide temporary and removable protection for installed products. Control activity in immediate Work area to prevent damage.

C. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

D. Prohibit traffic from landscaped areas.

## 3.6 FINAL CLEANING

A. In addition to the standards described in this Section, comply with all pertinent requirements of governmental agencies having Jurisdiction.

B. 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.

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.

E. 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.

F. At least each week, and more often if necessary, completely remove all scrap, debris and waste material from the job site.

G. 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.

H. 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. 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.

J. 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 remain with the Contractor.

**END OF SECTION**

# SECTION 01 75 16

## START-UP PROCEDURES

## PART 1 GENERAL

### 1.01 DESCRIPTION

A. Refer to Contract Provisions as well as Section 01 60 00, “Product Requirements.”

B. The inspection and testing requirements in this Section are in addition to those requirements defined in the technical specifications. At a minimum, provide the following startup and testing activities:

1. Installation check and inspection of equipment and materials as specified in section 01 60 00, Product Requirements, and as specified herein.
2. Shop test of equipment as specified in these sections.
3. Functional test of equipment as specified in these sections.
4. Performance test of equipment and systems as specified herein.
5. Operational test of equipment and systems as specified herein.

C. The exact sequence of start-up will depend upon a start-up schedule proposed by the Contractor and reviewed by the Engineer. The facility start-up schedule will be based upon the schedule information generated via the Project Schedule and a priority list of the equipment and systems developed by the Engineer, which are critical and required for start-up. The start-up schedule will be updated on a monthly basis, or as directed by the Engineer.

D. It is the Contractor's responsibility to make sure that all Work is completed in time to support functional, performance and operational tests. The Contractor is further responsible for advising the Engineer no less than two weeks prior to the Work being ready to begin testing. Functional testing of the systems may begin only after the Engineer has received full documentation and certification by the manufacturer and Contractor of the complete and correct installation of equipment associated with the Work. The Contractor shall also certify to the Engineer that all ancillary systems and components associated with testing have been correctly installed/constructed, completed and tested. For example, prior to beginning a functional test for a pump, the Contractor must certify to the Engineer that all associated pipes, tanks, electrical equipment, and instrumentation have been tested according to the applicable specification section(s).

### 1.02 DEFINITIONS

A. Shop Test: A test performed by the Supplier either at the place of manufacture, the place of assembly, or at another location where the required testing apparatus is

located, for the purpose of proving that the Products meet the requirements of the pertinent technical specification(s).

B. Installation Check: See Section 01 60 00, "Product Requirements."

C. Functional Test: A test or series of tests performed by the Contractor in the presence of the Engineer for the purpose of demonstrating that equipment operates in prescribed manner without overheating, jamming, excessive noise or vibration, or evidence of excessive wear. Tests are performed using clean water or air as appropriate.

D. Vibration Test: A test performed on specified motors by an independent agency in the presence of the Engineer and Manufacturers Representative, for the purpose of demonstrating that equipment operates without excessive vibration.

E. Performance Test: A specified test or series of tests performed by the Contractor in the presence of the Engineer, and Owner after the functional test. The test/tests are performed using process fluid (e.g. wastewater, chemical, digester gas, etc.) with the intent to demonstrate and confirm that the equipment and/or system meets the specified performance requirements.

F. Operational Test: The effort which follows successful functional and performance testing, and includes the process of putting the facility or any separately functioning and usable part of the work in operating order, with the intent to demonstrate and verify the operation of the completed facility as a unit.

G. Operational Period: A 30-day period of time in which the operational test is performed and final cleaning, adjusting and balancing of equipment is completed. This period is prior to Final Completion.

H. Significant Interruption of Operational Test may include, but is not limited to, any of the following events:

1. Failure of Contractor to maintain qualified on-site operational testing personnel as scheduled.

2. Failure to meet specified performance criteria for more than 2 consecutive hours.

3. Failure of any critical equipment unit, system, or subsystem that is not satisfactorily corrected within 5 hours after failure.

4. Failure of non-critical unit, system, or subsystem that is not satisfactorily corrected within 8 hours after failure.

5. As may be determined by Engineer.

I. System: The overall process, or a portion thereof, that performs a specific function. A system may consist of two or more subsystems as well as two or more types of equipment.

J. Manufacturer's technical representative: that person, or persons, provided by the Manufacturer who is qualified, by having the training and experience, to provide

technical and/or process related advice, and/or assistance, relating to the installation or utilization of the Products provided by that same manufacturer, for installation and utilization in the Work. Such training and experience shall include a minimum of three years participation in similar work including no less than three similar projects during this three-year period.

## 1.03 SUBMITTALS

A. Functional and performance test schedules and plan for equipment, units, and systems. Include test plan, procedures, and log format.

B. Schedule and plan of operational test activities.

C. Qualifications of manufacturer's technical representatives.

D. Manufacturer's Certificate of Proper Installation as required in Section 01 60 00, "Product Requirements."

E. Manufacturer's Test Reports: Functional and performance tests;

1. In a format appropriate for equipment and testing performed.
2. Acceptable to Engineer.
3. Submitted for each piece of equipment or system tested.

F. Summary log of all testing and training activities, by specification section and specific equipment item, as applicable.

G. Operation and maintenance data as specified in Section 01 70 00, "Execution and Closeout Requirements."

## 1.04 TESTING AND START-UP COORDINATION MEETINGS

A. Coordination meetings will be conducted by the Engineer to discuss the overall testing and startup program associated with the equipment being provided under this contract. The Engineer will notify the Contractor of the time and place of the meetings. The purpose of these meetings will be to:

1. Review the testing and startup requirements of both the Contractor and manufacturer's technical representative(s).
2. Develop a testing and startup plan based upon Owner, Contractor, manufacturer's technical representative, and Engineer input on the:
   a. Status of equipment installation and readiness for testing and operation.
   b. Status of required testing and startup deliverables.
   c. Requirements of the Contract Documents for Owner personnel training, testing and startup involvement.

3. Incorporate the above into the Project Schedule for testing and startup of the equipment/sub-system/system/facility.

4. Coordinate activities among the Contractor, Engineer, and Owner during start-up testing.

B. Attended by: Contractor, Engineer, and Owner

# PART 2 PRODUCTS

## 2.01 DOCUMENTS

A. The Contractor shall prepare and maintain certain records, reports, and logs to manage and report on the testing and startup proceedings as they occur during the course of the project.

B. Forms:

1. Equipment Start-up and Testing Log – The Log consists of information pertaining to specific equipment items and the testing and starting information relative to the equipment.

2. Equipment Start-up/Testing Report – This report documents that the particular equipment has been properly and successfully tested and started.

# PART 3 EXECUTION

## 3.01 EQUIPMENT AND SYSTEM TESTING PREPARATION

A. The Contractor shall:

1. Complete Work associated with the unit and related processes, to include but not be limited to:

a. Pressure testing of associated piping

b. Leak testing of associated tanks

c. Testing of associated electrical equipment, wire, and cable.

d. Testing of associated instrumentation and controls

2. Provide and coordinate qualified manufacturer’s technical representative services.

3. Furnish related documentation to include but not be limited to:

a. Manufacturer's Certificate of Proper Installation per Section 01 60 00, “Product Requirements.”

b. Approved testing plan.

c. Equipment operation and maintenance manuals

d. Electrical testing documentation

4. Coordinate all testing with ENGINEER and OWNER. With the exception of physical inspection and bumping of motors to determine proper rotation, all testing must be approved by ENGINNER.

5. Designate and furnish one or more persons to be responsible for coordinating and expediting Contractor's facility startup and testing duties. The person or persons shall be present during facility startup meetings and shall be available at all times during the facility startup period.

6. Provide and have on hand temporary valves, gauges, and piping, as well as any test equipment, spare parts, and special tools before testing any unit or system.

7. Provide all labor required to aid the manufacturer’s technical representatives with their inspection and in making required adjustments to all equipment installed under this contract.

8. Installation check: Prior to starting functional and performance testing the Contractor shall complete the requirements of Installation check per section 01 60 00, “Product Requirements”.

B. Ready-to-test determination will be by the Engineer based at least on the following:

1. Notification by Contractor of equipment and system readiness for testing.

2. Acceptable testing plan.

3. Acceptable operation and maintenance manuals, loop drawings and other related test documentation.

4. Receipt of Manufacturer's Certificate of Proper Installation.

5. Adequate completion of Work adjacent to, or interfacing with, equipment to be tested.

6. Availability and acceptability of manufacturer’s technical representative to assist in testing of respective equipment, and satisfactory fulfillment of other specified manufacturers' responsibilities.

7. Equipment and electrical tagging and identification complete

8. Necessary testing devices, spare parts, and special tools on hand.

## 3.02 SHOP TEST

In accordance with the requirements of the individual equipment specifications.

## 3.03 FUNCTIONAL TEST

A. Contractor shall coordinate the date and time for the functional test of equipment with the Owner and the Engineer. Test plans must be approved at least 14 days prior to date of test.

B. After installation and checkout, all equipment shall be tested in the presence of the Engineer and in accordance with the testing requirements specified in the applicable technical Specifications. During the field tests, the equipment shall be subjected to various full load and partial load conditions and emergency operating and shutdown conditions. The ability of the equipment to operate in the manner prescribed in the technical specifications without overheating, jamming, excessive noise or vibration, or evidence of excessive wear shall be demonstrated to the Engineer. Equipment with package controls shall include as a part of the test, operation in AUTOMATIC mode.

C. All equipment shall be tested before it is covered or insulated. All accessory equipment, which may be damaged by conditions during the test, shall be isolated or otherwise protected.

D. The Contractor in conjunction with the Manufacturer's technical representative's guidance and recommendations shall furnish all testing instruments and gauges necessary for conducting the tests. Installed instruments and gauges shall be used whenever possible if calibrated and approved for the purpose. Calibrate all installed instruments and gauges and attach a cloth tag showing date of calibration. Portable test equipment used in field-testing shall be calibrated in the presence of the Engineer or suitable written evidence attesting to the accuracy of the equipment shall be submitted.

E. A record shall be made of each field test showing operating temperatures and pressures, motor current and voltage, speed, flow rate and other pertinent data. Information recorded for fans, blowers, compressors and pumps shall include static pressures entering and leaving the equipment, fluid temperature entering and leaving the equipment, ambient temperature, barometric pressure and relative humidity, rpm and discharge flow rate. Four copies of all recorded test data and information shall be submitted to the Engineer.

F. Test fluid shall be potable water, plant effluent, or air as applicable unless the Engineer approves other fluids in writing.

G. Should the results of the tests indicate that the equipment has failed to perform in accordance with the requirements of the applicable Specifications, the manufacturer's technical representative shall make such modifications or adjustments as required for satisfactory operation, including replacement of any or all components, at no additional cost to the Owner. Following the modifications or adjustments, the manufacturer's technical representative shall repeat the field tests as specified herein. This procedure shall be repeated until the results of the field tests indicate that the equipment has satisfied the requirements of the applicable Specification section.

H. If, in Engineer's opinion, each system meets the functional requirements specified, such system will be identified and acknowledged as conforming for purposes of

advancing to performance testing phase. If, in Engineer's opinion, functional test results do not meet requirements specified, the system(s) will be considered as nonconforming. Additional testing will be conducted as required to achieve conformance, and will be accomplished at no additional cost to the Owner.

I. Separate items of equipment demonstrated to function properly during subsystem testing may require no further acceptance test if documentation of subsystem testing is acceptable to Engineer.

J. Performance testing shall not commence until the equipment or system meets functional tests specified herein and required by the manufacturer.

## 3.04 OPERATIONAL TEST

A. Prior to initiation of the operation test, the Contractor shall certify in writing that:

1. Hydraulic structures, piping systems, and valves have been successfully tested. Include copies of pertinent test reports/results.

2. Equipment systems and subsystems have been checked for proper installation, started, and successfully tested to indicate that they are operational. Include copies of pertinent test reports/results.

3. Systems and subsystems are capable of performing their intended functions. Include a copy of the signed Manufacturer's Certificate of Proper Installation.

4. Facilities and systems are ready for intended operation.

B. Operational test shall demonstrate proper installation, adjustment, function, performance, and operation of equipment, systems, control devices, and required interfaces individually and in conjunction with process instrumentation and control system. Unless otherwise specified, operational testing shall be considered complete when, in the opinion of the Engineer, the facility has operated in the manner intended for 14 continuous days without a significant interruption. This period is in addition to any training, functional, or performance test periods specified elsewhere. A significant interruption will require the startup then in progress to be stopped and restarted (i.e. the14 continuous days requirement starts over at day 1) after corrections are made.

C. When operational testing has commenced, the Contractor shall schedule remaining Work so as not to interfere with or delay the completion of facility startup. Support operational testing activities with adequate staff to prevent delays and process upset. This staff shall include, but not be limited to, major equipment and system manufacturer's technical representatives, Subcontractors, electricians, instrumentation personnel, millwrights, pipe fitters, plumbers, and others as appropriate.

D. Any and all adjustments, repairs, and corrections necessary to complete operational testing shall be coordinated and completed by the Contractor.

## 3.05 SUBSTANTIAL COMPLETION

In accordance with the requirements of the Contract Provisions.

## 3.06 FINAL ACCEPTANCE

In accordance with the requirements of the Contract Provisions.

## 3.07 CONTINUOUS OPERATIONS

Owner will accept equipment and systems as substantially complete and ready for continuous operation only after successful operational test is completed, documented, and reports submitted, disinfections complete, all required spare parts and special tools are turned over by the Contractor, and manufacturers' services completed for training of Owner's personnel.

**END OF SECTION**

# SECTION 02 41 00

## DEMOLITION

## PART 1 GENERAL

### 1.01 RELATED DOCUMENTS

Construction Plans and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

### 1.02 DESCRIPTION OF WORK

A. Extent of demolition work is indicated on the Construction Plans.

B. Demolition includes all operations necessary for demolition of the existing structures, foundations and utilities as shown.

C. Remove debris, rubbish and other materials resulting from demolition operations from the site. Transport and legally dispose of materials off site.

### 1.03 SUBMITTALS

A. Schedule: Submit schedule indicating proposed methods and sequence of operations for demolition work to Owner's Representative for review prior to commencement of work. Include coordination for shut-off, capping, and continuation of utility services as required, together with details for dust and noise control protection. The procedures shall provide for safe conduct of the work, careful removal and disposition of materials specified to be salvaged, protection of property which is to remain undisturbed, coordination with other work in progress, and timely disconnection of utility services. The submittal shall include a detailed description of the methods and equipment to be used for each operation, and the sequence of operation.

B. Provide detailed sequence of demolition and removal work to ensure uninterrupted progress of Owner's on-site operations.

C. Coordinate with Owner's continuing occupation of portions of existing building/site, with Owner's partial occupancy of completed new addition/site.

### 1.04 JOB CONDITIONS

A. Occupancy: Owner will be continuously occupying areas of the building/site immediately adjacent to areas of selective demolition. Conduct selective demolition work in manner that will minimize need for disruption of Owner's normal operations. Provide minimum of 72 hours advance notice to Owner of

demolition activities which will severely impact Owner's normal operations.

B. Condition of Structures: Owner assumes no responsibility for actual condition of items or structures to be demolished.

C. Conditions existing at time of commencement of contract will be maintained by Owner insofar as practicable. However, variations within structure may occur by Owner's removal and salvage operations prior to start of selective demolition work.

D. Partial Demolition and Removal: Items indicated to be removed but of salvable value to Contractor may be removed from structure as work progresses. Transport salvaged items from site as they are removed.

E. Storage or sale of removed items on site will not be permitted.

F. Protection: Provide temporary barricades and other forms of protection as required to protect Owner's personnel and general public from injury due to selective demolition work.

G. Provide protective measures as required to provide free and safe passage of Owner's personnel and general public to and from occupied portions of building/site.

H. Erect temporary covered passageways as required by authorities having jurisdiction.

I. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of structure or element to be demolished, and adjacent facilities or work to remain.

J. Protect from damage existing finish work that is to remain in place and becomes exposed during demolition operations.

K. Protect floors with suitable coverings when necessary.

L. Construct temporary insulated solid dustproof partitions where required to separate areas where noisy or extensive dirt or dust operations are performed. Equip partitions with dustproof doors and security locks if required.

M. Provide temporary weather protection during interval between demolition and removal of existing construction on exterior surfaces, and installation of new construction to insure that no water leakage or damage occurs to structure or interior areas of existing building.

N. Remove protections at completion of work.

O. Damages: Promptly repair damages caused to adjacent facilities by demolition work at no cost to Owner.

P. Traffic: Conduct selective demolition operations and debris removal in a manner to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.

Q. Do not close, block or otherwise obstruct streets, walks or other occupied or used facilities without written permission from authorities having jurisdiction. Provide

alternate routes around closed or obstructed traffic ways if required by governing regulations.

R. Explosives: Use of explosives will not be permitted unless otherwise noted.

S. Utility Services: Maintain existing utilities indicated to remain, keep in service, and protect against damage during demolition operations.

T. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.

U. Environmental Controls: Use water sprinkling, temporary enclosures, and other suitable methods to limit dust and dirt rising and scattering in air to lowest practical level. Comply with governing regulations pertaining to environmental protection.

V. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.

W. NESHAP Compliance: The Contractor is responsible for being aware of and complying with the National Emission Standard for Hazardous Air Pollutants (NESHAP) Section 112 of the Federal Clean Air Act regarding asbestos.

# PART 2 PRODUCTS (NOT APPLICABLE)

# PART 3 EXECUTION

## 3.01 INSPECTION

Prior to commencement of demolition work, inspect areas in which work will be performed. Photograph existing conditions to structure surfaces, equipment or to surrounding properties which could be misconstrued as damage resulting from selective demolition work; file with Owner's Representative prior to starting work.

## 3.02 PREPARATION

A. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement or collapse of structures to be demolished and adjacent facilities to remain.

B. Cease operations and notify the Owner's Representative immediately if safety of structure appears to be endangered. Take precautions to support structure until determination is made for continuing operations.

C. Cover and protect furniture, equipment and fixtures to remain from soiling or damage when demolition work is performed in rooms or areas from which such

item have not been removed.

D. Erect and maintain dust-proof partitions and closures as required to prevent spread of dust or fumes to occupied portions of the building.

E. Where selective demolition occurs immediately adjacent to occupied portions of the building, construct dust-proof partitions of minimum 4" studs, 5/8" drywall (joints taped) on occupied side 1/2" fire-retardant plywood on demolition side, and fill partition cavity with sound-deadening insulation.

F. Provide weatherproof closures for exterior openings resulting from demolition work.

G. Locate, identify, stub off and disconnect utility services that are not indicated to remain.

H. Provide by-pass connections as necessary to maintain continuity of service to occupied areas of building. Provide minimum of 72 hours advance notice to Owner if shut-down of service is necessary during change-over.

## 3.03 DEMOLITION

A. Perform selective demolition work in a systematic manner. Use such methods as required to complete work indicated on the Plans in accordance with demolition schedule and governing regulations.

B. Demolish concrete and masonry in small sections. Cut concrete and masonry at junctures with construction to remain using power-driven masonry saw or hand tools; do not use power-driven impact tools.

C. Locate demolition equipment throughout structure and promptly remove debris to avoid imposing excessive loads on supporting walls, floors or framing.

D. All existing structures shall be completely removed where denoted on the Plans. All foundations and slabs shall be broken up and removed from the site. Sidewalks, curbs, gutters, streets and street light bases shall be completely removed. It is not anticipated that piling will be encountered under any of the structures to be removed; however, where piling are encountered they shall be removed to a point three feet below existing ground.

E. When approved in writing by the Engineer 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 result from the Contractor's operations. On easements through private property, the Contractor shall not burn on the site unless written consent is also secured from the property owner, in addition to authorization from the proper authorities.

F. Demolish foundation walls to a depth of not less than 12" below existing ground surface. Demolish and remove below-grade wood or metal construction. Break up below-grade concrete slabs.

G. For interior slabs on grade, use removal methods that will not crack or structurally disturb adjacent slabs or partitions. Use power saw where possible.

H. Completely fill below-grade areas and voids resulting from demolition work. Provide fill consisting of approved earth, gravel or sand, free of trash and debris, stones over 6" diameter, roots or other organic matter.

I. If anticipated mechanical, electrical or structural elements which conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Owner's Representative in written, accurate detail. Pending receipt of directive form Owner's Representative rearrange selective demolition schedule as necessary to continue overall job progress without delay.

## 3.04 SALVAGE MATERIALS

A. Salvage Items: Where indicated on the Plans as "Salvage-Deliver to Owner", carefully remove indicated items, clean, store and turn over to Owner and obtain receipt.

B. Historic artifacts, including cornerstones and their contents, commemorative plaques and tables, antiques, and other articles of historic significance remain the property of the Owner. Notify Owner's Representative if such items are encountered and obtain acceptance regarding method of removal and salvage for Owner.

## 3.05 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove debris, rubbish and other materials resulting from demolition operations from the site. Transport and legally dispose of materials off site.

B. If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning removal, handling and protection against exposure or environmental pollution.

1. Burning of removed materials is not permitted on project site.

## 3.06 DEMOLITION AND REPAIR

A. Upon completion of demolition work, remove tools, equipment and demolished materials from site. Remove protections and leave interior areas broom clean.

