CONTRACT DOCUMENTS
AND
SPECIFICATIONS

PUBLIC WORKS VEHICLE MAINTENANCE FACILITY

FOR
THE CITY OF SOCIAL CIRCLE

PREPARED ON BEHALF OF
THE HONORABLE MAYOR AND COUNCIL
OF
THE CITY OF SOCIAL CIRCLE, GEORGIA

MAYOR ---------- **David Kenner**

COUNCIL MEMBER ---------- **Traysa Price**

COUNCIL MEMBER ---------- **Tyson Jackson**

COUNCIL MEMBER ---------- **Adam Conavay**

COUNCIL MEMBER ---------- **Steve Shelton**

CITY MANAGER ---------- **Eric Taylor**

CITY CLERK ---------- **Susan Roper**

CITY ATTORNEYS ---------- **Anthony O.L. Powell**
Jay Crowley

MARCH 2026

PROJECT NO. 242774

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MARCH 2026

PROJECT NO. 242774

Prepared by:

CONTRACT DOCUMENTS
AND
SPECIFICATIONS

PUBLIC WORKS VEHICLE MAINTENANCE FACILITY
FOR
THE CITY OF SOCIAL CIRCLE

SPECIFICATIONS

END OF SECTION

SECTION 00020
REQUEST FOR PROPOSAL
CITY OF SOCIAL CIRCLE, GEORGIA
PUBLIC WORKS VEHICLE MAINTENANCE FACILITY
FOR THE
CITY OF SOCIAL CIRCLE, GEORGIA

Proposals: for the Public Works Vehicle Maintenance Facility will be received at the City Manager's Office of Social Circle City Hall located at 166 North Cherokee Road, Social Circle, GA 30025, until 10:00 A.M. Thursday April 23, 2026. The project consists of:

Construction of Vehicle Maintenance (Fleet) Facility for Social Circle Public Works Department.

Proposals will be reviewed by the City and will be awarded to the proposal most advantageous to the City. A copy of the proposal tabulation will be provided upon request.

Work to Be Done: The work to be performed consists of but is not limited to the following major items:

1. All applicable site work for clearing, grading, and filling subject property
2. Paving for roads and parking areas and building pads
3. All applicable utilities
4. Construction of Vehicle Maintenance Facility and other truck sheds
5. Erosion Control Measures
6. Work to be completed within 365 consecutive calendar days.

Specifications and Contract Documents: Digital copies of the plans and specifications may be obtained from the City of Social Circle's website or from Turnipseed Engineers website at https://turnipseed.com/current-projects/out-for-bid.

The street address, phone number, and email of contractors submitting proposals must be provided to ensure prompt delivery of any addenda.

All Bidders must have a State of Georgia General Contractor License.

All proposals shall be accompanied by a Bid Bond drawn in favor of Social Circle, Georgia, in the amount of at least 5% of the lump sum bid for the complete work; such Bid Bond representing that the Bidder, if awarded the contract, will promptly enter into a contract and furnish Performance Bond and Payment Bond as provided by law and approved by the Attorney for Social Circle, Georgia. Each bond shall be equal to 100% of the contract amount. The Bid Bond shall be forfeited to Social Circle, Georgia as liquidated damages if the Bidder fails to execute the contract and provide Performance and Payment Bonds within ten (10) days after being notified that he has been awarded the contract.

The Owner reserves the right to reject any or all proposals, to waive informalities, and to re-advertise.

City of Social Circle
By:
Robbie Groves

SECTION 00100

INSTRUCTIONS TO BIDDERS

1. **Intent**: It is intended that the Instructions to Bidders, General Conditions, Detailed Specifications and the Contract Drawings shall define and describe the complete work to which they relate.

2. **Definitions**: Where the following words or the pronouns used in their stead herein, they shall have the following meaning:

"**Owner**" shall mean the City of Social Circle, Georgia, or its authorized and legal representatives.

"**Engineer**" shall mean the City of Social Circle, Georgia, or its authorized and legal representatives.

"**Contractor**" shall mean the party of the second part to the Contract Agreement or the authorized and legal representative of such party.

"**Contract Time**" shall mean Three Hundred Sixty Five (365) consecutive calendar days for completion of the work, to be computed from the date of the Notice to Proceed.

"**Liquidated Damages**" shall mean the sum of Six Hundred Dollars ($600.00) which the Bidder agrees to pay for each consecutive working day beyond the Contract Time required to complete the work.

"**Products**" shall mean materials or equipment permanently incorporated into the work.

"**Provide**" shall mean to furnish and install.

"**Working Day**" shall generally mean weekdays, Monday through Friday, inclusive. Each week shall include five (5) working days. Each working day shall be eight (8) hours duration. Nationally recognized holidays shall not be considered working days. **NO EXCEPTION, EXTENSION OR ADDITIONAL PAYMENT SHALL BE MADE FOR ANY WEATHER RELATED DELAY. NO RAIN OR OTHER WEATHER RELATED EVENTS SHALL ADD TO THE DURATION OF THE CONTRACT.**

3. Registered Bidder: Is the company or party that has obtained a set of specifications and contract documents with the purpose of participating in the bid for the Public Works Vehicle Maintenance Facility project.

Work to Be Done: The work to be performed by the General Contractor consists of but is not limited to the following major items:

1. All applicable site work for clearing, grading, and filling subject property
2. Paving for roads and parking areas and building pads
3. All applicable utilities
4. Construction of Vehicle Maintenance Facility and other truck sheds
5. Erosion Control Measures
6. Work to be completed within 365 consecutive calendar days.

4. Addenda and Interpretations: No interpretation of the meaning of the Drawings, Specifications or other bid documents will be made to any bidder orally. Every request for such interpretation should be made in writing and addressed to Turnipseed Engineers, 4210 Columbia Road, Building 3, Augusta, Georgia 30907, and to be given consideration, must be received at least five (5) days prior to the date fixed for the opening of bids. Any and all such interpretations and any supplemental instructions will be in the form of written Addenda to the "Specifications" which, if issued, will be mailed to all prospective bidders (at the respective addresses furnished) not later than three (3) days prior to the date fixed for the opening of bids. Failure of a bidder to receive any Addendum shall not relieve him of any obligation under his bid. All Addenda shall become part of the Contract Documents.

5. Substitutions: Whenever the design is based on a specific product of a particular manufacturer, that manufacturer will be shown on the Drawings and/or listed first in the list of approved manufacturers in the Specifications. Substitutions will be considered only if the term "Equal To" precedes the names of approved manufacturers in the Specification. The Contractor may, after receiving the Notice to Proceed, submit shop drawings on the substitute product for the approval of the owner.

Any bidder intending to furnish substitute products is cautioned to verify that the item being furnished will perform the same functions and have the same capabilities as the item specified. The Bidder should include in his bid the cost of accessory items which may be required by the substitute product and the cost of any architectural, structural, mechanical, piping, electrical or other modifications required to accommodate the substitution.

Approval of the Owner is dependent on the determination that the product offered is essentially equal in function, performance, quality of manufacture, ease of maintenance, reliability, service life and other criteria to that on which the design is based, and will require no major modifications to structures, electrical systems, control systems, or piping systems.

6. Site Examination: The Bidder is advised to examine the locations of the work and to inform himself fully as to its conditions, the conformation of the ground, the character, quality and quantity of the products needed preliminary to and during the execution of the work; the general and local conditions and all other matters which can in any way affect the work to be done under the Contract. The Plans are based on field run survey provided