B. Repair demolition performed in excess of that required. Return structures and surfaces to remain to condition existing prior to commencement of selective demolition work. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.

**END OF SECTION**

# SECTION 03 31 00

## CAST-IN-PLACE CONCRETE

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

This section specifies cast-in place structural concrete.

### 1.02 RELATED SECTIONS

A. Section 03 10 00 - Concrete Forming and Accessories

B. Section 03 20 00 - Concrete Reinforcing.

### 1.03 REFERENCES

A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute International; 1991 (Reapproved 1997).

B. ACI 211.2 - Standard Practice for Selecting Proportions for Structural Lightweight Concrete; American Concrete Institute International; 1998.

C. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International; 1996.

D. ACI 302.1R - Guide for Concrete Floor and Slab Construction; American Concrete Institute International; 1996.

E. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; American Concrete Institute International; 1989 (Reapproved 1997).

F. ACI 305R - Hot Weather Concreting; American Concrete Institute International; 1991.

G. ACI 306R - Cold Weather Concreting; American Concrete Institute International; 1988.

H. ACI 308 - Standard Practice for Curing Concrete; American Concrete Institute International; 1992 (Reapproved 1997).

I. ACI 318 - Building Code Requirements for Reinforced Concrete and Commentary; American Concrete Institute International; 1999.

J. AC1350R – Environmental Engineering Concrete Structures; American Concrete Institute International; 1989.

K. ASTM A 185 - Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement; 1997.

L. ASTM A 497 - Standard Specification for Steel Welded Wire fabric, Deformed, for Concrete Reinforcement; 1997.

M. ASTM A 615/A 615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement; 1996a.

N. ASTM A 767/A 767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement; 1997.

O. ASTM A 775/A 775M - Standard Specification for Epoxy-Coated Reinforcing Steel Bars; 1997.

P. ASTM A 884/A 884M - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Fabric for Reinforcement; 1996a.

Q. ASTM C 33 - Standard Specification for Concrete Aggregates; 1999a.

R. ASTM C 39/C 39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 1999.

S. ASTM C 94/C 94M - Standard Specification for Ready-Mixed Concrete; 2000.

T. ASTM C 150 - Standard Specification for Portland Cement; 1999a.

U. ASTM C 171 - Standard Specification for Sheet Materials for Curing Concrete; 1997a.

V. ASTM C 173 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 1994a.

W. ASTM C 260 - Standard Specification for Air-Entraining Admixtures for Concrete; 1998.

X. ASTM C 309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 1998a.

Y. ASTM C 330 - Standard Specification for Lightweight Aggregates for Structural Concrete; 1999.

Z. ASTM C 494/C 494M - Standard Specification for Chemical Admixtures for Concrete; 1999a.

AA. ASTM C 618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete; 1999.

AB. ASTM C 685 - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing; 1998a.

AC. ASTM C 881 - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 1999.

AD. ASTM C 1059 - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete; 1999.

AE. ASTM C 1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 1999.

AF. ASTM D 994 - Standard Specification for Preformed Expansion Joint Filler for

Concrete (Bituminous Type); 1998.

AG. ASTM D 1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); 1999.

AH. ASTM D 3963/D 3963M - Standard Specification for Fabrication and Job-Site Handling of Epoxy Coated Reinforcing Steel Bars; 1999.

AI. ASTM E 1155 - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers; 1996.

## 1.04 SUBMITTALS

A. Concrete mixture proportions shall be determined by the Contractor and submitted for review. The concrete mixture quantities of all ingredients per cubic meter yard and nominal maximum coarse aggregate size that will be used in the manufacture of each quality of concrete shall be stated. Proportions shall indicate the mass of cement, pozzolan and ground granulated blast-furnace (GGBF) slag when used, and water; the mass of aggregates in a saturated surface-dry condition; and the quantities of admixtures. The submission shall be accompanied by test reports from a laboratory complying with ASTM C 1077 which show that proportions thus selected will produce concrete of the qualities indicated. No substitution shall be made in the source or type of materials used in the work without additional tests to show the quality of the new material and concrete are satisfactory.

B. Statements that the concrete testing technicians and the concrete inspectors meet the specified requirements, in sections 01 45 29.

C. The method and equipment proposed for joint cleanup and waste disposal shall be submitted for review and approval

D. The curing medium and methods to be used shall be submitted for review and approval.

E. If concrete is to be placed under cold-weather conditions, the proposed materials, methods, and protection shall be submitted for approval.

F. If concrete is to be placed under hot-weather conditions, the proposed material and methods shall be submitted for review and approval.

G. Aggregate quality tests shall be submitted at least 30 days prior to start of concrete placement.

H. The results of the initial mixer uniformity tests shall be submitted at least 5 days prior to the initiation of placing.

I. Cementitious materials, including cement and pazzolan, (and Ground Granulated Blast Furnace Slag) will be accepted on the basis of the manufacturer's certification of compliance, accompanied by mill test reports that materials meet the requirements of the specification under which they are furnished.

Certification and mill test reports shall be form samples taken from the particular lot furnished. No cementitious materials shall be used until notice of acceptance has been given by the Contracting Officer. Cementitious material will be subject to check testing from samples obtained at the source, at transfer points, or at the project site, as scheduled by the Contracting Officer, and such sampling will be by or under the supervision of the Owner at its expense. Material not meeting specifications shall be promptly removed from the site of work.

J. Impervious-Sheet Curing materials shall be certified for compliance with all specification requirements.

K. Air-Entraining Admixture shall be certified for compliance with all specification requirements.

L. Other chemical admixtures shall be certified for compliance withal all specification requirements.

M. Membrane-Forming curing compound shall be certified for compliance with all specification requirements.

N. Epoxy Resin and Latex Bonding Compound shall be certified for compliance with all specification requirements.

O. Descriptive literature of the Nonshrink Grout proposed for use shall be furnished together with a certificate form the manufacturer stating that it is suitable for the application or exposure for which it is being considered.

## 1.05 PRE-CONCRETE CONFERENCE:

A. General: At least 15 days prior to submittal of design mixes, conduct a meeting to review proposed methods of concrete construction to achieve the required results.

B. Agenda: Includes but is not limited to:

1. Submittals.
2. Coordination of work.
3. Availability of material.
4. Concrete mix design including admixtures.
5. Methods of placing, finishing, and curing.
6. Finish criteria required to obtain required flatness and levelness.
7. Timing of floor finish measurements.
8. Material inspection and testing.

C. Attendees: Include but not limited to representatives of Contractor; subcontractors involved in supplying, conveying, placing, finishing, and curing concrete; lightweight aggregate manufacturer; admixture manufacturers; Resident Engineer; and Consulting Engineer.

D. Minutes of the meeting: Contractor shall take minutes and type and distribute the

minutes to attendees within five days of the meeting.

### 1.06 MOCK-UP

A. In addition to the other specified samples and tests, construct a mock-up using the materials, reinforcing, forming system and construction methods proposed for use in exposed architectural concrete.

B. Construct the mock-up with at least an 8 feet by 8 feet exposed surface and suitable foundations. Include the following where applicable: Control joints, reglets, recesses or other typical architectural details.

C. Before casting the mock-up, submit full detailed Shop Drawings of the mock-up formwork for review by the Engineer Perform all necessary preliminary tests to ensure that concrete used for the mock-up will exactly match the approved sample in color and texture.

D. Perform the surface treatment proposed for use on one or more areas not less than 1 foot by 1 foot on the back side of the mock-up to establish the texture of finish required by the Engineer. Repeat as required until a sample satisfactory to the Engineer has been obtained.

E. Treat the finished front surface of the mock-up to produce a uniform appearance similar in every respect to the approved sample area.

F. The completed mock-up shall be inspected by the Engineer. Failure of the mock-up to match the approved sample will require the construction of further mock-ups until approval is obtained. Remove rejected mock-ups immediately.

G. Maintain the approved mock-ups in good condition at the job site until all architectural concrete surfaces have been completed and approved by the Engineer. Remove the mock-up from the site after completion of the above.

## PART 2 PRODUCTS

### 2.01 MATERIALS

A. Portland Cement: ASTM C150 Type I, II or III.

B. Fly Ash: ASTM C618, Class C or F including supplementary optional requirements relating to reactive aggregates and alkalies, and loss on ignition (LOI) not to exceed 5 percent.

C. Coarse Aggregate: ASTM C33.

1. Size 67. Size 467 may be used for footings and walls over 12 inches thick.

2. Coarse aggregate for applied topping, encasement of steel columns, and metal pan stair fill shall be Size 7.

3. Maximum size of coarse aggregates not more than one-fifth of narrowest

dimension between sides of forms, one-third of depth of slabs, nor three-fourth of minimum clear spacing between reinforcing bars.

D. Lightweight Aggregates for Structural Concrete: ASTM C330, Table 1. Maximum size of aggregate not larger than one-fifth of narrowest dimension between forms, nor three-fourth of minimum clear distance between reinforcing bars. Contractor to furnish certified report to verify that aggregate is sound and durable, and has a durability factor of not less than 80 based on 300 cycles of freezing and thawing when tested in accordance with ASTM C666.

E. Fine Aggregate: ASTM C33. Fine aggregate for applied concrete floor topping shall pass a No. 4 sieve, 10 percent maximum shall pass a No. 100 sieve.

F. Mixing Water: Fresh, clean, and potable.

G. Admixtures:

1. Water Reducing Admixture: ASTM C494, Type A and not contain more chloride ions than are present in municipal drinking water.

2. Water Reducing, Retarding Admixture: ASTM C494, Type D and not contain more chloride ions than are present in municipal drinking water.

3. High-Range Water-Reducing Admixture (Superplasticizer): ASTM C494, Type F or G, and not contain more chloride ions than are present in municipal drinking water.

4. Non-Corrosive, Non-Chloride Accelerator: ASTM C494, Type C or E, and not contain more chloride ions than are present in municipal drinking water. Admixture manufacturer must have long-term non-corrosive test data from an independent testing laboratory of at least one year duration using an acceptable accelerated corrosion test method such as that using electrical potential measures.

5. Air Entraining Admixture: ASTM C260.

6. Microsilica: Use only with prior review and acceptance of the Resident Engineer. Use only in conjunction with high range water reducer.

7. Calcium Nitrite corrosion inhibitor: ASTM C494 Type C.

8. Prohibited Admixtures: Calcium chloride, thiocyanate or admixtures containing more than 0.05 percent chloride ions are not permitted.

9. Certification: Written conformance to the requirements above and the chloride ion content of the admixture prior to mix design review.

H. Expansion Joint Filler: ASTM D1751.

I. Sheet Materials for Curing Concrete: ASTM C171.

J. Liquid Membrane-forming Compounds for Curing Concrete: ASTM C309, Type I, with fugitive dye. Compound shall be compatible with scheduled surface treatment, such as paint and resilient tile, and shall not discolor concrete surface.

K. Abrasive Aggregate: Aluminum oxide grains or emery grits.

L. Liquid Hardener and Dustproofer: Fluosilicate solution of magnesium fluosilicate or zinc fluosilicate. Magnesium and zinc may be used separately or in combination as recommended by manufacturer.

M. Liquid Densifier/Sealer: 100% active colorless aqueous siliconate solution.

N. Penetrating Sealer: For use on parking garage ramps and decks. High penetration silane sealer providing minimum 95 percent screening per National Cooperative Highway Research Program (NCHRP) No. 244 standards for chloride ion penetration resistance. Requires moist (non-membrane) curing of slab.

O. Non-Shrink Grout:

1. ASTM C1107, pre-mixed, produce a compressive strength of at least 2500 psi at three days and 5000 psi at 28 days. Furnish test data from an independent laboratory indicating that the grout when placed at a fluid consistency shall achieve 95 percent bearing under a 4 foot by 4 foot base plate.

2. Where high fluidity or increased placing time is required, furnish test data from an independent laboratory indicating that the grout when placed at a fluid consistency shall achieve 95 percent under an 18 inch by 36 inch base plate.

## 2.02 CONCRETE MIX DESIGN

A. Mix Designs: Proportioned in accordance with Section 5.3, "Proportioning on the Basis of Field Experience and/or Trial Mixtures" of ACI 318. The concrete compressive strength Fc' shall be 4,000 psi unless otherwise indicated on the drawings.

1. If trial mixes are used, make a set of at least 6 cylinders in accordance with ASTM C192 for test purposes from each trial mix; test three for compressive strength at 7 days and three at 28 days.

2. Submit a report of results of each test series, include a detailed listing of the proportions of trial mix or mixes, including cement, fly ash, admixtures, weight of fine and coarse aggregate per cubic yard measured dry rodded and damp loose, specific gravity, fineness modulus, percentage of moisture, air content, water-cement -fly ash ratio, and consistency of each cylinder in terms of slump. Include dry unit weight of lightweight structural concrete.

3. Prepare a curve showing relationship between water-cement-fly ash ratio at 7-day and 28-day compressive strengths. Plot each curve using at least three specimens.

4. If the field experience method is used, submit complete standard deviation analysis.

B. After approval of mixes no substitution in material or change in proportions of approval mixes may be made without additional tests and approval of Resident

Engineer or as specified. Making and testing of preliminary test cylinders may be carried on pending approval of cement and fly ash, providing Contractor and manufacturer certify that ingredients used in making test cylinders are the same. Resident Engineer may allow Contractor to proceed with depositing concrete for certain portions of work, pending final approval of cement and fly ash and approval of design mix.

C. Cement Factor: Maintain minimum cement factors in Table I regardless of compressive strength developed above minimums. Fly ash may be substituted for up to 20 percent of the minimum cement factor at option of Contractor, except fly ash may not be used in concrete designated as architectural concrete.

**TABLE I - CEMENT AND WATER FACTORS FOR CONCRETE**

| Concrete Strength | Water/Cement Ratio |
|---|---|
| Min. 28 Day Comp. Str. psi | Max. Water Cement Ratio |
| 4000[1,3] | 0.46 |

1. If trial mixes are used, the proposed mix design shall achieve a compressive strength 1200 psi in excess of f'c.
2. Lightweight Structural Concrete. Pump mixes may require higher cement values.
3. For concrete exposed to high sulfate content soils maximum water cement ratio is 0.44.

D. Maximum Slump: Maximum slump, as determined by ASTM C143 with tolerances as established by ASTM C94, for concrete to be vibrated shall be as shown in Table II.

**TABLE II - MAXIMUM SLUMP, INCHES**

| Type of Construction | Normal Weight Concrete |
|---|---|
| Reinforced Footings and Substructure Walls | 3 inches |
| Slabs, Beams, Reinforced Walls, and Building Columns | 4 inches |

* Slump may be increased by the use of the approved high-range water-reducing admixture (superplasticizer). Tolerances as established by ASTM C94. Concrete containing the high-range-water-reducing admixture may have a maximum slump of 9 inches. The concrete shall arrive at the job site at a slump of 2 inches to 3 inches. This should be verified, and then the high-range-water-reducing admixture added to increase the slump to the approved level.

E. Air-Entrainment: Air-entrainment of normal weight concrete shall conform with Table III. Air-entrainment of lightweight structural concrete shall conform with Table IV. Determine air content by either ASTM C173 or ASTM C231.

**TABLE III - TOTAL AIR CONTENT**

| Location | Air Content |
|---|---|
| Concrete Exposed to Weather | 4.5% to 7.5% |
| Interior normal weight concrete slabs | 2% to 3% |

F. High early strength concrete, made with Type III cement or Type I cement plus non-corrosive accelerator, shall have a 7-day compressive strength equal to specified minimum 28-day compressive strength for concrete type specified made with standard Portland cement.

G. Concrete slabs placed at air temperatures below 50 degrees Fahrenheit use non-corrosive, non-chloride accelerator. Concrete required to be air entrained use approved air entraining admixture. Pumped concrete, synthetic fiber concrete, architectural concrete, concrete required to be watertight, and concrete with a water/cement ratio below 0.50 use high-range water-reducing admixture (superplasticizer).

H. Durability: Use air entrainment for exterior exposed concrete subjected to freezing and thawing and other concrete shown or specified. Air content as shown in Table III.

I. Enforcing Strength Requirements: Test as specified in Section 01 45 29, TESTING LABORATORY SERVICES, during the progress of the work. Seven-day tests may be used as indicators of 28-day strength. Average of any three 28-day consecutive strength tests of laboratory-cured specimens representing each type of concrete shall be equal to or greater than specified strength. No single test shall be more than 500 psi below specified strength. Interpret field test results in accordance with ACI 214. Should strengths shown by test specimens fall below required values, Resident Engineer may require any one or any combination of the following corrective actions, at no additional cost to the Owner:

1. Require changes in mix proportions by selecting one of the other appropriate trial mixes or changing proportions, including cement content, of approved trial mix.

2. Require additional curing and protection.

3. If five consecutive tests fall below 95 percent of minimum values given in Table I or if test results are so low as to raise a question as to the safety of the structure, Resident Engineer may direct Contractor to take cores from portions of the structure. Use results from cores tested by the Contractor retained testing agency to analyze structure.

4. If strength of core drilled specimens falls below 85 percent of minimum value given in Table I, Resident Engineer may order load tests, made by Contractor retained testing agency, on portions of building so affected. Load tests in accordance with ACI 318 and criteria of acceptability of

concrete under test as given therein.

5. Concrete work, judged inadequate by structural analysis, by results of load test, or for any reason, shall be reinforced with additional construction or replaced, if directed by the Resident Engineer.

# PART 3 EXECUTION

## 3.01 PREPARATION

A. Mixing

1. All concrete shall be ready-mixed concrete and shall be mixed and delivered in accordance with the requirements of "Specifications for Ready-Mixed Concrete", ASTM C94 and ACI 318 to produce concrete with the required strength, slump and air content.

2. The concrete producer shall furnish with each load of concrete a numbered delivery ticket showing name of Contractor, name and location of project, date and time batched, truck number, number of cubic yards in load, specified strength, slump, and mix design number.

3. In the event concrete is mixed at a central batching plant, the delivery shall be arranged so that intervals between batches are kept at a minimum, and in any event not more than thirty (30) minutes. Trucks shall be in first class condition and kept in constant rotation during delivery.

4. When concrete is delivered in a truck mixer or agitator, no water from the truck water system or elsewhere shall be added after the initial introduction of mixing water for the batch, except when on arrival at the job site the slump of the concrete is less than that specified. Such additional water to bring the slump within required limits shall be injected into the mixer, provided the maximum water-cement ratio specified is <u>not</u> exceeded. The drum or blades shall be turned an additional 30 revolutions or more at mixing speed until the concrete is within the proper slump limits.

B. Discharge of concrete after initial batching shall be completed within 90 minutes, or before the drum has revolved 300 revolutions, whichever comes first, after the introduction of the mixing water to the cement and aggregates. In hot weather (as defined by ACI) the discharge of the concrete shall be completed within 60 minutes.

C. Maximum delivery temperature of concrete shall be 90°F. Minimum delivery temperature as follows.

| Atmospheric Temperature | Minimum Concrete Temperature |
|---|---|
| 30 degrees to 40 degrees F | 60 degrees F |

| | |
|---|---|
| 0 degrees to 30 degrees F | 70 Degrees F |

## 3.02 VAPOR BARRIER

A. Except where membrane waterproofing is required, interior concrete slab on grade shall be placed on a continuous vapor barrier.

1. 6 mil thick clear polyethylene film, type recommended for below grade application.
2. Place 4 inches of fine granular fill over the vapor barrier to act as a blotter for concrete slab.
3. Vapor barrier joints lapped 6 inches and sealed with compatible waterproof pressure-sensitive tape.
4. Patch punctures and tears.

## 3.03 CONSTRUCTION JOINTS

A. Unless otherwise shown, location of construction joints to limit individual placement shall not exceed 80 feet in any horizontal direction, except slabs on grade which shall have construction joints shown. Allow 48 hours to elapse between pouring adjacent sections unless this requirement is waived by Resident Engineer.

B. Locate construction joints in suspended floors near the quarter-point of spans for slabs, beams or girders, unless a beam intersects a girder at center, in which case joint in girder shall be offset a distance equal to twice width of beam. Provide keys and inclined dowels as shown. Provide longitudinal keys as shown.

C. Place concrete for columns slowly and in one operation between joints. Install joints in concrete columns at underside of deepest beam or girder framing into column.

D. Allow 2 hours to elapse after column is cast before concrete of supported beam, girder or slab is placed. Place girders, beams, grade beams, column capitals, brackets, and haunches at the same time as slab unless otherwise shown.

E. Install polyvinyl chloride or rubber water seals, as shown in accordance with manufacturer's instructions, to form continuous watertight seal. Waterstops selection shall be defined in specification section 03 10 00 Concrete Forming and Accessories.

## 3.04 EXPANSION JOINTS

A. Clean expansion joint surfaces before installing premolded filler and placing adjacent concrete.

B. Install polyvinyl chloride or rubber water seals, as shown in accordance with manufacturer's instructions, to form continuous watertight seal and as specified in

section 03 10 00.

## 3.05 PLACING CONCRETE

A. Preparation:

1. Remove hardened concrete, wood chips, shavings and other debris from forms.

2. Remove hardened concrete and foreign materials from interior surfaces of mixing and conveying equipment.

3. Have forms and reinforcement inspected and approved by Resident Engineer before depositing concrete.

4. Provide runways for wheeling equipment to convey concrete to point of deposit. Keep equipment on runways which are not supported by or bear on reinforcement. Provide similar runways for protection of vapor barrier on coarse fill.

B. Bonding: Before depositing new concrete on or against concrete which has been set, thoroughly roughen and clean existing surfaces of laitance, foreign matter, and loose particles.

1. Preparing surface for applied topping:

a. Remove laitance, mortar, oil, grease, paint, or other foreign material by sand blasting. Clean with vacuum type equipment to remove sand and other loose material.

b. Broom clean and keep base slab wet for at least four hours before topping is applied.

c. Use a thin coat of one part Portland cement, 1.5 parts fine sand, bonding admixture; and water at a 50: 50 ratio and mix to achieve the consistency of thick paint. Apply to a damp base slab by scrubbing with a stiff fiber brush. New concrete shall be placed while the bonding grout is still tacky.

C. Conveying Concrete: Convey concrete from mixer to final place of deposit by a method which will prevent segregation. Method of conveying concrete subject to approval of Resident Engineer.

D. Placing: For special requirements see Paragraphs, HOT WEATHER and COLD WEATHER.

1. Do not place concrete when weather conditions prevent proper placement and consolidation, or when concrete has attained its initial set, or has contained its water or cement content more than 1 1/2 hours.

2. Deposit concrete in forms as near as practicable in its final position. Prevent splashing of forms or reinforcement with concrete in advance of placing concrete.

3. Do not drop concrete freely more than 10 feet for concrete containing the high-range water-reducing admixture (superplasticizer) or 5 feet for conventional concrete. Where greater drops are required, use a tremie or flexible spout (canvas elephant trunk), attached to a suitable hopper.

4. Discharge contents of tremies or flexible spouts in horizontal layers not exceeding 20 inches in thickness, and space tremies such as to provide a minimum of lateral movement of concrete.

5. Continuously place concrete until an entire unit between construction joints is placed. Rate and method of placing concrete shall be such that no concrete between construction joints will be deposited upon or against partly set concrete, after it's initial set has taken place, or after 45 minutes of elapsed time during concrete placement.

6. On bottom of members with severe congestion of reinforcement, deposit 1 inch layer of flowing concrete containing the specified high-range water-reducing admixture (superplasticizer). Successive concrete lifts may be a continuation of this concrete or concrete with a conventional slump.

7. Concrete on metal deck:

   a. Concrete on metal deck shall be minimum thickness shown. Allow for deflection of steel beams and metal deck under the weight of wet concrete in calculating concrete quantities for slab.

      1) The Contractor shall become familiar with deflection characteristics of structural frame to include proper amount of additional concrete due to beam/deck deflection.

E. Consolidation: Conform to ACI 309. Immediately after depositing, spade concrete next to forms, work around reinforcement and into angles of forms, tamp lightly by hand, and compact with mechanical vibrator applied directly into concrete at approximately 18 inch intervals. Mechanical vibrator shall be power driven, hand operated type with minimum frequency of 5000 cycles per minute having an intensity sufficient to cause flow or settlement of concrete into place. Vibrate concrete to produce thorough compaction, complete embedment of reinforcement and concrete of uniform and maximum density without segregation of mix. Do not transport concrete in forms by vibration.

1. Use of form vibration shall be approved only when concrete sections are too thin or too inaccessible for use of internal vibration.

2. Carry on vibration continuously with placing of concrete. Do not insert vibrator into concrete that has begun to set.

## 3.06 HOT WEATHER

Follow the recommendations of ACI 305 or as specified to prevent problems in the manufacturing, placing, and curing of concrete that can adversely affect the properties and serviceability of the hardened concrete. Methods proposed for cooling materials and

arrangements for protecting concrete shall be made in advance of concrete placement and approved by Resident Engineer.

## 3.07 COLD WEATHER

Follow the recommendations of ACI 306 or as specified to prevent freezing of concrete and to permit concrete to gain strength properly. Use only the specified non-corrosive, non-chloride accelerator. Do not use calcium chloride, thiocyantes or admixtures containing more than 0.05 percent chloride ions. Methods proposed for heating materials and arrangements for protecting concrete shall be made in advance of concrete placement and approved by Resident Engineer.

## 3.08 PROTECTION AND CURING

A. Conform to ACI 308: Initial curing shall immediately follow the finishing operation. Protect exposed surfaces of concrete from premature drying, wash by rain and running water, wind, mechanical injury, and excessively hot or cold temperatures. Keep concrete not covered with membrane or other curing material continuously wet for at least 7 days after placing, except wet curing period for high-early-strength concrete shall be not less than 3 days. Keep wood forms continuously wet to prevent moisture loss until forms are removed. Cure exposed concrete surfaces as described below. Other curing methods may be used if approved by Resident Engineer.

1. Liquid curing and sealing compounds: Apply by power-driven spray or roller in accordance with the manufacturer's instructions. Apply immediately after finishing. Maximum coverage 400 square feet per gallon on steel troweled surfaces and 300 square feet per gallon on floated or broomed surfaces for the curing/sealing compound.

2. Plastic sheets: Apply as soon as concrete has hardened sufficiently to prevent surface damage. Utilize widest practical width sheet and overlap adjacent sheets 2 inches. Tightly seal joints with tape.

3. Paper: Utilize widest practical width paper and overlap adjacent sheets 2 inches. Tightly seal joints with sand, wood planks, pressure-sensitive tape, mastic or glue.

## 3.09 REMOVAL OF FORMS

A. Remove in a manner to assure complete safety of structure after the following conditions have been met.

1. Where structure as a whole is supported on shores, forms for beams and girder sides, columns, and similar vertical structural members may be removed after 24 hours, provided concrete has hardened sufficiently to prevent surface damage and curing is continued without any lapse in time as specified for exposed surfaces.

2. Take particular care in removing forms of Engineerural exposed concrete to insure surfaces are not marred or gouged, and that corners and arises are true, sharp and unbroken.

B. Control Test: Use to determine if the concrete has attained sufficient strength and curing to permit removal of supporting forms. Cylinders required for control tests taken in accordance with ASTM C172, molded in accordance with ASTM C31, and tested in accordance with ASTM C39. Control cylinders cured and protected in the same manner as the structure they represent. Supporting forms or shoring not removed until strength of control test cylinders have attained at least 70 percent of minimum 28-day compressive strength specified. For post-tensioned systems supporting forms and shoring not removed until stressing is completed. Exercise care to assure that newly unsupported portions of structure are not subjected to heavy construction or material loading.

C. Reshoring: Reshoring is required if superimposed load plus dead load of the floor exceeds the capacity of the floor at the time of loading. In addition, for flat slab/plate, reshoring is required immediately after stripping operations are complete and not later than the end of the same day. Reshoring accomplished in accordance with ACI 347 at no additional cost to the Owner.

## 3.10 CONCRETE SURFACE PREPARATION

A. Metal Removal: Unnecessary metal items cut back flush with face of concrete members.

B. Patching: Maintain curing and start patching as soon as forms are removed. Do not apply curing compounds to concrete surfaces requiring patching until patching is completed. Use cement mortar for patching of same composition as that used in concrete. Use white or gray Portland cement as necessary to obtain finish color matching surrounding concrete. Thoroughly clean areas to be patched. Cut out honeycombed or otherwise defective areas to solid concrete to a depth of not less than 1 inch. Cut edge perpendicular to surface of concrete. Saturate with water area to be patched, and at least 6 inches surrounding before placing patching mortar. Give area to be patched a brush coat of cement grout followed immediately by patching mortar. Cement grout composed of one part Portland cement, 1.5 parts fine sand, bonding admixture, and water at a 50:50 ratio, mix to achieve consistency of thick paint. Mix patching mortar approximately 1 hour before placing and remix occasionally during this period without addition of water. Compact mortar into place and screed slightly higher than surrounding surface. After initial shrinkage has occurred, finish to match color and texture of adjoining surfaces. Cure patches as specified for other concrete. Fill form tie holes which extend entirely through walls from unexposed face by means of a pressure gun or other suitable device to force mortar through wall. Wipe excess mortar off exposed face with a cloth.

C. Upon removal of forms, clean vertical concrete surface that is to receive bonded applied cementitious application with wire brushes or by sand blasting to remove

unset material, laitance, and loose particles to expose aggregates to provide a clean, firm, granular surface for bond of applied finish.

## 3.11 CONCRETE SLAB FINISHES

A. General

1. Finish slab concrete per the requirements of ACI 302.1R.
2. Use manual screeds, vibrating screeds, or roller compacting screeds to place concrete level and smooth.
3. Do not use “jitterbugs” or other special tools designed for purpose of forcing coarse aggregate away from surface and allowing layer of mortar, which will be weak and cause surface cracks or delamination, to accumulate.
4. Do not dust surfaces with dry materials.
5. Round off edges of slabs with steel edging tool, except where cove finish is shown. Steel edging tool radius shall be 1/4 inch for slabs subject to wheeled traffic.

B. Type S-1 (Bull Float Finish):

1. Finish slab to receive fill and mortar setting bed by screeding with straightedges to bring surface to required finish plane.
2. Wood float finish to compact and seal surface.
3. Remove laitance and leave surface clean.
4. Coordinate with other finish procedures.

C. Type S-2 (Steel Troweled Finish):

1. Finish by screeding and floating with straightedges to bring surfaces to required finish elevation. Use evaporation retardant.
2. While concrete is still green, but sufficiently hardened to bear a person's weight without deep imprint, wood float to true, even plane with no coarse aggregate visible.
3. Use sufficient pressure on wood floats to bring moisture to surface.
4. After surface moisture has disappeared, hand trowel concrete to produce smooth, impervious surface, free from trowel marks.
5. Burnish surface with an additional troweling. Final troweling shall produce ringing sound from trowel.
6. Do not use dry cement or additional water during troweling, nor will excessive troweling be permitted.
7. Power Finishing:
   a. Approved power machine may be used in lieu of hand finishing in

accordance with directions of machine manufacturer.

b. Do not use power machine when concrete has not attained necessary set to allow finishing without introducing high and low spots in slab.

c. Do first steel troweling for slab S-1 finish by hand.

D. Type S-3 (Underside Elevated Slab Finish): When forming is removed, grind off projections on underside of slab and patch defective areas, including small shallow air pockets where schedule of concrete finishes requires:

1. Prepare surfaces for painting as specified in Section 09 90 00 Painting and Coating.

E. Type S-4 (Broomed Finish):

1. Finish as specified for Type S-1 floor finish, except omit final troweling and finish surface by drawing fine-hair broom lightly across surface.

2. Broom in same direction and parallel to expansion joints, or, in the case of inclined slabs, perpendicular to slope, except for round roof slab, broom surface in radial direction.

## 3.12 CONCRETE SLAB TOLERANCES

A. Concrete Thickness Tolerances shall be 3/8” greater or ¼” less than specified as specified in ACI code section 117.

B. Concrete Level Tolerances shall be $F_F25$ as defined in ACI code section 117 or ¼” gap under an unleveled 10 ft. straightedge.

C. Slope slabs to floor drain and gutter, and shall adequately drain regardless of tolerances.

## 3.13 CONCRETE WALL FINISHES

A. Type W-1 (Ordinary Wall Finish):

1. Point & Patch tie holes.

2. Knock off projections.

3. Patch defective areas.

B. Type W-2 (Smooth Wall Finish):

1. Point & Patch tie holes.

2. Grind off projections, fins, and rough spots.

3. Patch defective areas and repair rough spots resulting from form release agent failure or other reasons to provide smooth uniform appearance.

C. Type W-3 (Finish for Painting):

1. Point & Patch tie holes.
2. Grind off projections, fins, and rough spots.
3. Patch and repair defective areas as specified for Type W-2.
4. Leave surface ready for painting as specified in Section 09 90 00 Painting and Coating.

D. Type W-4 (Smooth Rubbed Wall Finish):

1. Only water curing will be permitted on walls being rubbed.
2. Patch and repair defective areas as specified for Type W-2.
3. Perform rubbing while green concrete can be physically worked and smoothed without adding other materials, if structurally possible, the day following placement. Finish no later than 3 days after placement has been completed.
4. Remove forms at such a rate that all finishing, form tie filling, fin removal, and patching can be completed on same day forms are removed while curing wall.
5. After pointings have set sufficiently to permit working on surface, thoroughly saturate entire surface with water for period of 3 hours and rub until uniform surface is obtained.
6. Rub either by hand with carborundum stone of medium-coarse grade or abrasive of equal quality, or mechanically operated carborundum stone.
7. Mechanically operated carborundum stones shall be approved by ENGINEER before concrete finishing.
8. No cement grout, other than cement paste drawn from the concrete itself by the rubbing process shall be used.
9. Finish Paste Formed by Rubbing by Either Brushing or Floating as Follows:
    a. Brushing:
        1) Carefully strike with clean brush.
        2) Brush in long direction of surface being finished.
    b. Floating:
        1) Spread uniformly over surface and allow to reset.
        2) Finish by floating with canvas, carpet face, or cork float, or rub down with dry burlap.
9. Continue water curing of wall during finishing operation in areas not being rubbed.
10. Move water curing onto rubbed areas as soon as water will not erode rubbed surface.

E. Type W-5 (Cementitious water-proof coating)

1. Patch and repair defective areas as specified for Type W-2.

2. Substrate must be clean, sound, and free of surface contaminates. Remove dust, laitance, grease, oils, curing compounds, form release agents and all foreign particles by mechanical means. An open-textured, sandpaper-like substrate is ideal. Substrate shall be in accordance with ICRI Guideline No. 03732 for coatings and fall within CSP4. All surfaces must be saturated surface dry (SSD), with no standing water at time of application.

3. Apply cementitious water proof coating identified as Thoroseal by ChemRex, Inc., Sealcoat 1000 by Dayton Superior, or SikaTop 144 by the Sika Corporation (contractor selection) per the manufacturer's recommendation and as described below:

   a. Thoroseal by ChemRex Inc.

      1. Prepare a mixing solution of 1 part Acryl 60 and 3 parts water.

      2. Mix one 50-pound bag of Thoroseal with 8 quarts of mixing solution from item 1 above.

      3. 1st coat shall be applied at a rate of 225 sq. feet per 50lb bag.

      4. 2nd coat shall be applied at a rate of 450 sq. feet per 50lb bag.

   b. Sealcoat 1000 by Dayton Superior

      1. Prepare a mixing solution of 1 part Ad Bond (J-40) to 3 parts clean water.

      2. Mix one 50lb bag of Sealcoat 1000 with 8 quarts of mixing solution from item 1 above.

      3. 1st coat shall be applied at a rate of 225 sq. feet per 50lb bag.

      4. 2nd coat shall be applied at a rate of 450 sq. feet per 50lb bag.

   c. Sikatop 144 by Sika Corporation

      1. Mix components A and B at a 1:1.647 by weight ratio

      2. 1st coat 100 sq. feet per gallon

      3. 2nd coat 150 sq. feet per gallon

## 3.14 CONCRETE WALL TOLERANCES

Concrete Wall Tolerances shall be as defined in specification section "03 10 00 Concrete Forming and Accessories" and as indicated in ACI code section 301.

## 3.15 BEAM AND COLUMN FINISHES (B=Beam, C=Column)

A. Type B-1: Match wall Type W-1.

B. Type B-2: Match wall Type W-2.

C. Type B-3: Match wall Type W-3

D. Type B-4: Match wall Type W-4

E. Type B-5: Match wall Type W-5

F. Type C-1: Match wall Type W-1.

G. Type C-2: Match wall Type W-2.

H. Type C-3: Match wall Type W-3

I. Type C-4: Match wall Type W-4

J. Type C-5: Match wall Type W-5.

## 3.16 CONCRETE BEAM AND COLUMN TOLERANCES

Concrete Beam and Column Tolerances shall be as defined in specification section "03 10 00 Concrete Forming and Accessories" and as indicated in ACI code section 301.

## 3.17 BACKFILL AGAINST WALLS

A. Do not backfill against walls until concrete has obtained specified 28 day compressive strength.

B. Place backfill simultaneously on both sides of wall, where required, to prevent differential pressures.

## 3.18 FIELD QUALITY CONTROL

A. General:

1. Provide adequate facilities for safe storage and proper curing of concrete test cylinders onsite for first 24 hours, and for additional time as may be required before transporting to test lab.

2. Provide concrete for testing of slump, air content, and for making cylinders from the point of discharge into forms. When concrete is pumped, Samples used shall be taken from discharge end of pump hose.

3. Evaluation will be in accordance with ACI 301, Chapter 17 and Specifications.

4. Specimens shall be made, cured, and tested in accordance with ASTM C31 and ASTM C39.

5. Frequency of testing may be changed at discretion of ENGINEER.

6. Pumped Concrete: Take concrete samples for slump (ASTM C143) and test cylinders (ASTM C31 and C39) and shrinkage specimens (ASTM C157) at placement (discharge) end of line.

7. Reject concrete represented by cylinders failing to meet strength and air content specified.

## 3.19 SCHEDULE OF CONCRETE FINISHES

| Structure | Type of Finish |
|---|---|
| 1) Concrete Pavement | S-4 |

**END OF SECTION**

# SECTION 31 10 00

## SITE CLEARING

# PART 1 GENERAL

### 1.01 SCOPE

This Section describes materials and equipment to be utilized and requirements for their use in preparing the work site for construction. The Contractor shall furnish all materials, equipment and labor necessary to complete the work. The contractor is required to contact the **Utilities Protection Center, Inc.** in the **State of Georgia call 811** prior to any excavation or construction.

### 1.02 REFERENCES

Georgia Manual for Erosion and Sedimentation Control, current edition. .

### 1.03 QUALITY ASSURANCE

A. Comply with applicable codes, ordinances, rules, regulations and laws of local, municipal, state or federal authorities having jurisdiction.

B. Layout work shall be done under supervision of a Civil Engineer or Registered Land Surveyor, registered in Georgia.

C. Transit and measuring devices shall be calibrated to layout site and construction work.

### 1.04 SITE CONDITIONS

The area to be cleared and grubbed is shown schematically on the Drawings or specified below.

# 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, dozers, chippers, trucks, loaders, and root rakes.

# PART 3 EXECUTION

## 3.01 PREPARATION

A. Protect and maintain all benchmarks, monuments and reference points. Replace if disturbed or destroyed. If found at variance with the Drawings, notify the Engineer before proceeding with layout work.

B. Install erosion and sedimentation control structures as shown on the Drawings.

C. Protect all trees, vegetation, structures, utilities, and buildings not designated for removal for demolition.

## 3.02 TOPSOIL STRIPPING AND STOCKPILING

A. Topsoil (top 6" – 8" of material) is to be removed from all cleared and grubbed areas and placed in designated stockpile areas as shown on the plans. The Contractor shall then grade the entire work site to conform, in general, to the finish elevations shown on the Plans.

B. Shape topsoil stockpiles to drain without ponding water.

C. Where trees are indicated to remain, stop topsoil stripping at drip line.

## 3.03 TREE PROTECTION

A. Construct tree protection barricades, minimum 3'-0" high around individual trees and groups of trees designated to remain. Construct barricades at drip line.

B. Protect tree root systems from damage due to deleterious materials caused by run-off or spillage during mixing, use or discarding of construction materials or drainage from stored materials. Protect root systems form compaction, flooding, erosion or excessive wetting.

## 3.04 EXCAVATION AROUND TREES TO REMAIN

A. Where trenching for utilities is required within drip line, hand dig under or around roots. Cut no lateral roots or tap roots; cut smaller roots which interfere with new construction.

B. Where excavation for new construction is required within drip line of trees, hand excavate to minimize damage to root systems. Use narrow tine spading forks and comb soil to expose roots. Relocate roots in backfill areas. If large, main lateral roots are encountered, expose beyond excavation limits, bend and relocate without breaking. If encountered immediately adjacent to location of new construction and relocation is not practical, cut roots approximately 3" back from new construction.

C. Allow no exposed roots to dry out before permanent backfill is places; provide temporary earth cover, or pack with peat moss and wrap with burlap. Water and

maintain in moist condition and temporarily support and protect from damage until permanently relocated and covered with backfill.

D. Prune braches in accord with standard horticultural practice to balance loss to root system caused by damage or cutting of root system. Engage qualified arborist approved by the Engineer to prune branches.

## 3.05 REPAIR FOR DAMAGED TREES

A. Engage a qualified arborist approved by the Engineer to perform tree repair work.

B. Make repairs promptly after damage occurs to prevent progressive deterioration of damaged trees.

C. Remove dead trees and damaged trees in construction area which are determined by the tree arborist to be incapable of restoration to normal growth pattern.

## 3.06 CLEARING AND GRUBBING

A. Clear and grub each area before excavating. All trees, herbaceous growth and stumps are to be chipped for mulch. Mulch will be stockpiled in the areas designated on the Plans or used for erosion control as required. All other debris is to be removed to an approved landfill.

B. Materials to be removed from the project site include, but are not limited to trash, organic matter, construction waste materials (i.e. paving, concrete miscellaneous structures, houses), debris and abandoned utilities.

C. 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.

D. All foundations and planking embedded in the ground shall be removed and disposed. Butts of utility poles shall be removed.

E. Landscaping features shall include, but not limited to, fences, cultivated trees and shrubbery, property corners, man made improvements and signs. The Contractor shall take extreme care in moving landscape features and promptly re-establishing these features.

F. Surface rocks and boulders shall be grubbed from the soil and removed from the site if not suitable as rip rap.

G. The entire construction area shall be grubbed by heavy tractors with root rakes. Raking shall generally proceed along the contour rather than up and down slopes so as to inhibit soil erosion.

H. 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.

I. Any work pertaining to utility poles shall comply with the requirements of the appropriate utility.

J. 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 Engineer's opinion, is significantly damaged shall be replaced with new fence material.

K. Stumps and roots shall be grubbed and removed to a depth not less than two feet below grade. All holes or cavities which extend below the subgrade elevation of the proposed work shall be filled with crushed rock or other suitable material, compacted to the same density as the surrounding material.

L. 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.

M. The Contractor shall be responsible for all damages to existing improvements resulting from Contractor's operations.

## 3.07 DISPOSAL OF DEBRIS

A. The debris resulting from the clearing and grubbing operation shall be removed from the site and 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. 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 Engineer 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 result from the Contractor's operations. On easements through private property, the Contractor shall not burn on the site unless written consent is also secured from the property owner, in addition to authorization from the proper authorities.

**END OF SECTION**

# SECTION 31 20 00

## EARTH MOVING

## PART 1 GENERAL

### 1.01 SCOPE

A. This Section includes earthwork and related operations, including, but not limited to dewatering, excavating all classes of material encountered, pumping, draining and handling of water encountered in the excavations, handling, storage, transportation and disposal of all excavated and unsuitable material, construction of fills and embankments, backfilling around structures, compacting, all sheeting, shoring and bracing, preparation of subgrades, surfacing and grading, and any other similar, incidental, or appurtenant earthwork operations which may be necessary to properly complete the work.

B. The Contractor shall provide all services, labor, materials, and equipment required for all earthwork and related operations, necessary or convenient to the Contractor, for furnishing complete work as shown on the Drawings or specified in these Contract Documents.

### 1.02 RELATED SECTIONS

A. Geotechnical Report - Section 00 31 32 (If provided in bidding documents)

B. Site Clearing - Section 31 10 00

C. Trench Excavation and Backfill - Section 31 23 16

### 1.03 GENERAL

A. The elevations shown on the Drawings as existing are taken from the best existing data and are intended to give reasonably accurate information about the existing elevations. They are not precise and the Contractor shall become satisfied as to the exact quantities of excavation and fill required.

B. Earthwork operations shall be performed in a safe and proper manner with appropriate precautions being taken against all hazards.

C. All excavated and filled areas for structures, trenches, fills, topsoil areas, embankments, and channels shall be maintained by the Contractor in good condition at all times until final acceptance by the Owner. All damage caused by erosion or other construction operations shall be repaired by the Contractor using material of the same type as the damaged material.

D. The Contractor shall control grading in a manner to prevent surface water from running

into excavations. Obstruction of surface drainage shall be avoided and means shall be provided whereby storm water can be uninterrupted in existing gutters, other surface drains, or temporary drains. Free access must be provided to all fire hydrants and meters.

E. Tests for compaction and density shall be conducted by the Engineer or by an independent testing laboratory selected in accordance with Section 01450 of these Specifications.

1. The soils testing laboratory is responsible for the following:

   a. Field compaction testing shall be based on using the maximum dry density determined by the Standard Proctor Compaction Test in accordance with ASTM D 698.

   b. Determination of in-place backfill density shall be done in accordance with ASTM D 1556, “Density and unit weight 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)”.

   c. Field density tests for each lift; one test for each 5,000 square feet of fill or minimum one test per lift.

   d. Inspecting and testing stripped site, subgrades and proposed fill materials.

2. Contractor's duties relative to testing include:

   a. Notifying laboratory of conditions requiring testing.

   b. Coordinating with laboratory for field testing.

   c. Providing representative fill soil samples to the laboratory for test purposes. Provide 50 pound samples of each fill soil.

3. Inspection

   a. Earthwork operations, suitability of excavated materials for fill and backfill, and placing and compaction of fill and backfill is subject to inspection. Engineer will observe earthwork operations.

   b. Foundations and shallow spread footing foundations are required to be inspected by an engineer to verify suitable bearing and construction.

F. All earthwork operations shall comply with the requirements of OSHA Construction Standards, Part 1926, Subpart P, Excavations, Trenching, and Shoring, and Subpart O, Motor Vehicles, Mechanized Equipment, and Marine Operations, and shall be conducted in a manner acceptable to the Engineer.

G. It is understood and agreed that the Contractor has made a thorough investigation of the surface and subsurface conditions of the site and any special construction problems which might arise as a result of nearby watercourses and floodplains. The Contractor shall be responsible for providing all services, labor, equipment, and materials

necessary or convenient to the Contractor for completing the work within the time specified in these Contract Documents.

H. 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.

# PART 2 PRODUCTS

## 2.01 SOILS CLASSIFICATIONS

Bedding materials listed here include a number of processed materials plus the soil types defined according to the Unified Soil Classification System (USCS) in ASTM D 2487, Standard Method for Classification of Soils for Engineering Purposes. (See below for description of soil classification). These materials are grouped into five broad categories according to their suitability for this application:

A. Class I - Angular, 1/4 to 1 1/2 inches (6 to 40 mm) graded stone, including such as coral, slag, cinders, crushed shells and crushed stone. Note - The size range and resulting high voids ratio of Class I material make it suitable for use to dewater trenches during pipe installation. This permeable characteristic dictates that its use be limited to locations where pipe support will not be lost by migration of other embedment materials into the Class I material. When such migration is possible, the material's minimum size range should be reduced to finer than 1/4 inch (6 mm) and the gradation properly designed to limit the size of the voids.

B. Class II - Coarse sands and gravels with maximum particle size of 1 1/2 inch (40 mm), including variously graded sands and gravels containing small percentages of fines, generally granular and non-cohesive, either wet or dry. Soil Types GW, GP, SW and SP are included in this class. Note - Sands and gravels which are clean or borderline between clean and with fines should be included. Coarse-grained soils with less than 12% but more than 5% fines are neglected in ASTM D2487 and the USCS and should be included. The gradation of Class II material influences its density and pipe support strength when loosely placed. The gradation of Class II material influences its density and pipe support strength when loosely placed. The gradation of Class II material may be critical to the pipe support and stability of the foundation and embedment if the material is imported and is not native to the trench excavation. A gradation other than well graded, such as uniformly graded or gap graded, may permit loss of support by migration into void spaces of a finer grained natural material from the trench wall and foundation.

C. Class III - Fine sand and clayey (clay filled) gravels, including fine sands, sand-clay mixtures and gravel-clay mixtures. Soil Types SM, GC, SM, and SC are included in

this class.

D. Class IV - Silt, silty clays and clays, including inorganic clays and silts of not to high plasticity and liquid limits. Soil Types MH, ML, CH, and CL are included in this class. Note- Caution should be used in the design and selection of the degree and method of compaction for Class IV soils because of the difficulty in properly controlling the moisture content under field conditions. Some Class IV soils with medium to high plasticity and with liquid limits greater than 50% (CH, MH, CH-MH) exhibit reduced strength when wet and should only be used for bedding, haunching and initial backfill in arid locations where the pipe embedment will not be saturated by ground water, rainfall and/or exfiltration from the pipeline system. Class IV soils with low to medium plasticity and with liquid limits lower than 50% (CL, ML, CL-ML) also require careful consideration in design and installation to control moisture content but need not be restricted in use to arid locations.

E. Class V - This class includes the organic soils OL, OH, and PT as well as soils containing frozen earth, debris, rocks larger than 1 1/2 inch (40 mm) in diameter, and other foreign materials. These materials are not recommended for bedding, haunching or initial backfill.

**DESCRIPTION OF EMBEDMENT MATERIAL CLASSIFICATIONS**

| SOIL CLASS | SOIL TYPE | DESCRIPTION MATERIAL CLASSIFICATION |
|---|---|---|
| Class I Soils * | --- | Manufactured angular, granular material, 3/4 to 1 1/2 inches (6 to 40 mm) size, including materials having regional significance such as crushed stone, or rock, broken coral, crushed slag, cinders, or crushed shells. |
| Class II Soil ** | GW | Well-graded gravels and gravel-sand mixtures, little or no fines. 50% or more retained on No. 4 sieve. More than 95% retained on No. 200 sieve. Clean.. |
| | GP | Poorly graded gravels and gravel-sand mixtures, little or no fines. 50% or more retained on No. 4 sieve. More than 95% retained on No. 200 sieve. Clean |
| | SW | Well-graded sands and gravely sands, little or no fines. More than 50% passes No. 4 sieve. More than 95% retained on No. 200 sieve. Clean. |
| | SP | Poorly graded sands and gravelly sand, little or no fines. More than 50% passes No. 4 sieve. More than 95% retained on No. 200 sieve. Clean. |
| Class III Soil *** | GM | Silty gravels, gravel-sand-silt mixtures. 50% or more retained on No. 200 sieve. |

| | | |
|---|---|---|
| | GC | Clayey gravels, gravel-sand-clay mixtures. 50% or more retained on No. 4 sieve. More than 50% retained on No. 200 sieve. |
| | SM | Silty sands, sand-silt mixtures. More than 50% passes No. 4 sieve. More than 50% retained on No. 200 sieve. |
| | SC | Clayey sands, sand-clay mixtures. More than 50% passes No. 4 sieve. More than 50% retained on No. 200 sieve. |
| Class IV Soils | ML | Inorganic silts, very fine sands, rock flour, silty or clayey fine sands. Liquid limit 50% or less. 50% or more passes No. 200 sieve. |
| | CL | Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays. Liquid limit 50% or less. 50% or more passes No. 200 sieve. |
| | MH | Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts. Liquid limit greater than 50%. 50% or more passes No. 200 sieve. |
| | CH | Inorganic clays of high plasticity, fat clays. Liquid limit greater than 50%. 50% or more passes No. 200 sieve. |
| Class V Soils | OL | Organic silts and organic silty clays of low plasticity. Liquid limit 50% or less. 50% or less. 50% or more passes No. 200 sieve. |
| | OH | Organic clays of medium to high plasticity. Liquid limit 50% or less. 50% or more passes No. 200 sieve. |
| | PT | Peat, muck and other highly organic soils. |

* Soils defined as Class I materials are not defined in ASTM D2487.

** In accordance with ASTM D2487, less than 5% pass No. 200 sieve.

*** In accordance with ASTM D2487, more than 12% pass No. 200 sieve. Soils with 5% to 12% pass No. 200 sieve fall in borderline classification, e.g. GP-GC.

## 2.02 FILL MATERIAL

A. Sand Fill: Material shall consist of a clean sand with a fineness modulus of 1.6 to 3.1 and containing not more than 10 percent by weight finer than No. 200 U.S. Standard Sieve.

B. Earth Fill: Material shall consist of inorganic material free of roots, cobbles and boulders and classified as SM, ML, SC, or CL by ASTM D2487-85 "Standard Methods for Classification of Soils for Engineering Purposes". Earth Fill shall also conform to the following:

1. Liquid Limit = 50 maximum
2. Plasticity Index = 20 maximum
3. Dry Unit Weight = 90 pcf minimum maximum density

C. Coarse Aggregate (Crushed Stone): Coarse aggregate shall conform to the Georgia Department of Transportation Standard Specifications for Construction of Road and Bridges, Table 800.01 H, Size No. 57.

## 2.03 UNSUITABLE SITE FILL MATERIAL

Material which does not conform to the above classifications (soil classification SP, SW.GM, CH, MH, OH, OL, and PT) may be used as Site Fill material in areas identified on the drawings as "spoil areas", in areas with no structures and or roads and other non-critical areas.

## 2.04 SHEETING, BRACING AND TIMBERING

A. Sheeting, Bracing and Timbering: The Contractor shall furnish, place and maintain all sheeting, bracing and timbering required to properly support trenches and other excavations in open cut and to prevent all movement of the soil, pavement, structures, or utilities outside of the trench or pit.

1. General

a. Cofferdams and bracing design, including computations, shall be prepared before commencing construction operations. Drawings and design computations shall be signed and sealed by a professional engineer registered in the State of Georgia. The drawings and design computations shall be submitted to the Engineer for informational purposes only.

b. Sheeting, bracing and timbering shall be so placed as to allow the work to be constructed to the lines and grades shown on the Drawings and as ordered by the Engineer.

c. If at any time the method being used by the Contractor for supporting any material or structure in or adjacent to any excavation is not reasonably safe, the Contractor shall provide additional bracing and

support necessary to furnish the added degree of safety.

d. All sheeting in contact with the concrete or masonry shall be cut off as directed by the Engineer and left in place.

2. Timber: Timber may be substituted for steel sheet piling when approved by the Engineer. Timber for shoring, sheeting or bracing shall be sound and free of large or loose knots, and in good condition. Size and spacing shall be in accordance with OSHA regulations.

3. Steel 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/or 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. Steel piling shall be removed, unless otherwise directed by the Engineer.

4. Remove bracing and sheeting in units when backfill reaches the point necessary to protect the structures and adjacent property. Leave sheeting in place when, in the opinion of the Engineer, it cannot be safely removed. Cut off sheeting left in place at least two feet below the surface.

## 2.05 FILTER FABRIC

A. Filter fabric associated with bedding shall be a UV stabilized, spunbonded, continuous filament, needle punched, polypropylene, nonwoven geotextile.

B. The fabric shall have an equivalent open size (EOS or AOS) of 120 - 70. The fabric shall also conform to the minimum property values listed in the following table:

| Fabric Property | Unit | Test Procedure | Average Value | |
|---|---|---|---|---|
| | | | Typical | Minimum |
| Weight | $oz/yd^2$ | ASTM D 3776 | 8.3 | |
| Thickness | mils | ASTM D 1777 | 105 | |
| Grab Strength | lbs. | ASTM D 4632 | 240 | 210 |
| Grab Elongation | % | ASTM D 4632 | >50 | 50 |
| Tear Strength | lbs. | ASTM D 4533 | 100 | 85 |
| Mullen Burst | psi | ASTM D 3786 | 350 | 320 |
| Puncture Resistance | lbs. | ASTM D 4833 | 115 | 100 |
| Permittivity | $sec^{-1}$ | ASTM D 4491 | 1.7 | |

| | | | | |
|---|---|---|---|---|
| Water Permeability | cm/sec | ASTM D 4491 | 0.4 | |
| Water Flow Rate | gpm/ft$^2$ | ASTM D 4491 | 120 | |
| UV Resistance (500 hrs) | % | ASTM D 4355 | >85 | |
| PH | | | 2 – 13 | |

C. Filter fabric shall be Polyfelt TS 700, Trevira 1125 or SuPac 7-MP.

### 2.06 CONCRETE

Concrete for 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.

### 2.07 FLOWABLE FILL

Flowable fill, where required for backfill, shall meet the requirements of Georgia Department of Transportation Standard Specifications, Section 600 for Excavatable or Non-Excavatable type.

## PART 3 EXECUTION

### 3.01 GENERAL

A. Safety: Comply with local regulations and with the provisions of the "Manual of Accident Prevention in Construction" of the Associated General Contractors of America, Inc., Occupational Safety and Health Act and all other applicable safety regulations.

B. Topsoil

1. Remove all topsoil to a depth at which subsoil is encountered, from all areas under buildings, pavements, and from all areas which are to be cut to lower grades or filled.
2. With the Engineer's approval, topsoil to be used for finish grading may be stored on the site.
3. Other topsoil may be used for fill in non-critical areas with approval of the Engineer.
4. Properly dispose of all excess topsoil in the designated area.

C. Bracing and Sheeting

1. Furnish, put in place, and maintain all sheeting, bracing, and shoring as may be

required to properly support the sides of all excavations and to prevent all movement of earth which could in any way injure the work, adjacent property or workers.

2. Properly support all excavations where necessary to conform to all pertinent rules and regulations and these Specifications, even though, such locations are not indicated on the Drawings.

3. Exercise care in the removal of sheeting, shoring, bracing and timbering to prevent collapse or caving of the excavation faces being supported and damage to the work and adjacent property.

4. Do not leave any sheeting or bracing in the trench or excavation after completion of the work, unless approved by the Engineer.

D. Obstructions

1. Remove and dispose of all boulders, sidewalks, driveways, pavement, pipes, and the like, as required for the performance of the work.

2. Exercise care in excavating around catch basins, inlets and manholes so as to not disturb or damage these structures.

3. Avoid removing or loosening castings or pushing dirt into catch basins, inlets and manholes.

4. Damaged or displaced structures or casting shall be repaired, replaced and dirt entering the structures during the performance of the work shall be removed at no additional cost to the Owner.

E. Utilities to be Abandoned

1. When pipes, conduits, sewers, or other structures are removed from the trench, leaving dead ends in the ground, such ends shall be fully plugged or sealed with brick and non-shrink grout.

2. Abandoned structures such as manholes or chambers shall be entirely removed.

3. All materials from abandoned utilities shall be removed from the site.

4. All salvageable materials shall become the property of the Owner.

5. All equipment to be salvaged is noted in the Specifications and shall be turned over to the Owner at a designated location.

F. Extra Earth Excavation

1. In case soft or excessively wet material which, in the opinion of the Engineer, is not suitable, is encountered below the final subgrade elevation of an excavation or underneath a structure, the Engineer may order the removal of this material and its replacement with crushed stone, filter fabric, or other suitable material in order to make a suitable foundation for the construction of the structure.

G. Cutting Paved Surfaces and Similar Improvements

1. Remove existing pavement as necessary for installing pipe utilities and

appurtenances or as otherwise shown on the Drawings.

2. Before removing any pavement, mark the pavement neatly, paralleling pipe lines and existing street lines. Space the marks the width of the trench.

3. Break asphalt pavement along the marks using rotary saws or other suitable tools. Break concrete pavement along the marks by use of scoring with a rotary saw and breaking below the score by the use of jackhammers or other suitable tools.

4. Do not pull pavement with machines until completely broken and separated from pavement to remain.

5. Do not disturb or damage the adjacent pavement. If the adjacent pavement is disturbed or damaged, remove and replace the damaged pavement. No additional payment will be made for removing and replacing damaged adjacent pavement.

6. Remove and replace sidewalks disturbed by construction for their full width and to the nearest undisturbed joint.

7. The Contractor may tunnel under curbs that are encountered. Remove and replace any curb disturbed by construction to the nearest undisturbed joint.

## 3.02 EXCAVATION

A. Method

1. All excavation shall be by open cut from the surface except as indicated on the Drawings.

2. All excavations for pipe appurtenances and structures shall be made in such a manner, and to such depth and width, as will give ample room for building the structures, and for bracing, sheeting, and supporting the sides of the excavation, for pumping and draining groundwater which may be encountered, and for the removal from the excavation of all materials excavated.

3. Take special care so that the soil below the bottom of the structure to be built is left undisturbed.

B. Grades: Excavate to grades indicated on the Drawings. Where excavation grades are not indicated on the Drawings, excavate as required to accommodate installation.

C. Disposal of Excavated Material

1. Remove and properly dispose of all excavated material not needed to complete filling, backfilling and grading.

2. Dispose of excess earth and rock excavated materials at locations on-site designated by the Engineer. Off-site disposal of all other material shall be and 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 on any street. No debris shall be deposited on any private property, except by written consent of the property owner. In no case shall any material be shoved onto abutting private properties, or be buried in embankments or trenches on the Project.

## 3.03 EXCAVATING FOR STRUCTURES

A. Earth Excavation: Earth excavation shall include all substances to be excavated other than rock. Earth excavation for structures shall be to limits not less than two feet outside wall lines, to allow for formwork and inspection, and further as necessary to permit the trades to install their work. All materials loosened or disturbed by excavation shall be removed from surfaces to receive concrete or crushed stone.

B. Excavation for Foundations: Footings and slabs on grades shall rest on undisturbed earth, rock or compacted materials to insure proper bearing.

1. Unsuitable Foundation Material: Any material, in the opinion of the Engineer, which is unsuitable for foundation shall be removed and replaced with compacted crushed stone, or with compacted fill material as directed by the Engineer. No determination of unsuitability will be made until all requirements for dewatering are satisfactorily met.

2. Foundation in Rock: Foundations for a structure shall be on similar materials. Should excavation for a foundation be partially in rock, the Contractor shall undercut that portion of the rock 12-inches and bring the excavation to grade with compacted crushed stone.

3. Pipe Trenches Beneath Structures: Where piping or conduit passes beneath footings or slabs resting on grade, trenches shall be excavated to provide a minimum 6-inch clearance from all surfaces of the pipe or conduit. The trench shall be backfilled to the base of the structure with concrete.

4. Unauthorized Excavation: Care shall be taken that excavation does not extend below bottom levels of footings or slabs on earth or rock. Should the excavation, through carelessness or neglect, be carried below such levels, the Contractor shall fill in the resulting excess excavation with concrete under footings and compacted crushed stone or other approved material under slabs. Should excavation be carried beyond outside lines of footings such excess excavation shall be filled with concrete, or formwork shall be provided, as directed by the Engineer.

C. Unsuitable Bearing

1. If suitable bearings for foundations are not encountered at the elevations indicated on the Drawings, immediately notify the Engineer.

2. Do not proceed further until instructions are received.

## 3.04 DEWATERING REQUIREMENT

A. The Contractor may use any dewatering method he deems feasible so long as it results in working in the dry and stable soil conditions.

B. The Contractor shall conform and meet all conditions, obtain necessary permits and requirements of the regulatory agencies that have jurisdiction.

C. It is the intent of these specifications that an adequate dewatering system be installed to lower and control the groundwater in order to permit excavation, construction, grading and the placement of fill materials, all to be performed under dry conditions. The dewatering system shall be adequate to pre-drain the water-bearing strata above and below the bottom of the excavation.

D. The Contractor shall be solely responsible for the arrangement, location and depths of dewatering system necessary to accomplish the work described under this section of the specifications. The dewatering shall be accomplished in a manner that will reduce the hydrostatic head below any excavation to the extent that the water level in the construction area are a minimum of three (3) feet below the prevailing excavation surface and any surface to be compacted; will prevent the loss of fines, seepage, boils, quick conditions, or softening of the foundation strata; will maintain stability of the sides and bottom of the excavation; and will result in all construction operations being performed in the dry.

E. The Contractor shall promptly dispose of all water removed from the excavations in such a manner as will not endanger public health, damage public or private property, or affect adversely any portion of the work under construction or completed by him or any other Contractor. Contractor shall obtain written permission from the Owner for any property involved before digging ditches or constructing water courses for the removal of water.

F. The disposal of water from the dewatering system shall meet the requirements of all regulatory agencies having jurisdiction.

G. If the dewatering requirements are not satisfied due to inadequacy or failure of the dewatering system, then loosening of the foundation strata, or instability of the slopes, or damage to the foundations or structures may occur. The supply of all labor and materials, and the performance of all work necessary to carry out additional work for reinstatement of the structures of foundation soil resulting from such inadequacy or failure shall be undertaken by the Contractor subject to the approval of the Engineer, and at no additional expense to the Owner.

## 3.05 ROCK EXCAVATION

A. Definition of Mass Rock (only for payment purposes where payment is on a unit quantity basis): Any material which cannot be excavated with a single-tooth ripper drawn by a crawler tractor having a minimum draw bar pull rated at not less than 56,000 pounds (comparable to Caterpillar D 8K or comparable to Caterpillar 973 front-end loader, and occupying an original volume of at least one cubic yard). The Engineer shall be the sole determinate as to the limits to which the material is

classified as rock.

B. Definition of Trench Rock (only for payment purposes where payment is on a unit quantity basis): Any material which cannot be excavated with a backhoe having a bucket curling force rated at not less than 25,700 pounds (Caterpillar Model 225 or equivalent), and occupying an original volume of at least one-half (1/2) cubic yards.

C. Excavation: Where rock is encountered within excavation for structures, it shall be excavated to the lines and grades indicated on the Drawings or as otherwise directed by the Engineer. The Contractor shall be responsible for obtaining any blasting permits required.

D. Blasting: Blasting operations shall be conducted in accordance with all existing ordinances and regulations. All structures shall be protected from the effects of the blast. Blasting shall be performed and supervised by qualified and licensed workers. Dispose of excavated rock in accordance with applicable federal, state, county and local regulations. All blasting within 750 ft of an inhabited structure and or roadway must be siesmic monitored for ground and air vibrations. Peak Particle Velocity shall be measured at nearest structure and shall be 0.5 inch per second or less during blasts. Shots must be covered with at least 6 feet of earthen and synthetic cover (blasting mats). Bore hole diameter must not exceed 4” in diameter. Blast hole cannot exceed 20 feet of solid rock with single delay detonator (in terms, if drill depth exceeds more than 20 feet in depth, decking must be done, accomplish by using multiple detonators in the blast hole. The blast holes must be stemmed with gravel, 89/57 stone. Pre-blast inspections are required. Inspections shall be via an engineer that includes inspection of structure, and pictures of any existing damage or cracks that structure may have prior to blasting.

E. If excess excavation is made or the material becomes disturbed so as to require removal below final subgrade elevations or beyond the prescribed limits, the resulting space shall be refilled with concrete in accordance with Section 2.07 of this Specification

F. Measurement for Payment

All rock excavation shall be paid for as an incidental part of the item on which the work is done except where a separate, unqualified item for rock excavation is indicated in the BID FORM or where rock excavation is ORDERED as an EXTRA by the OWNER, by WRITTEN ORDER. Where payment for rock excavation is established by the BID FORM or ORDERED as an EXTRA by the OWNER, CONTRACTOR shall be paid only for the quantity of rock removed, measured as follows:

A. For all masonry structures such as buildings, tanks, vaults, catch basins, manholes and the like, the horizontal rock measurement shall be made to include 2-1/2 feet from the outside face of finished vertical sidewall of such structure and the vertical rock measurement shall be made from the top elevation of the rock, before disturbed or removed, to the elevation of the under or lower side of the bottom concrete slab of the structure. Any projection below the bottom slab of any structure required for sump, well, or other pertinent

construction shall be measured separately.

B. For installation of pipe lines and fittings the horizontal rock measurement shall be the nominal outside diameter of the pertinent pipe plus 16-inches, except, however, that no horizontal measurement shall be considered to be less than 27-inches; the vertical rock measurement shall be made from the top elevation of the rock, before disturbance or removal, to an elevation of 9-inches below the bottom outside surface of the pipe for pipe having a diameter of 8-inches through 24-inches, and to an elevation of 12-inches below the bottom outside surface of the pipe for all pipe having a diameter greater than 24-inches.

G. Excess Rock Excavation

If rock excavated beyond the limits of payment indicated on the Drawings, specified, or authorized in writing by the OWNER, the excess excavation whether resulting from overbreakage or other causes, shall be backfilled, by and at the expense of the CONTRACTOR.

H. Shattered Rock

If rock below normal depth is shattered due to drilling or blasting operations and such shattered rock is unfit for foundations, the shattered rock shall be removed and the excavation shall be backfilled as described above in EXCESS ROCK EXCAVATION. All such removal and backfilling shall be done at the expense of the CONTRACTOR.

## 3.06 COMPACTION

A. Fill materials supporting roadways, parking areas, sidewalks, structures, and buildings and backfill around structures shall be compacted to 95 percent of the standard proctor density. The top 12-inches of fill materials supporting structures, concrete pads, pavement, curb and gutter shall be compacted to 98 percent of the standard proctor density. Fill placed for general site grading shall be compacted to 90 percent of the standard proctor density.

B. Compaction of embankments shall be by vibratory sheepsfoot or pad-foot rollers with staggered, uniformly spaced knobs and suitable cleaning devices. The projected area of each knob and the number and spacing of the knobs shall be such that the total weight of the roller and ballast when distributed over the area of one row of knobs shall be 250 psi. Placement and compaction of materials shall extend at least 5 feet beyond the final contours sufficiently to insure compaction of the material at the resulting final surface. Final contours shall then be achieved by a tracked bulldozer shaping the face of the embankment.

C. Compaction of backfill next to walls shall be accomplished with hand-powered tamping equipment. The backfill shall be placed in 8-inch maximum lifts, with each lift compacted to 95 percent of standard proctor density.

D. If tests indicate that density of fill is less than that specified, the area shall be, as

directed by the Engineer, either recompacted or undercut, filled, and compacted until specified density is achieved.

## 3.07 FILL

A. Controlled Fill

1. The fill for roadways, parking areas, walks, structures, and building slabs on grade shall be controlled fill.
2. After the existing ground or excavated area has been proofrolled and examined by the Engineer, all holes and other irregularities shall be filled and compacted before the main fill is placed.
3. The fill shall be placed in even layers not exceeding 8-inches in depth and shall be thoroughly compacted as herein specified.
4. If an analysis of the soil being placed shows a marked difference from one location to another, the fill being placed shall not be made up of a mixture of these materials.
5. Each different type of material shall be handled continuously so that field control of moisture and density may be based upon a known type of material.
6. No fill shall be placed following a heavy rain without first making certain on isolated test areas that compaction can be obtained without damage to the already compacted fill.

B. Proofrolling

1. All areas where roadways, parking areas, sidewalks, structures, and buildings are to be constructed on cut areas, compacted fill, and other areas where indicated on the Drawings, shall be proofrolled to detect soft spots prior to the placement of fill material or building foundations.
2. Proofrolling shall be performed using a fully loaded tandem-axle dump truck 20 tons or other suitable pneumatic tired equipment over the subgrade before the subgrade is shaped.
3. Proofrolling shall be witnessed by the Engineer.
4. Subgrade shall be proofrolled with 10 overlapping passes of the roller. Depressions that develop during the proofrolling operation shall be filled with suitable material and those filled areas shall be proofrolled with six passes of the roller. If, after having been filled and proofrolled, the subgrade areas that still “pump” or “rut”, shall be further evaluated by a geotechnical engineer, and remedial work be determined based on the conditions found at locations under structures or pavement. The contractor shall execute remedial work determined by the geotechnical engineer to achieve a subgrade acceptable to the Engineer.
5. After the proofrolled subgrade has been accepted by the Engineer, the surface of the subgrade shall be finish rolled with a smooth steel wheel roller weighing

not less than 10 tons. Finished surface of the subgrade shall be within a tolerance of 1/4-inch at every point.

6. Conduits, pipes, culverts, and underdrains shall be neither disturbed nor damaged by proofrolling operations. Rollers shall neither pass over, nor approach closer than five feet to, conduits, pipes, culverts, and underdrains unless the tops of those products are deeper than three feet.

C. Placement

1. Prior to placement of any material in embankments, the area within embankment limits shall be stripped of topsoil and all unsuitable materials removed in accordance with this Section. The area shall then be scarified to a depth of at least 6-inches.

2. Fill materials shall be placed in continuous, approximately horizontal layers extending the full width of the embankment cross-section and the full dimension of the excavation where practical and having an uncompacted thickness of not over 8-inches.

D. Final Grading: Upon completion of construction operations, the area shall be graded to finish contour elevations and grades shown on the Drawings. Graded areas shall be made to blend into conformation with remaining ground surfaces. All surfaces shall be left smooth and free to drain.

E. Excess Material: Surfaces and slopes of waste fills shall be left smooth and free to drain.

F. Moisture

1. Fill materials shall be placed at optimum moisture content within practicable limits, but not less or more than two percent of optimum. Optimum moisture shall be maintained by sprinkling the layers as placed or by allowing materials to dry before placement.

2. If fill material is too wet, provide and operate approved means to assist the drying of the fill until suitable for compaction.

3. If fill material is too dry, provide and operate approved means to add moisture to the fill layers.

## 3.08 BACKFILLING

A. Backfill carefully to restore the ground surface to its original condition. Dispose of excess material in accordance with this Section.

B. Compact backfill underlying roadways, parking areas, sidewalks, structures and buildings in accordance with the requirements of Article 3.06 of this Section.

C. Backfilling Around Structures

1. General

a. Remove debris from excavations before backfilling.

b. Do not backfill against foundation walls until so directed by the Engineer nor until all indicated perimeter insulation and/or waterproofing is in place.

c. Protect such insulation and/or waterproofing during filling operations.

d. Do not backfill against water retaining structures until successful leakage tests have been completed.

e. Wherever possible, backfilling shall be simultaneous on both sides of walls to equalize lateral pressures.

f. Do not backfill against walls until all permanent construction is in place to furnish lateral support on both top and bottom of wall.

g. Backfilling against walls shall take place after all the concrete in the affected members has attained the specified strengths.

h. To prevent excessive lateral pressure on external walls, large compaction equipment shall not be allowed within a zone wall footing.

2. Materials: Backfill material placed against structures built or encountered during the work of this Section shall be suitable fill material. No broken concrete, bricks or similar materials will be permitted as backfill.

## 3.09 GRADING

A. General: Perform all rough and finish grading required to attain the elevations indicated on the Drawings. Perform finish grading to an accuracy of ±0.10 foot.

B. Treatment After Completion of Grading

1. After grading is completed, permit no further excavation, filling or grading, except with the approval of the Engineer.

2. Use all means necessary to prevent the erosion of freshly graded areas during construction and until such time as permanent drainage and erosion control measures have been installed.

## 3.10 SETTLEMENT

A. The Contractor shall be responsible for all settlement of backfill, fills and embankments which may occur within one year after final acceptance of the Work by the Owner.

B. The Contractor shall make, or cause to be made, all repairs or replacements made necessary by settlement within 30 days after receipt of written notice from the Engineer or Owner.

## 3.11 CLEAN-UP

A. Leave unused materials in a neat, compact stockpile.

B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

C. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

**END OF SECTION**

# SECTION 31 23 16

## TRENCH EXCAVATION AND BACKFILL

## 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 site utilities, including all pipelines, electrical conduits, and duct banks as shown on the plans and as specified.

B. Excavation shall include the removal of any tree 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 plans and as specified.

C. Backfill shall include the filling and compaction of 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 12-inches above the top of the barrel of the pipe.
5. Final Backfill: The area above a plane 12-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 RELATED SECTIONS

A. Geotechnical report: Section 00 31 32 (If Provided in bidding documents)

B. Site Clearing: Section 31 10 00.

C. Earth Moving 30 20 00.

## 1.03 GENERAL

A. The elevations shown on the Drawings as existing are taken from the best existing data and are intended to give reasonably accurate information about the existing elevations. They are not precise and the Contractor shall become satisfied as to the exact quantities of excavation and fill required.

B. Earthwork operations shall be performed in a safe and proper manner with appropriate precautions being taken against all hazards.

C. All excavated and filled areas for structures, trenches, fills, topsoil areas, embankments, and channels shall be maintained by the Contractor in good condition at all times until final acceptance by the Owner. All damage caused by erosion or other construction operations shall be repaired by the Contractor using material of the same type as the damaged material.

D. The Contractor shall control grading in a manner to prevent surface water from running into excavations. Obstruction of surface drainage shall be avoided and means shall be provided whereby storm water can be uninterrupted in existing gutters, other surface drains, or temporary drains. Free access must be provided to all fire hydrants and meters.

E. Tests for compaction and density shall be conducted by the Engineer or by an independent testing laboratory selected in accordance with Section 01 45 29 of these Specifications.

1. The soils testing laboratory is responsible for the following:

   a. Field compaction testing shall be based on using the maximum dry density determined by the Standard Proctor Compaction Test in accordance with ASTM D 698.

   b. Determination of in-place backfill density shall be done in accordance with ASTM D 1556, “Density and unit weight 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)”.

   c. Test frequency for trenches and confined areas of 1 test per two foot vertical lift for every 100 linear feet.

   d. Inspecting and testing stripped site, subgrades and proposed fill materials.

2. Contractor's duties relative to testing include:

   a. Notifying laboratory of conditions requiring testing.

   b. Coordinating with laboratory for field testing.

   c. Providing representative fill soil samples to the laboratory for test

purposes. Provide 50 pound samples of each fill soil.

3. Inspection

a. Earthwork operations, suitability of excavated materials for fill and backfill, and placing and compaction of fill and backfill is subject to inspection. Engineer will observe earthwork operations.

b. Foundations and shallow spread footing foundations are required to be inspected by an engineer to verify suitable bearing and construction.

F. All earthwork operations shall comply with the requirements of OSHA Construction Standards, Part 1926, Subpart P, Excavations, Trenching, and Shoring, and Subpart O, Motor Vehicles, Mechanized Equipment, and Marine Operations, and shall be conducted in a manner acceptable to the Engineer.

G. It is understood and agreed that the Contractor has made a thorough investigation of the surface and subsurface conditions of the site and any special construction problems which might arise as a result of nearby watercourses and floodplains. The Contractor shall be responsible for providing all services, labor, equipment, and materials necessary or convenient to the Contractor for completing the work within the time specified in these Contract Documents.

H. 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.

# PART 2 PRODUCTS

## 2.01 SOILS CLASSIFICATIONS

Bedding materials listed here include a number of processed materials plus the soil types defined according to the Unified Soil Classification System (USCS) in ASTM D 2487, Standard Method for Classification of Soils for Engineering Purposes. (See below for description of soil classification). These materials are grouped into five broad categories according to their suitability for this application:

A. Class I - Angular, 1/4 to 1 1/2 inches (6 to 40 mm) graded stone, including such as coral, slag, cinders, crushed shells and crushed stone. Note - The size range and resulting high voids ratio of Class I material make it suitable for use to dewater trenches during pipe installation. This permeable characteristic dictates that its use be limited to locations where pipe support will not be lost by migration of other embedment materials into the Class I material. When such migration is possible, the material's minimum size range should be reduced to finer than 1/4 inch (6 mm)

and the gradation properly designed to limit the size of the voids.

B. Class II - Coarse sands and gravels with maximum particle size of 1 1/2 inch (40 mm), including variously graded sands and gravels containing small percentages of fines, generally granular and non-cohesive, either wet or dry. Soil Types GW, GP, SW and SP are included in this class. Note - Sands and gravels which are clean or borderline between clean and with fines should be included. Coarse-grained soils with less than 12% but more than 5% fines are neglected in ASTM D2487 and the USCS and should be included. The gradation of Class II material influences its density and pipe support strength when loosely placed. The gradation of Class II material influences its density and pipe support strength when loosely placed. The gradation of Class II material may be critical to the pipe support and stability of the foundation and embedment if the material is imported and is not native to the trench excavation. A gradation other than well graded, such as uniformly graded or gap graded, may permit loss of support by migration into void spaces of a finer grained natural material from the trench wall and foundation.

C. Class III - Fine sand and clayey (clay filled) gravels, including fine sands, sand-clay mixtures and gravel-clay mixtures. Soil Types SM, GC, SM, and SC are included in this class.

D. Class IV - Silt, silty clays and clays, including inorganic clays and silts of not to high plasticity and liquid limits. Soil Types MH, ML, CH, and CL are included in this class. Note- Caution should be used in the design and selection of the degree and method of compaction for Class IV soils because of the difficulty in properly controlling the moisture content under field conditions. Some Class IV soils with medium to high plasticity and with liquid limits greater than 50% (CH, MH, CH-MH) exhibit reduced strength when wet and should only be used for bedding, haunching and initial backfill in arid locations where the pipe embedment will not be saturated by ground water, rainfall and/or exfiltration from the pipeline system. Class IV soils with low to medium plasticity and with liquid limits lower than 50% (CL, ML, CL-ML) also require careful consideration in design and installation to control moisture content but need not be restricted in use to arid locations.

E. Class V - This class includes the organic soils OL, OH, and PT as well as soils containing frozen earth, debris, rocks larger than 1 1/2 inch (40 mm) in diameter, and other foreign materials. These materials are not recommended for bedding, haunching or initial backfill.

**DESCRIPTION OF EMBEDMENT MATERIAL CLASSIFICATIONS**

| SOIL CLASS | SOIL TYPE | DESCRIPTION MATERIAL CLASSIFICATION |
|---|---|---|
| Class I Soils * | --- | Manufactured angular, granular material, 3/4 to 1 1/2 inches (6 to 40 mm) size, including materials having regional significance such as crushed stone, or rock, broken coral, crushed slag, cinders, or crushed shells. |

| SOIL CLASS | SOIL TYPE | DESCRIPTION MATERIAL CLASSIFICATION |
|---|---|---|
| Class II Soil ** | GW | Well-graded gravels and gravel-sand mixtures, little or no fines. 50% or more retained on No. 4 sieve. More than 95% retained on No. 200 sieve. Clean. |
| | GP | Poorly graded gravels and gravel-sand mixtures, little or no fines. 50% or more retained on No. 4 sieve. More than 95% retained on No. 200 sieve. Clean. |
| | SW | Well-graded sands and gravely sands, little or no fines. More than 50% passes No. 4 sieve. More than 95% retained on No. 200 sieve. Clean. |
| | SP | Poorly graded sands and gravelly sand, little or no fines. More than 50% passes No. 4 sieve. More than 95% retained on No. 200 sieve. Clean. |
| Class III Soil *** | GM | Silty gravels, gravel-sand-silt mixtures. 50% or more retained on No. 200 sieve. |
| | GC | Clayey gravels, gravel-sand-clay mixtures. 50% or more retained on No. 4 sieve. More than 50% retained on No. 200 sieve. |
| | SM | Silty sands, sand-silt mixtures. More than 50% passes No. 4 sieve. More than 50% retained on No. 200 sieve. |
| | SC | Clayey sands, sand-clay mixtures. More than 50% passes No. 4 sieve. More than 50% retained on No. 200 sieve. |
| Class IV Soils | ML | Inorganic silts, very fine sands, rock flour, silty or clayey fine sands. Liquid limit 50% or less. 50% or more passes No. 200 sieve. |
| | CL | Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays. Liquid limit 50% or less. 50% or more passes No. 200 sieve. |
| | MH | Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts. Liquid limit greater than 50%. 50% or more passes No. 200 sieve. |

| SOIL CLASS | SOIL TYPE | DESCRIPTION MATERIAL CLASSIFICATION |
|---|---|---|
| | CH | Inorganic clays of high plasticity, fat clays. Liquid limit greater than 50%. 50% or more passes No. 200 sieve. |
| Class V Soils | OL | Organic silts and organic silty clays of low plasticity. Liquid limit 50% or less. 50% or less. 50% or more passes No. 200 sieve. |
| | OH | Organic clays of medium to high plasticity. Liquid limit 50% or less. 50% or more passes No. 200 sieve. |
| | PT | Peat, muck and other highly organic soils. |

* Soils defined as Class I materials are not defined in ASTM D2487.

** In accordance with ASTM D2487, less than 5% pass No. 200 sieve.

*** In accordance with ASTM D2487, more than 12% pass No. 200 sieve. Soils with 5% to 12% pass No. 200 sieve fall in borderline classification, e.g. GP-GC.

## 2.02 PIPE BEDDING CLASSES

A. Class A Bedding shall consist of a continuous concrete cradle as determined by the Engineer.

B. Class B Bedding: The pipe shall be bedded with No. 57 stone bedding material placed on the trench foundation. The bedding shall have a minimum thickness beneath the pipe of 4 inches or one-eighth of the outside diameter of the pipe, whichever is greater, and shall extend up the side to the springline. Initial backfill from the pipe horizontal centerline to a level not less than 12 inches above the top of the pipe and shall be bedding material or carefully placed native soil, compacted to 90% of Standard Proctor Density. The final backfill of the soil to ground surface shall be compacted to the specified density.

C. Class C Bedding: The pipe shall be bedded in No. 57 stone bedding material placed on the trench foundation. The bedding shall have a minimum thickness beneath the pipe of 4 inches or one-eighth of the outside diameter of the pipe, whichever is greater, and shall extend up the sides of the pipe one-sixth the outside diameter of the pipe. Initial backfill between the top of haunching and a point 12 inches above the top of pipe shall be compacted to 90% of Standard Proctor Density. The final backfill of the soil to ground surface shall be compacted to the specified density.

D. Crushed stone utilized for bedding and haunching 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 size shall be between No. 57 and No. 4, inclusive.

## 2.03 TRENCH FOUNDATION MATERIALS

When unsuitable material is encountered and extends more than 6 inches below the pipe. 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 size shall be between No. 57 and No. 4, inclusive or Class I material.

## 2.04 FILTER FABRIC

A. Filter fabric associated with bedding shall be a UV stabilized, spunbonded, continuous filament, needle punched, polypropylene, nonwoven geotextile.

B. The fabric shall have an equivalent open size (EOS or AOS) of 120 - 70. The fabric shall also conform to the minimum property values listed in the following table:

| Fabric Property | Unit | Test Procedure | Average Value | |
|---|---|---|---|---|
| | | | Typical | Minimum |
| Weight | $oz/yd^2$ | ASTM D 3776 | 8.3 | |
| Thickness | mils | ASTM D 1777 | 105 | |
| Grab Strength | lbs. | ASTM D 4632 | 240 | 210 |
| Grab Elongation | % | ASTM D 4632 | >50 | 50 |
| Tear Strength | lbs. | ASTM D 4533 | 100 | 85 |
| Mullen Burst | psi | ASTM D 3786 | 350 | 320 |
| Puncture Resistance | lbs. | ASTM D 4833 | 115 | 100 |
| Permittivity | $sec^{-1}$ | ASTM D 4491 | 1.7 | |
| Water Permeability | cm/sec | ASTM D 4491 | 0.4 | |
| Water Flow Rate | $gpm/ft^2$ | ASTM D 4491 | 120 | |
| UV Resistance (500 hrs) | % | ASTM D 4355 | >85 | |
| PH | | | 2 – 13 | |

C. If ordered by the Engineer, the filter fabric manufacturer shall furnish the services of a competent factory representative to supervise and/or inspect the installation of pipe. This service will be furnished for a minimum of 10 days during initial pipe installation.

D. Filter fabric shall be Polyfelt TS 700, Trevira 1125 or SuPac 7-MP.

## 2.05 BEDDING AND HAUNCHING MATERIALS

A. Crushed stone utilized for bedding and hunching 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 size shall be between No. 57 and No. 4, inclusive.

B. Earth materials shall be suitable materials selected from the trench excavation.

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.

## 2.06 INITIAL BACKFILL

A. Initial backfill material shall be earth materials or crushed stone as specified for bedding and haunching materials. Soil shall be tamped to 90% of Standard Proctor Density (ASTM D698).

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, provide select material conforming to the requirements of this Section.

## 2.07 FINAL BACKFILL

A. Final backfill material shall be general excavated earth materials, shall not contain rock larger than 2-inches at its greatest diameter, 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, provide select material conforming to the requirements of this Section.

B. In areas not used for streets or driveways, carefully refill in layers not exceeding 8 inches in thickness and thoroughly tamp with hand tamps to one foot above the top of the pipe. Finish filling by machine without tamping. As trench settles, bring back to grade by adding more material. Maintain trenches in safe condition at all times. Restore all special grassing and shrubbery, fences, etc., to original condition. The remaining backfill shall be thoroughly compacted in 8 inch layers to at least 95% (percent) of the Standard Proctor Density (ASTM D698).

C. In streets, roadways and driveways, carefully refill in layers not exceeding 8 inches in thickness and thoroughly tamp with hand tamps to one foot above the top of the pipe. The remaining backfill shall be thoroughly compacted in 8 inch layers to at least 98% (percent) of the Standard Proctor Density (ASTM D698).

D. Backfilling and tamping work in state highway right-of-ways and streets under jurisdiction of the State Highway Department will be in accordance with the State

of Georgia Department of Transportation "Policy and Procedure for Accommodation of Utilities".

### 2.08 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.

### 2.09 FLOWABLE FILL

Flowable fill, where required for trench backfill, shall meet the requirements of Georgia Department of Transportation Standard Specifications, Section 600 for Excavatable or Non-Excavatable type.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Identify required lines, levels, contours, and datum locations.

B. Locate, identify, and protect utilities that remain and protect from damage. The contractor is required to contact the Utilities Protection Center, Inc. in the State of Georgia call 811 prior to any excavation or construction. Additional information is available at www.gaupc.com. The contractor shall first, Call Before You Dig. Second, Wait the Required Amount of Time. Third, Respect the Marks and Lastly, Dig With Care.

C. Notify utility company to remove and relocate utilities.

### 3.02 TRENCH EXCAVATION

A. Notify of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

B. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.

C. Do not interfere with 45 degree bearing splay of foundations.

D. Cut trenches O.D of pipe plus two feet minimum or O.D. of pipe plus four feet maximum wide enough to allow installation and inspection of utilities.

E. Hand trim excavations. Remove loose matter.

F. Remove large stones and other hard matter which could damage piping or impede

consistent backfilling or compaction.

G. Remove lumped subsoil, boulders, and rock up to 1/3 cu yd (0.25 cu m) measured by volume.

H. Remove excavated material that is unsuitable for re-use from site.

I. Stockpile excavated material to be re-used in areas designated on site.

J. Remove excess excavated material from site.

K. In areas not used for streets and in unpaved streets, maximum trench width shall be the pipe diameter plus 24 inches. Protect all trees, shrubs and structures. Protect all fences and replace those damaged/removed with like kind. Keep work and equipment within easement limits. Repair and replace any damage.

L. Paved streets shall have a maximum trench width of pipe diameter plus 24 inches. Shore and brace trench walls as necessary to prevent damage to existing paving. Do not cut existing sidewalk, or curb and gutter without approval by the Engineer. Use rubber tired equipment only on streets. Repair and replace all damage. Saw cut all pavements for smooth edge on replacement.

## 3.03 DEWATERING REQUIREMENT

A. The Contractor may use any dewatering method he deems feasible so long as it results in working in the dry and stable soil conditions.

B. The Contractor shall conform and meet all conditions, obtain necessary permits and requirements of the regulatory agencies that have jurisdiction.

C. It is the intent of these specifications that an adequate dewatering system be installed to lower and control the groundwater in order to permit excavation, construction, grading and the placement of fill materials, all to be performed under dry conditions. The dewatering system shall be adequate to pre-drain the water-bearing strata above and below the bottom of the excavation.

D. The Contractor shall be solely responsible for the arrangement, location and depths of dewatering system necessary to accomplish the work described under this section of the specifications. The dewatering shall be accomplished in a manner that will reduce the hydrostatic head below any excavation to the extent that the water level in the construction area are a minimum of two (2) feet below the prevailing excavation surface and any surface to be compacted; will prevent the loss of fines, seepage, boils, quick conditions, or softening of the foundation strata; will maintain stability of the sides and bottom of the excavation; and will result in all construction operations being performed in the dry.

E. The Contractor shall promptly dispose of all water removed from the excavations in such a manner as will not endanger public health, damage public or private property, or affect adversely any portion of the work under construction or completed by him or any other Contractor. Contractor shall obtain written permission from the Owner for any property involved before digging ditches or constructing water courses for the removal of water.

F. The disposal of water from the dewatering system shall meet the requirements of all regulatory agencies having jurisdiction.

G. If the dewatering requirements are not satisfied due to inadequacy or failure of the dewatering system, then loosening of the foundation strata, or instability of the slopes, or damage to the foundations or structures may occur. The supply of all labor and materials, and the performance of all work necessary to carry out additional work for reinstatement of the structures of foundation soil resulting from such inadequacy or failure shall be undertaken by the Contractor subject to the approval of the Engineer, and at no additional expense to the Owner.

## 3.04 ROCK EXCAVATION

A. Definition of Mass Rock (only for payment purposes where payment is on a unit quantity basis): Any material which cannot be excavated with a single-tooth ripper drawn by a crawler tractor having a minimum draw bar pull rated at not less than 56,000 pounds (comparable to Caterpillar D 8K or comparable to Caterpillar 973 front-end loader, and occupying an original volume of at least one cubic yard). The Engineer shall be the sole determinate as to the limits to which the material is classified as rock.

B. Definition of Trench Rock (only for payment purposes where payment is on a unit quantity basis): Any material which cannot be excavated with a backhoe having a bucket curling force rated at not less than 25,700 pounds (Caterpillar Model 225 or equivalent), and occupying an original volume of at least one-half (1/2) cubic yards.

C. Excavation: Where rock is encountered within excavation for structures, it shall be excavated to the lines and grades indicated on the Drawings or as otherwise directed by the Engineer. The Contractor shall be responsible for obtaining any blasting permits required.

D. Blasting: Blasting operations shall be conducted in accordance with all existing ordinances and regulations. All structures shall be protected from the effects of the blast. Blasting shall be performed and supervised by qualified and licensed workers. Dispose of excavated rock in accordance with applicable federal, state, county and local regulations. All blasting within 750 ft of an inhabited structure and or roadway must be siesmic monitored for ground and air vibrations. Peak Particle Velocity shall be measured at nearest structure and shall be 0.5 inch per second or less during blasts. Shots must be covered with at least 6 feet of earthen and synthetic cover (blasting mats). Bore hole diameter must not exceed 4” in diameter. Blast hole cannot exceed 20 feet of solid rock with single delay detonator (in terms, if drill depth exceeds more than 20 feet in depth, decking must be done, accomplish by using multiple detonators in the blast hole. The blast holes must be stemmed with gravel, 89/57 stone. Pre-blast inspections are required. Inspections shall be via an engineer that includes inspection of structure, and pictures of any existing damage or cracks that structure may have prior to blasting.

E. If excess excavation is made or the material becomes disturbed so as to require removal below final subgrade elevations or beyond the prescribed limits, the resulting space shall be refilled with concrete in accordance with Section 2.08 of this Specification

F. Measurement for Payment

All rock excavation shall be paid for as an incidental part of the item on which the work is done except where a separate, unqualified item for rock excavation is indicated in the BID FORM or where rock excavation is ORDERED as an EXTRA by the OWNER, by WRITTEN ORDER. Where payment for rock excavation is established by the BID FORM or ORDERED as an EXTRA by the OWNER, CONTRACTOR shall be paid only for the quantity of rock removed, measured as follows:

A. For all masonry structures such as buildings, tanks, vaults, catch basins, manholes and the like, the horizontal rock measurement shall be made to include 2-1/2 feet from the outside face of finished vertical sidewall of such structure and the vertical rock measurement shall be made from the top elevation of the rock, before disturbed or removed, to the elevation of the under or lower side of the bottom concrete slab of the structure. Any projection below the bottom slab of any structure required for sump, well, or other pertinent construction shall be measured separately.

B. For installation of pipe lines and fittings the horizontal rock measurement shall be the nominal outside diameter of the pertinent pipe plus 16-inches, except, however, that no horizontal measurement shall be considered to be less than 48-inches; the vertical rock measurement shall be made from the top elevation of the rock, before disturbance or removal, to an elevation of 9-inches below the bottom outside surface of the pipe for pipe having a diameter of 8-inches through 24-inches, and to an elevation of 12-inches below the bottom outside surface of the pipe for all pipe having a diameter greater than 24-inches.

G. Excess Rock Excavation

If rock excavated beyond the limits of payment indicated on the Drawings, specified, or authorized in writing by the OWNER, the excess excavation whether resulting from overbreakage or other causes, shall be backfilled, by and at the expense of the CONTRACTOR.

H. Shattered Rock

If rock below normal depth is shattered due to drilling or blasting operations and such shattered rock is unfit for foundations, the shattered rock shall be removed and the excavation shall be backfilled as described above in EXCESS ROCK EXCAVATION. All such removal and backfilling shall be done at the expense of the CONTRACTOR.

## 3.05 SHEETING, BRACING AND SHORING

A. 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.

B. Remove bracing and sheeting in units when backfill reaches the point necessary to protect the utility and adjacent property. Leave sheeting in place when in the opinion of the Engineer 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.

C. Sheet piling within three feet of an existing structure or utility shall remain in place, unless otherwise directed by the Engineer.

## 3.06 TRENCH FOUNDATION AND STABILIZATION

A. The bottom of the trench shall provide a foundation to support the utility and its specified bedding. The trench bottom shall be graded to support the utility 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 utility, the trench will be determined to be unsuitable.

C. If in the opinion of the Engineer the undisturbed material at the trench bottom constitutes an unstable pipe foundation, then the Contractor shall replace such unstable materials with crushed stone.

D. If the crushed stone does not provide adequate foundation, then the trench shall be excavated to a depth of at least two feet below the specified trench bottom. The over excavation shall be filled with No. 4 foundation stone to the bottom of the bedding stone or the over excavation shall be lined with filter fabric, with the fabric being supported along the sides of the trench to a point above the top of the utility. The trench shall then be filled with No. 57 foundation stone to the top of the pipe and the filter fabric shall be overlapped above the pipe and stone.

## 3.07 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 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 at joints.

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. Gravity Pipelines and Accessories: Lay PVC (plastic pipe) gravity sewer pipe with minimum Class B bedding. Lay all other gravity sewer pipelines with Class C bedding, unless shown or specified otherwise. All trenches under paving, concrete, etc. shall be placed in Class B bedding only.

F. Bedding for storm drain piping shall be as specified in Section 33 40 00 Storm Drainage Piping.

G. Manholes: Excavate to a minimum of 12-inches below the planned elevation of the base of the manhole. Place and compact crushed stone bedding material to the required grade before constructing the manhole.

H. Pressure Mains

Bedding and haunching for pressure pipe shall be with Class II or III soils compacted to 90% of standard proctor density. All trenches under paving, concrete, etc. shall be placed in Class B bedding only.

I. Excessive Width and Depth

1. If the trench is excavated in excess of the pipe diameter plus two feet, provide the next higher bedding type.

2. If the trench is excavated to excessive depth, provide foundation stone to the bottom of the bedding material.

J. Compaction: Bedding and haunching materials under pipe, manholes and accessories shall be compacted to a minimum of 95 percent of the maximum dry density, unless shown or specified otherwise.

## 3.08 CONCRETE ENCASEMENT FOR PIPELINES

Where concrete encasement is shown on the Drawings for pipelines not under structures, 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 CONCRETE ENCASEMENT FOR ELECTRICAL DUCT BANKS

A. Install top of duct bank minimum 18-inches below finished grade with plastic warning tape 12-inches below finished grade.

B. Terminate conduit in end bell at manhole entries.

C. Stagger conduit joints in concrete encasement 6-inches minimum.

D. Provide minimum 3-inch concrete cover at bottom, top, and sides of duct bank. Use suitable separators and chairs installed not greater than four feet on center to provide conduit spacing as indicated. Securely anchor conduit to prevent movement during concrete placement.

E. Where duct bank passes beneath footings or slabs, excavate to provide a minimum of 6-inches clearance between the conduits and the structure. Backfill to the base of the structure with concrete.

## 3.10 INITIAL BACKFILL

A. Fill up to subgrade elevations unless otherwise indicated.

B. Employ a placement method that does not disturb or damage other work.

C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

D. Maintain optimum moisture content of fill materials to attain required compaction density.

E. Granular Fill: Place and compact materials in equal continuous layers not exceeding 6 inches compacted depth.

F. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches compacted depth.

G. Correct areas that are over-excavated.

1. Thrust bearing surfaces: Fill with concrete.

2. Other areas: Use general fill, flush to required elevation, compacted to minimum 98 percent of standard proctor dry density.

H. Compaction Density Unless Otherwise Specified or Indicated:

1. Under paving, slabs-on-grade, and similar construction: 98 percent of standard proctor density.

2. At other locations: 95 percent of standard proctor density.

## 3.11 FINAL BACKFILL

A. Backfill to contours and elevations indicated using suitable materials.

B. Employ a placement method that does not disturb or damage other work.

C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

D. Maintain optimum moisture content of fill materials to attain required compaction density.

E. Granular Fill: Place and compact materials in equal continuous layers not exceeding 6 inches compacted depth.

F. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches compacted depth.

G. Slope grade away from building minimum 2 inches in 10 ft, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.

H. Compaction Density Unless Otherwise Specified or Indicated:

1. Under paving, slabs-on-grade, and similar construction: 98 percent of standard proctor density.

2. At other locations: 95 percent of standard proctor density.

I. Reshape and re-compact fills subjected to vehicular traffic.

## 3.12 TOLERANCES

A. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

B. Top Surface of Backfilling Under Paved Areas: Plus or minus 1 inch from required elevations.

## 3.13 CLEAN-UP

A. Leave unused materials in a neat, compact stockpile.

B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

C. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

**END OF SECTION**

# SECTION 33 05 13

## MANHOLES AND STRUCTURES

## PART 1 GENERAL

### 1.01 DESCRIPTION

A. The work required under this section consists of all materials, accessories, equipment, tools, and labor required to construct and/or place precast concrete manholes, where shown on the drawings.

B. Manholes shall be constructed of specified materials to the sizes, shapes and dimensions, and at the locations shown on the plans or as otherwise directed by the Engineer. Generally, the height of manholes shall be such that the top of the manhole frame will be at the finished grade of the pavement or ground surface for manholes located in pavement, in road or street rights-of-ways or in maintained grounds. In areas other than above, the top of the manhole shall be 24 to 30 inches above the finish ground level.

### 1.02 RELATED SECTIONS

A. Section 03 41 00 – Precast Concrete Structures.

### 1.03 REFERENCES

A. ASTM A 48 - Standard Specification for Gray Iron Castings.

B. ASTM C 55 - Standard Specification for Concrete Brick.

C. ASTM C 62 - Standard Specification for Building Brick (Solid Masonry Units Made From Clay or Shale).

D. ASTM C 144 - Standard Specification for Aggregate for Masonry.

E. ASTM C 270 – Standard Specification for Mortar for Unit Masonry.

F. ASTM C 478 - Standard Specification for Precast Reinforced Concrete Manhole Sections.

G. ASTM C 923 - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals.

H. IMIAWC (CW) - Recommended Practices & Guide Specifications for Cold Weather Masonry Construction; International Masonry Industry All-Weather Council.

I. ASTM C 1244 - Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test.

### 1.04 SUBMITTALS

A. See Section 01330 for submittal procedures.

B. Shop Drawings: Indicate manhole locations, elevations, piping sizes and elevations of penetrations.

C. Product Data: Provide manhole covers, component construction, features, configuration, and dimensions.

### 1.05 QUALITY ASSURANCE

Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

### 1.06 ENVIRONMENTAL REQUIREMENTS

A. Maintain materials and surrounding air temperature to minimum 50 degrees F (10 degrees C) prior to, during, and 48 hours after completion of masonry work.

B. Cold Weather Requirements: Comply with recommendations of IMIAWC (CW).

## PART 2 PRODUCTS

### 2.01 MATERIALS

A. Manhole Sections: Reinforced precast concrete in accordance with ASTM C 478, with resilient connectors complying with ASTM C 923.

B. Manhole Sections and Joints: Water tight joints for precast manhole sections, using rubber gaskets for sealing the joints shall be in accordance with ASTM C 443.

C. Manhole Boots: Shall be NPC Kor-N-Seal connectors or approved equal.

D. Integral Steps: Fiber reinforced plastic in accordance with ASTM D 3753.

E. Concrete: As specified in Section 03 31 00.

F. Concrete Reinforcement: As specified in Section 03 31 00.

G. Brick: Shall conform to applicable requirements of ASTM C62 Grade NW.

H. Mortar: Shall be a 3:1 sand-cement mix.

### 2.02 COMPONENTS

A. Ring and Cover: ASTM A 48, Class 30B Cast iron construction, machined flat bearing surface, removable lockable cover (Bolted Watertight Cover) or

removable non-lockable cover (non-bolted), closed cover design; sealing gasket; cover molded with identifying name provided by the owner. Use USF 367 for (Bolted Watertight Standard) Cover or approved equal. Or use U.S. Foundry (USF) 360-E Ring and Cover Series or approved equal for (non-bolted) covers. See plans for frame and cover requirements.

B. Manhole Steps: Polypropylene safety steps meet to ASTM A-615 and ASTM C-478, AASHTO M-199 and all OSHA specifications. The 1/2" grade 60 steel reinforcing bar meets ASTM A-615. Polypropylene rungs shall be 1 inch diameter or approved equal.

C. Manhole Boots: Rubber boots shall be designed and manufactured to meet or exceed the requirements of ASTM C-923 "Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals". The rubber seal shall be made from a resilient rubber compound, which conforms to ASTM C923. The pipe clamp shall be manufactured from 304 series non-magnetic stainless steel, which conforms to ASTM C923 and ASTM A167.

### 2.03 CONFIGURATION

A. Construction: Cylindrical base, vertical sections with eccentric cone top section with tongue and groove joints.

B. Shape: Cylindrical unless otherwise noted on the plans.

C. Clear Inside Dimensions: 48 inch diameter or as indicated on the plans.

D. Design Depth: As indicated on the plans.

E. Clear Cover Opening: Shall be 20-5/8” to 22-1/2”.

F. Pipe Entry: Provide openings as indicated on the plans.

G. Steps: Set every 15 inches as indicated on the plans.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify items provided by other sections of work are properly sized and located.

B. Verify that built-in items are in proper location, and ready for roughing into work.

C. Verify excavation for manholes is correct.

### 3.02 MANHOLES

A. All manhole sections shall be manufactured in accordance to ASTM C-478.

B. Place manhole sections plumb and level, trim to correct elevations.

C. Form and place manhole cylinder plumb and level, to correct dimensions and elevations.

D. All manholes base sections shall have preformed inverts cast per the plans.

E. The manhole base shall be set on a 8 inch (minimum thickness) mat of No. 57 stone or as shown on the construction drawings.

F. Set frames and covers to correct elevations and properly anchor to the masonry. Where manholes are constructed in paved areas, the top surface of the frame and cover shall be tilted to conform to the exact slope, crown and grade of the existing or proposed pavement.

G. Installation for the step can be cast in place or driven into pre-formed or drilled hole. The step will resist pullout forces of over 1500 lbs.

## 3.03 MASONRY WORK

A. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

B. Lay masonry units in running bond. Course one unit and one mortar joint to equal 8 inches.

C. Form concave mortar joints.

D. Lay masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

E. Install joint reinforcement 16 inches on center.

F. Place joint reinforcement in first and second horizontal joints above base pad and below cover frame opening.

## 3.04 TESTING

A. Leakage Testing: Testing shall be conducted for each precast structure or manhole in accordance with ASTM C 1244 - Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test.:

B. Vacuum Testing: Manholes shall be tested after assembly and prior to backfilling. Stub outs, manhole boots and pipe plugs shall be secured to prevent movement while the vacuum is drawn. Installation and operation of vacuum equipment and indicating devices shall be in accordance with equipment specifications for which performance information has been provided by the manufacturer and approved by the Engineer. A measured vacuum of 10 inches of mercury (-4.91 psi) shall be established in the manhole. The time for the vacuum to drop to nine inches of mercury (-4.42 psi) shall be recorded. Acceptance standards for leakage shall be established from the elapsed time for negative pressure change from 10 inches to 9 inches of mercury. The maximum allowable leakage rate and instructions for a four foot diameter manhole shall be in accordance with the following:

Testing Instructions:

1. Testing is done after complete assembly of the manhole.

2. The manhole to pipe connection should be a flexible connector, such as Kor-N-Seal or equivalent.

3. All lift holes need to be plugged with a non-shrinking mortar, or equivalent.

4. The seal between the manhole sections shall be in accordance with ASTM-C 923.

5. The contractor must plug the pipe openings, taking care to securely brace the plugs and pipe.

6. With the vacuum tester in place:

7. Inflate the compression band to 40 psi to effect a seal between the vacuum base and the structure

8. Connect the vacuum pump to the outlet port with the value open.

9. Draw a vacuum to 10" of Hg. (-4.91 psi) and close the value.

10. The test is considered passing if the vacuum remains between 9" Hg. and 10" Hg. in a time greater than one minute. If the initial test fails, the contractor can locate the leak, and the appropriate repairs made.

| 4’ dia. Manhole Depth Minimum | Elapsed Time for a Pressure Change of 1 inch Hg |
|---|---|
| 10 ft. or less | 60 seconds |
| >10 ft. but < 15 ft. | 75 seconds |
| >15 ft. but < 25 ft. | 90 Seconds |

For manholes five feet in diameter, add an additional 15 seconds and for manholes six feet in diameter, add an additional 30 seconds to the time requirements for four-foot diameter manholes. If the manholes fails the test, necessary repairs shall be made and the vacuum test and repairs shall be repeated until the manhole passes the test. If a manhole joint sealer is completely pulled out during the vacuum test, the manhole shall be disassembled and the sealer replaced.

**END OF SECTION**

# PART 1 GENERAL

## 1.01 SCOPE

A. Furnish all labor, tools, equipment and materials necessary for the construction of all gravity sewer lines as shown on the plans and/or in the specifications; including mains, fittings, connections, piers, collars, headwalls and all other appurtenances specified and/or required.

B. Site piping covered under this Section shall begin at the outside face of structures and buildings, except where there is no joint at the outside face, then site piping shall begin not more than two feet beyond the face of the structure or building.

## 1.02 RELATED WORK SPECIFIED ELSEWHERE

Section 31 23 16 - Trench Excavation and Backfill.

Section 33 05 23 – Pipe Jacking

Section 00 34 00 – Sanitary Sewer Force Main.

Section 33 05 13 – Manholes and Structures.

Section 33 31 05 – Sanitary Utility Equipment.

## 1.03. SUBMITTALS

Complete product data and engineering data, including shop drawings, shall be submitted to the Engineer in accordance with the requirements of Section 01 33 00 of the Contract Documents.

## 1.04 TRANSPORTATION 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 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. Do not use chains in handling pipe, fittings and appurtenances.

## 1.05 STORAGE AND PROTECTION

A. Store all pipe which cannot be distributed along the route. Make arrangements for the use of suitable storage areas.

B. 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.

C. 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.

D. Stored 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.

# PART 2 PRODUCTS

## 2.01 PIPE

A. Polyvinyl Chloride Pipe (PVC: SDR-26) is classified as "Flexible" pipe, the plastic having a cell classification of 12454 or 12364, as defined in ASTM D3034 for 4” through 15” and F679 for 18” through 36”. Furnished in 14 or 20-foot lengths. Minimum wall thickness shall be as follows:

| | | | | | |
|---|---|---|---|---|---|
| 4” | - | .162 inches | 15” | - | .588 inches |
| 6” | - | .241 inches | 18” | - | .671 inches |
| 8” | - | .323 inches | 21” | - | .791 inches |
| 10” | - | .404 inches | 24” | - | .889 inches |
| 12” | - | .481 inches | 27” | - | 1.002 inches |

1. Each length of pipe shall be marked with the manufacturer’s name, trade name, nominal size, class, hydrostatic test pressure, manufacturer’s standard symbol signifying it was tested and date of manufacture.

2. Each rubber ring shall be marked with the manufacturer’s identification, size, year of manufacture and the classes of pipe with which it can be used.

B. Ductile Iron Pipe – DIP shall be pressure class 350 for 4" thru 12", class 250 for 14" thru 20", class 200 for 24" and Class 150 for 30" thru 64". The pipe shall be coated on the interior with 40 mils nominal dry film thickness of PROTECTO 401 Ceramic Epoxy within 8 hours of surface preparation as manufactured by U.S. Pipe or “SewperCoat” with Calcium Aluminate as manufactured by Lafarge or approved

equal. Ductile Iron Pipe designed and manufactured in accordance with ANSI A21.51 centrifugally cast in metal or sand lined molds. Exterior surface shall be seal coated with 1 mil thick approved asphaltic coating in accordance with ANSI/AWWA C151/A21.51

C. Ultra-Rib Polyvinyl Chloride Pipe (PVC) Pipe from 8" thru 30" shall have a smooth interior with a solid cross-sectional rib exterior. The pipe shall have cell classification of 12454-B, 12454-C or 13364-B as defined in ASTM D1784. Ultra-Rib PVC Gravity Sewer Pipe shall meet the requirements of ASTM F794. Exterior ribs shall be perpendicular to the axis of the pipe to allow placement of sealing gasket without additional cutting or machining. The minimum "Pipe Stiffness" at 5% deflection shall be 60 psi for 8” thru 12” and 46 psi for 15" thru 30" when tested in accordance with ASTM D2412.

D. Reinforced Concrete Pipe (RCP) shall be manufactured in accordance with ASTM C 76, AASHTO M 170.

E. A-2000 Polyvinyl Chloride Pipe (PVC): Pipe from 4” thru 36” shall have a **smooth interior with corrugated exterior** the pipe shall have a cell classification of 12454-B or 12454-C, as defined in ASTM D1784 furnished in 13 or 20-foot lengths. A-2000 PVC Gravity Sewer Pipe shall meet the requirements of ASTM F949 and ASTM F794. Pipe shall be manufactured to a minimum “Pipe Stiffness” of 46 psi when tested in accordance with ASTM D2412.

1. Each length of pipe shall be marked with the manufacturer’s name, trade name, nominal size, class, hydrostatic test pressure, manufacturer’s standard symbol signifying it was tested and date of manufacture.

2. Each rubber ring shall be marked with the manufacturer’s identification, size, year of manufacture and the classes of pipe with which it can be used.

F. A-2026 Polyvinyl Chloride Pipe (PVC): Pipe from 8” thru 12” shall have a **smooth interior with corrugated exterior** the pipe shall have a cell classification of 12454-B or 12454-C, as defined in ASTM D1784 furnished in 121/2 foot lengths. A-2026 PVC Gravity Sewer Pipe shall meet the requirements of ASTM F949. Pipe shall be manufactured to a minimum “Pipe Stiffness” of 115 psi when tested in accordance with ASTM D2412.

1. Each length of pipe shall be marked with the manufacturer’s name, trade name, nominal size, class, hydrostatic test pressure, manufacturer’s standard symbol signifying it was tested and date of manufacture.

2. Each rubber ring shall be marked with the manufacturer’s identification, size, year of manufacture and the classes of pipe with which it can be used.

## 2.02 SERVICE PIPE AND FITTINGS

All service pipe and fittings shall be the same as approved for SDR 26 PVC and PC 350 DIP sewer pipe only. No other pipe material will be accepted unless approved by the Engineer.

## 2.03 JOINTS AND JOINING MATERIALS

A. PVC Pipe joints shall be rubber ring type slip joints as manufactured by Clow or approved equal. Ring/gasket shall be designed to prevent inflow or outflow. The rubber gaskets shall conform to ASTM D-3139 for Polyvinyl Chloride Slip Joint.

1. Joints for rubber push type gaskets and compression joint sealing meeting the requirements of ASTM D-3212 or F-477 shall also be acceptable.

2. All lubricants and gaskets used shall be suitable for sewage applications and be in accordance with the manufacturer's recommendations.

B. Ductile Iron Pipe joints shall be single rubber gasket push-on type, such as Fastite or Tyton, conforming to the requirements of ANSI A21.11; unless mechanical joints conforming to ANSI A 21.11 are specified in the bid schedule or on the plans.

1. All lubricants and gaskets used shall be suitable for sewage applications and be in accordance with the manufacturer's recommendations.

C. Ultra-Rib PVC Gravity Sewer Pipe joints shall be installed using the same methods currently used for PVC pipe.

D. Reinforced Concrete Pipe joints shall conform to ASTM C 361, ASTM C443 (AASHTO M198). "O"-ring type rubber gasketed concrete joints shall be installed in accordance with the manufacturer's recommendations. All lubricants and gaskets used shall be suitable for sewage applications and be in accordance with the manufacturer's recommendations.

E. A-2000 PVC Gravity Sewer Pipe joints shall be installed using the same methods currently used for PVC pipe.

F. A2026 PVC Gravity Sewer Pipe joints shall be installed using the same methods currently used for PVC pipe.

## 2.04 PIPE FITTINGS AND SPECIALS

A. Dip Fittings And Specials

Shall be manufactured in the USA. Mechanical joint fittings shall conform to either AWWA C110 or AWWA C153 (Compact Fittings). Minimum pressure rating for fittings shall be 350 psi. All other fittings shall conform to AWWA C110. The pipe shall be coated on the interior with 40 mils nominal dry film thickness of PROTECTO 401 Ceramic Epoxy within 8 hours of surface preparation as manufactured by U.S. Pipe or "SewperCoat" with Calcium Aluminate as manufactured by Lafarge or approved equal. Unless otherwise noted on the plans, fittings for underground installation shall be mechanical joint conforming to AWWA C111, and fittings for above ground installation shall be flanged conforming to ANSI B16.1 Class 125. Minimum pressure rating for fittings shall be 250 psi. Fittings and specials shall be completed with rings, bolts, gaskets, etc., for joints.

B. Polyvinylchloride Pipe

Fittings used on 4" thru 10” PVC Pipe transitions shall be mechanical or restrained joints as manufactured by American Pipe, U.S. Pipe, Clow, Contech Construction Products Inc. or EBAA Iron Inc.

### 2.05 TRANSITION COUPLINGS

Transition Couplings – Couplings shall be ductile iron conforming to ASTM A-536. Coupling shall be as manufactured by Ford, Dresser, JCM or approved equal.

## PART 3 EXECUTION

### 3.01 EXISTING UNDERGROUND UTILITIES AND OBSTRUCTIONS

A. The plans indicate utilities and obstructions that are known to exist according to the best information available to the Owner.

B. Existing Utility Location: The following steps shall be exercised to avoid interruption of existing utility service.

1. Expose the facility, for a distance of at least 100 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.

2. Avoid utility damage and interruption by protection with means or methods recommended by the utility owner.

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 piping does not permit safe installation of the piping 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 piping to avoid horizontal conflicts if the new alignment complies with regulatory agency requirements and after a written request to and subsequent approval by the Engineer. Where such relocation of the piping is denied by the Engineer, the Contractor shall arrange to have the utility, main, or service relocated.

2. Vertical Conflict: Vertical conflict shall be defined as when the actual vertical separation between a utility, main, or service and the proposed piping does not permit the crossing without immediate or potential future damage to the utility, main, service, or the piping. The Contractor may change the proposed grade of the piping 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 Engineer.

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. Gravity sewer lines should maintain a minimum 10 foot edge-to-edge separation from potable water mains. If the main cannot be installed providing 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 potable water main shall be encased in concrete with a minimum depth of 6-inches.

2. Where sewer mains cross the water, the pipe joint adjacent to the pipe crossing the water shall be cut to provide maximum separation of the pipe joints from the water.

3. No water main shall pass through, or come in contact with, any part of a sanitary sewer manhole.

## 3.02 INSTALLATION IN TRENCH

A. Installation for PVC pipe shall conform to ASTM D 2321 Latest Designation. Minimum cover for gravity sewer lines shall be 48 inches for PVC piping and 36 inches for all other materials. PVC shall be installed on a Class B bedding as specified in Section 31 23 16.

B. Installation for DIP shall conform to the Ductile Iron Pipe Handbook published by DIPRA latest revision. Installation in Georgia State Highway rights-of-way and streets and roads under the jurisdiction of the Georgia State Highway Department shall meet the requirements of the Georgia State Highway Department's Standard Specifications and Policy and Procedure for Accommodation of Utilities. Provide stakes, planks, nails, etc., and such field men and assistance for establishing benches and reference as the Engineer may request. DIP shall be installed on a Class C bedding as specified in Section 31 23 16.

C. Ultra-Rib PVC Gravity Sewer Pipe shall be installed using the same methods currently used for PVC pipe. PVC shall be installed on a Class B bedding as specified in Section 31 23 16.

D. Reinforced Concrete Pipe shall be installed in accordance with applicable provisions of the American Concrete Pipe Association (ACPA). RCP shall be installed on a Class C bedding as specified in Section 31 23 16.

E. A-2000 PVC Gravity Sewer Pipe shall be installed using the same methods currently used for PVC pipe. PVC shall be installed on a Class B bedding as specified in Section 31 23 16.

F. A2026 PVC Gravity Sewer Pipe shall be installed using the same methods currently used for PVC pipe. PVC shall be installed on a Class B bedding as specified in

Section 31 23 16.

## 3.03 UNPAVED AREAS

In areas not used for streets and in unpaved streets, maximum trench width shall be the pipe diameter plus 24 inches. Protect all trees, shrubs and structures. Protect all fences and replace those damaged/removed with like kind. Keep work and equipment within easement limits. Repair and replace any damage.

## 3.04 PAVED AREAS

A. Paved streets shall have a maximum trench width of pipe diameter plus 24 inches. Shore and brace trench walls as necessary to prevent damage to existing paving. Do not cut existing sidewalk, or curb and gutter without approval by the Engineer. Use rubber tired equipment only on streets. Repair and replace all damage. Saw cut all pavements an additional 6 inches on each side of the trench prior to replacement.

B. All materials and construction methods shall conform to the Georgia State Highway Department's Standard Specifications and Policy and Procedure for Accommodation of Utilities.

## 3.05 LAYING SEWER PIPE

A. Lay to line and grade established by the plans using a laser. Begin construction downstream and lay with bells upstream. Pipe to be clean and dry prior to placement. Maintain pipe in dry condition until joints are thoroughly set. Joints shall be close and even butting all around. Maintain true surface of invert throughout entire length of sewer. Secure and close pipe at end of each work period.

B. Any pipe, which has its alignment, grade or joints disturbed after installation shall be taken up and relaid.

C. Maintain 10' minimum edge-to-edge horizontal separation between sewers and water mains as shown on the plans. Where sewer and water lines cross, maintain 18" minimum edge-to-edge vertical separation. Crossings shall be arranged to obtain maximum separation between water and sewer joints. When minimum clearances cannot be met, encasement shall be accomplished as shown in the details or as directed by the Engineer.

## 3.06 JOINING SEWER PIPE AND SERVICE CONNECTIONS

A. Join pipe in strict accordance with pipe manufacturer's recommendations. All lubricants and gaskets used shall be suitable for sewage applications and be in accordance with the manufacturer’s recommendations. All pipe with defective joints will be removed from the job site. When joining any plastic pipe to manhole use only manhole adaptors that have been approved by the Engineer or coring method with

manhole adaptors for existing manholes.

B. Wyes and/or service connections to be installed where shown on the plans or as directed by the Engineer. All service pipe fittings shall be the same as approved for SDR 26 PVC and PC 350 DIP sewer pipe only. No other pipe material will be accepted unless approved by the Engineer. Service connections shall be carried from the sewer to the street right-of-way, easement line or as directed by the Engineer. Install service pipe under existing sidewalk, paved driveways, paved streets and roads where shown on plans by boring, tunneling, or jacking. All service lines not immediately connected to a service stub shall be closed with an air-tight, removable plastic plug and marked with a 2 x 2 or larger wood stake driven two feet in the ground or by other means approved by the Engineer. Contractor to record actual installed location of all wyes and/or services and submit same to Engineer.

## 3.07 CLEANOUTS

Cleanouts shall be installed at any bends, and at intervals no greater than 90 feet along straight runs in all sewer services. Cleanouts shall be located as shown on the plans or as directed in the field by the Engineer or the Owner's Representative.

## 3.08 PIPELINE DETECTION MARKING

A. All sewer mains shall be protected by a plastic marking tape placed a minimum of 24 inches above the top of pipe for its full length. The tape shall be similar to Reef Industries' Terra Tape Standard. It will have sufficient thickness; tensile strength; elongation and resistance to alkalis, acids and other destructive agents to remain a permanent marker of the line buried below. A message shall be printed on the tape at least every 30 inches "**CAUTION SEWER LINE BURIED BELOW**".

B. All non-metallic sewer mains shall be protected by a metalized foil tape buried a minimum of 24 inches above the top of the pipe or at a maximum depth of 6'-0" for its full length. The foil shall be protected by plastic film laminated on each side. The lamination shall be strong enough to prevent the separation of foil and plastic film. The tape should be similar to Reef Industries' Terra Type Detectable. It shall be inductively locatable and conductively traceable using a standard pipe and cable-locating device. A message shall be printed on the tape every 30 inches "**CAUTION SEWER LINE BURIED BELOW**".

## 3.09 TESTING

A. Payment may be withheld for work failing to meet the required tests. All lines and manholes must be laid accurately to line and grade and meet the required tests.

B. LAMP TEST: All gravity sewer lines shall be tested between manholes with lanterns or reflected light. Shall show at least 90% of the full circle of the pipe from manhole to manhole without obstruction.

C. INFILTRATION AND LOW PRESSURE AIR TEST: Infiltration of groundwater into sewer lines shall not exceed 25 gallons per inch of pipe diameter, per mile of sewer within a 24 hour day. All visible or audible leaks must be dug up and repaired unless it is found to be in a joint and can be repaired by chemical grouting. The contractor shall test the integrity of the installed sewer line by the use of low-pressure air. This test shall be performed upon such lines after connection laterals, if any, have been plugged adequately and braced to withstand the test pressure, and the trenches have been backfilled for sufficient time as to generate a reasonable portion of the ultimate trench load upon the pipe. The minimum time between completion of the backfill operation and commencing this testing shall be determined by the engineer.

1. The contractor shall have the responsibility to ensure that all air plugs are installed and braced to prevent blowouts. Pressurizing equipment shall include a regulator or relief valve to avoid over pressurizing and damaging an otherwise acceptable line. No one shall be allowed in the manholes during testing.

2. Secure the plugs in all pipe outlets, including stoppers in laterals, to resist the test pressure. Clean out all debris in the pipe. At the option of the contractor, the interior pipe surface may be wet by flushing the line, in order to produce more consistent test results.

3. Procedure; The sewer line to be tested shall be tested between manholes. The line shall be sealed at each end. The seal at one end shall have an orifice through which to pass air into the pipe. An air supply shall be connected to the orifice at one end of the line. The air supply line will contain an on-off gas valve and a pressure gauge having a range of from 0 to 5 psi. The gauge shall have minimum divisions of 0.10 psi and shall have an accuracy of = 0.04 psi. The pipe line under test shall be pressurized to 4 psig. The line will be allowed to stabilize between 4 psig and 3.5 psig for a period of no less than 5 minutes. If necessary, air should be added to the line to maintain the pressure above 3.5 psig. After the stabilization period, the gas valve shall be closed. When the line pressure drops to 3.5 psig, commence timing with a stop watch. The stop watch should be allowed to run until such time as the line pressure drops to 2.5 psig. Then the watch should be stopped and the time lapse compared with the allowable time lapse as specified below in this specification for the pipe size and leakage allowance specified by the Engineer. If the time lapse is greater than that specified, the section undergoing test shall have passed, and the test may be discontinued at that time. If the time is less than that specified, the line has not passed the test and the Contractor will be required to prepare the line for retest. If the pipe line to be tested is beneath the ground water level, the test pressure shall be increased 0.433 psi for each foot the ground water level is above the invert of the pipe.

Air Leakage Chart (min:s): ASTM F-1417

Minimum time required for a 1.0 psig pressure drop from 3.5 psig to 2.5 psig. See

Practice UNI-B-6-90

| Size (in.) | Min. Time min:s | Time for Length, s | Min. Time Size (in.) | Time for min:s | Length, s |
|---|---|---|---|---|---|
| 4 | 3:46 | 0.380*L | 15 | 14:10 | 5.342*L |
| 6 | 5:40 | 0.854*L | 18 | 17:00 | 7.692*L |
| 8 | 7:34 | 1.520*L | 21 | 19:50 | 10.740*L |
| 10 | 9:26 | 2.374*L | 24 | 22:40 | 13.674*L |
| 12 | 11:20 | 3.418*L | | | |

Example: 400 l.f. of 8-inch pipe; Time = 1.520*400 = 608.0s = 10m:08s

4. Retest of Test Section: Any section of line in which a loss of more than 1.0 psig is encountered during the period of test may be retested at the option of the contractor. Failure of a test section of a line shall require location and grouting or other repair or replacement of the source of excessive air loss. The engineer shall approve the method to be used prior to any repair or replacement. The cost of repair or replacement as well as acceptance retesting shall be borne by the contractor.

D. Compaction tests shall be required for line under pavement and structures. Initial testing shall be performed by a certified testing laboratory, and the cost borne by the Owner. The frequency shall be one test every one hundred (100) feet on each lift along a trench or as directed by the Engineer. Material failing to meet the required test shall be removed, replaced and retested at the Contractor's expense.

E. Deflection (Mandrel) Testing

PVC sewer lines suspect of excessive deflection will, when directed by the Engineer and at his option, be subjected to a mandrel test for deflection. Additionally, the mandrel test shall be performed on all PVC lines in accordance with ASTM D3034, F679, F949 or 2122.

Not before 30 days after pipe is laid and backfill placed, the Contractor shall, in the presence of the Engineer, test designated pipe for deflection. A mandrel, sized to permit up to 5.0% deflection, shall be used. Minimum diameters of mandrels used for their corresponding pipe size are as follows:

8" line=7.6" or 10" line=9.5" or 12" line=11.4"

The sequence for testing is as follows:

1. Completely flush the line making sure the pipe is clean of any mud or debris that would hinder the passage of the mandrel.

2. During the final flushing of the line, attach a floating block or ball to the end of the mandrel pull rope and float the rope through the line.

3. After the rope is threaded through the line, connect the pull rope to the mandrel and place the mandrel in the entrance of the pipe.

4. Connect a retrieval rope to the back of the mandrel to pull it back if necessary.

5. Remove all the slack in the pull rope and place a tape marker on the rope at the ends of the pipe where the mandrel will exit, determining the location of the mandrel in the line.

6. Draw mandrel through the sewer line.

7. If a section with excessive deflection is found, locate it; dig down and uncover the pipe; inspect the pipe, if any damaged pipe is found, replace it; if pipe is not damaged, replace and thoroughly tamp the haunching and initial backfill; replace remainder of backfill.

F. Television Testing

The sewer line to be TV inspected. The sewer line shall be flushed with clean water prior to TV inspection. The video shall be clear and of good quality. Contractor shall submit the video to Owner and Engineer for review.

## 3.10 CLEANUP

Remove all surplus materials, tools, excess dirt, rubbish, and debris from the site as installation progresses. Clean as directed by the Engineer. Obtain letter of approval from the State Highway Department covering work installed in areas of State Highway jurisdiction. Contractor to maintain surface of ditches, unpaved streets, road shoulders, sod, grass, and other disturbed surfaces for a period of thirty (30) days thereafter.

**END OF SECTION**

# SECTION 33 31 14

## TEMPORARY BYPASS PUMPING SYSTEM

## PART 1 GENERAL

### 1.01 SCOPE

A. Under this item the Contractor is required to furnish all materials, labor, equipment, power, maintenance, etc. to implement a temporary pumping system for the purpose of diverting the existing flow around the work area for the duration of the project.

B. The design, installation and operation of the temporary pumping system shall be the Contractor's responsibility. The Contractor shall employ the services of a vendor who can demonstrate to the engineer that he specializes in the design and operation of temporary bypass pumping systems. The vendor shall provide at least five (5) references of projects of a similar size and complexity as this project performed by his firm within the past three years. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction.

### 1.02 SUBMITTALS

The Contractor shall submit to the Engineer detailed plans and descriptions outlining all provisions and precautions to be taken by the Contractor regarding the handling of existing wastewater flows. This plan must be specific and complete, including such items as schedules, locations, elevations, capacities of equipment, materials and all other incidental items necessary and/or required to insure proper protection of the facilities, including protection of the access and bypass pumping locations from damage due to the discharge flows, and compliance with the requirements and permit conditions specified in these Contract Documents. No construction shall begin until all provisions and requirements have been reviewed by the Engineer.

A. Staging areas for pumps;

B. Sewer plugging method and types of plugs;

C. Number, size, material, location and method of installation of suction piping;

D. Number, size, material, method of installation and location of installation of discharge piping;

E. Bypass pump sizes, capacity, number of each size to be on site and power requirements;

F. Calculations of static lift, friction losses, and flow velocity (pump curves showing pump operating range shall be submitted);

G. Standby power generator size, location;

H. Downstream discharge plan;

I. Method of protecting discharge manholes or structures from erosion and damage;

J. Thrust and restraint block sizes and locations;

K. Sections showing suction and discharge pipe depth, embedment, select fill and special backfill;

L. Method of noise control for each pump and/or generator;

M. Any temporary pipe supports and anchoring required;

N. Design plans and computation for access to bypass pumping locations indicated on the drawings;

O. Calculations for selection of bypass pumping pipe size;

P. Schedule for installation of and maintenance of bypass pumping lines;

Q. Plan indicating selection location of bypass pumping line locations.

## 1.03 DESIGN REQUIREMENTS

A. Bypass pumping systems shall have sufficient capacity to pump peak flow. The Contractor shall provide all pipeline plugs, pumps of adequate size to handle peak flow, and temporary discharge piping to ensure that the total flow of the main can be safely diverted around the section to be repaired. Bypass pumping system will be required to be operated 24 hours per day.

B. The Contractor shall have adequate standby equipment available and ready for immediate operation and use in the event of an emergency or breakdown. One standby pump for each size pump utilized shall be installed at the mainline flow bypassing locations, ready for use in the event of primary pump failure.

## 1.04 PERFORMANCE REQUIREMENTS

A It is essential to the operation of the existing sewerage system that there be no interruption in the flow of sewage throughout the duration of the project. To this end, the Contractor shall provide, maintain and operate all temporary facilities such as dams, plugs, pumping equipment (both primary and back-up units are required), conduits, all necessary power, and all other labor and equipment necessary to intercept the sewage flow before it reaches the point where it would interfere with his work, carry it past his work and return it to the existing sewer downstream of his work.

B. The Contractor shall maintain sewer flow around the work area in a manner that will not cause surcharging of sewers, damage to sewers and that will protect public and private property from damage and flooding.

C. The Contractor shall protect water resources, wetlands and other natural resources.

# PART 2 PRODUCTS

## 2.01 EQUIPMENT

A. All pumps used shall be fully automatic self-priming units that do not require the use of foot-valves or vacuum pumps in the priming system. The pumps may be electric or diesel powered. All pumps used must be constructed to allow dry running for long periods of time to accommodate the cyclical nature of effluent flows.

B. The Contractor shall provide the necessary automatic stop/start controls with floats and autodailer for each pump.

C. The Contractor shall include one stand-by pump of each size to be maintained on site. Back-up pumps shall be on-line, isolated from the primary system by a valve.

D. Discharge Piping - In order to prevent the accidental spillage of flows all discharge systems shall be temporarily constructed of rigid pipe with positive, restrained joints (HDPE). Under no circumstances will aluminum "irrigation" type piping or glued PVC pipe be allowed. Discharge hose will only be allowed in short sections and by specific permission from the engineer.

E. The primary pump shall include a sound-attenuated canopy capable of maintaining a low noise level – at or below 72 dBA at 23 feet.

# PART 3 EXECUTION

## 3.01 PREPARATION

A. Contractor is responsible for locating any existing utilities in the area the Contractor selects to locate the bypass pipelines. The Contractor shall locate his bypass pipelines to minimize any disturbance to existing utilities and shall obtain approval of the pipeline locations from the City and the Engineer. All costs associated with relocating utilities and obtaining all approvals shall be paid by the Contractor.

B. During all bypass pumping operation, the Contractor shall protect the Pumping Station and main and all local sewer lines from damage inflicted by any equipment. The Contractor shall be responsible for all physical damage to the Pumping Station and main and all local sewer lines caused by human or mechanical failure.

## 3.02 INSTALLATION AND REMOVAL

A. The Contractor shall remove manhole sections or make connections to the existing sewer and construct temporary bypass pumping structures only at the

access location indicated on the Drawings and as may be required to provide adequate suction conduit.

B. Plugging or blocking of sewage flows shall incorporate a primary and secondary plugging device. When plugging or blocking is no longer needed for performance and acceptance of work, it is to be removed in a manner that permits the sewage flow to slowly return to normal without surge, to prevent surcharging or causing other major disturbances downstream.

C. When working inside manhole or force main, the Contractor shall exercise caution and comply with OSHA requirements when working in the presence of sewer gases, combustible or oxygen-deficient atmospheres, and confined spaces.

D. The installation of the bypass pipelines is prohibited in all saltmarsh/wetland areas. The pipeline must be located off streets and sidewalks and on shoulders of the roads. When the bypass pipeline crosses local streets and private driveways, the contractor must place the bypass pipelines in trenches and cover with temporary pavement. Upon completion of the bypass pumping operations, and after the receipt of written permission from the Engineer, the Contractor shall remove all the piping, restore all property to pre-construction condition and restore all pavement. The Contractor is responsible for obtaining any approvals for placement of the temporary pipeline within public ways from the City.

**END OF SECTION**

# SECTION 33 40 00

## STORM DRAINAGE PIPING

## PART 1 GENERAL

### 1.01 SCOPE

Furnish all labor, equipment, supplies, and materials and perform all operations in connection with construction of storm sewers as shown on the plans or specified. Construction shall be in accordance with the Georgia Department of Transportation Standard Specifications, Construction of Roads and Bridges, Latest Edition.

### 1.02 RELATED SECTIONS

A. Section 31 23 16 – Trench Excavation, and Backfill.

B. Section 33 05 13 - Manholes and Structures.

C. Section 03 31 00 - Cast-In-Place Concrete.

D. Section 03 41 00 - Precast Concrete Structures.

### 1.03 REFERENCES

A. AASHTO M 36/ASTM A 760 - Standard Specification for Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains; American Association of State Highway and Transportation Officials and Georgia Department of Transportation Standard Specifications, Section 844 latest Edition.

B. AASHTO M 170 - Standard Specification for Reinforced Concrete Pipe and Georgia Department of Transportation Standard Specifications, Section 843 latest Edition.

C. AASHTO M 190/ASTM A 849 - Standard Specification for Bituminous Coated Corrugated Steel Culvert Pipe and Georgia Department of Transportation Standard Specifications, Section 844 latest Edition.

D. AASHTO M 294 - Corrugated Polyethylene Pipe (12" through 48") and Georgia Department of Transportation Standard Specifications, Section 845 latest Edition.

E. ASTM C 14 - Standard Specification for Concrete Sewer, Storm Drain, and Culvert Pipe.

F. ASTM C 76 - Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.

G. ASTM C 443 - Standard Specification for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gasket.

H. ASTM F405 – Standard Specification for Corrugated Polyethylene Pipe and Fittings.

I. ASTM F667 – Standard Specification for large diameter Corrugated Polyethylene Pipe and Fittings.

J. ASTM 949 – Standard Specificaion for Poly(Vinyl Chloride) (PVC) Corrugated Sewer Pipe With a Smooth Interior and Fittings.

### 1.04 SUBMITTALS

Complete product data and engineering data, including shop drawings, shall be submitted to the Engineer in accordance with the requirements of Section 01 33 00 of the Contract Documents.

### 1.05 TRANSPORTATION AND HANDLING

A. Unloading: Furnish equipment and facilities for unloading, handling, distributing and storing pipe, fittings 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 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. Do not use chains in handling pipe, fittings and appurtenances.

### 1.06 STORAGE AND PROTECTION

A. Store all pipe which cannot be distributed along the route. Make arrangements for the use of suitable storage areas.

B. Stored materials shall be kept safe from damage.

C. 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.

## PART 2 PRODUCTS

### 2.01 PIPE MATERIALS

A. Reinforced Concrete Pipe (RCP): Shall conform to the requirements of AASHTO M 170, ASTM C 76, ASTM C 361; mesh reinforcement; bell and spigot end joints.

B. Corrugated Zinc Coated (Galvanized) Steel Pipe (CMP): Steel shall conform to the requirements of AASHTO M 36 and M 218 / ASTM A 760 and A 929. All pipe shall be 14 gauge unless otherwise noted on the plans.

C. Bituminous Coated Corrugated Metal Pipe (BCCMP): Galvanized corrugated, Federal Spec. QQ-C-806, fully bituminous coated .05" shall conform to the requirements of AASHTO M 190 / ASTM A 849 with paved inverts. All pipe shall be 14 gauge unless otherwise noted on the plans.

D. Aluminized Type 2 Corrugated Steel Pipe (ACSP): Type 2 Aluminized Steel shall conform to the requirements of AASHTO M 36 and M 274 / ASTM A 760 and ASTM A 929. All pipe shall be 14 gauge unless otherwise noted on the plans.

E. Corrugated Aluminum Alloy Pipe (CAAP): Aluminum Alloy Pipe shall conform to the requirements of AASHTO M 196 / ASTM B 745. All pipe shall be 14 gauge unless otherwise noted on the plans.

F. High Density Polyethylene Pipe (HDPE): Smooth interior, corrugated exterior HDPE storm sewer pipe meeting the requirements of AASHTO M 252, M 294 and MP7. The pipe shall be AASHTO Type 'S' (N-12) WT as manufactured by Advanced Drainage Systems, Inc. (ADS) for sizes 4” through 60” or approved equal.

G. Poly(Vinyl Chloride) (PVC): Smooth interior, corrugated exterior PVC storm sewer pipe shall conform to the requirements of ASTM F949, F794 and AASHTO M304. The pipe shall be A-2000 PVC belled as manufactured by CONTECH Construction Products Inc. for sizes 4” through 36” or approved equal.

H. All storm drainage pipe shall meet or exceed the Georgia Department of Transportation Standard Specification, Section 550 unless otherwise noted on the plans or within this specification.

## 2.02 PIPE ACCESSORIES

A. Pipe Joints: Mechanical clamp ring type, stainless steel expanding and contracting sleeve, neoprene ribbed gasket for positive seal and Reinforced Concrete Pipe Joint Device: Shall conform to the requirements of AASHTO M 198 / ASTM C 361, ASTM C 443. “O”-ring type rubber gasketed concrete joints.

B. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required.

All fittings shall conform to manufacturers specifications.

C. Filter Fabric: Non-biodegradable, woven.

D. Coupling Bands: Aluminized steel, 0.052 inches thick x 10 inches wide; connected with two neoprene "O" ring gaskets and two galvanized steel bolts and shall conform to the requirements of AASHTO M 36.

### 2.03 CATCH BASIN

A. Construction shall be in accordance with the Georgia Department of Transportation Standard Specifications, Section 668 latest Edition.

B. Lids and Drain Covers: Shall be cast iron.

C. Catch Basin: as shown on drawings, per Georgia Department of Transportation Standards and Details.

D. Shaft Construction and Concentric Cone Top Section: Reinforced precast concrete pipe sections ASTM C478, lipped male/female dry joints, nominal diameter of 48 inches.

E. Base Pad: Cast-in-place concrete of type specified in Section 03300 or 03305, leveled top surface to receive concrete shaft sections, sleeved to receive sewer pipe sections.

F. See Section 02532 Manholes and Covers for additional information on manhole steps, brick, mortar etc.

### 2.04 HEADWALLS AND END SECTIONS

Construction shall be in accordance with the Georgia Department of Transportation Standards and Details.

### 2.05 BEDDING AND COVER MATERIALS

Bedding and Cover: As specified in Section 31 23 16 - Trench Excavation and Backfill.

## PART 3 EXECUTION

### 3.01 EXISTING UNDERGROUND UTILITIES AND OBSTRUCTIONS

A. The plans indicate utilities and obstructions that are known to exist according to the best information available to the Owner.

B. Existing Utility Location: The following steps shall be exercised to avoid interruption of existing utility service.

1. Expose the facility, for a distance of at least 100 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.

2. Avoid utility damage and interruption by protection with means or methods recommended by the utility owner.

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 piping does not permit safe installation of the piping 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 piping to avoid horizontal conflicts if the new alignment complies with regulatory agency requirements and after a written request to and subsequent approval by the Engineer. Where such relocation of the piping is denied by the Engineer, the Contractor shall arrange to have the utility, main, or service relocated.

2. Vertical Conflict: Vertical conflict shall be defined as when the actual vertical separation between a utility, main, or service and the proposed piping does not permit the crossing without immediate or potential future damage to the utility, main, service, or the piping. The Contractor may change the proposed grade of the piping 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 Engineer.

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 Storm Sewer Separation

1. Potable water mains should maintain a minimum 10 foot edge-to-edge separation from storm sewer lines.

2. Where storm sewers cross the water main, the pipe joint adjacent to the pipe crossing the water main shall be cut to provide maximum separation of the pipe joints from the storm sewer.

3. No water main shall pass through, or come in contact with, any part of a storm sewer manhole.

## 3.02 TRENCHING

See Section 31 23 16 - Trench Excavation and Backfill for minimum requirements.

## 3.03 INSTALLATION - PIPE

A. Verify that trench cut is ready to receive work and excavations, dimensions, and elevations are as indicated on construction plans.

B. Install pipe, fittings, and accessories in accordance with manufacturer's

instructions. Seal watertight.

C. Lay pipe to slope gradients noted on construction plans; with maximum variation from true slope of 1/8 inch in 10 feet.

D. Reinforced Concrete Pipe shall be installed in accordance with applicable provisions of the American Concrete Pipe Association (ACPA). RCP shall be installed on a Class C bedding as specified in Section 31 23 16.

E. Bituminous Coated Corrugated Metal Pipe (BCCMP), Aluminized Type 2 Corrugated Steel Pipe (ACSP) and Corrugated Aluminum Alloy Pipe (CAAP) shall be installed on a Class B bedding as specified in Section 31 23 16.

F. High Density Polyethylene Pipe (HDPE) shall be installed on a Class B bedding as specified in Section 31 23 16.

G. Poly(Vinyl Chloride) (PVC) PIPE shall be installed on a Class B bedding as specified in Section 31 23 16.

## 3.04 INSTALLATION - CATCH BASINS AND MANHOLES

A. Form bottom of excavation clean and smooth to correct elevation.

B. Form and place cast-in-place concrete base pad, with provision for storm sewer pipe end sections.

C. All structures shall be placed on an 8-inch subbase of No. 57 stone.

D. Level top surface of base pad; sleeve concrete shaft sections to receive storm sewer pipe sections.

E. Establish elevations and pipe inverts for inlets and outlets as indicated.

F. Mount lid and frame level in grout, secured to top cone section to elevation indicated.

## 3.05 FIELD QUALITY CONTROL

A. Perform field inspection and testing as directed by the engineer.

B. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to owner.

## 3.06 PROTECTION

Protect pipe and bedding cover from damage or displacement until backfilling operation is in progress.

**END OF SECTION**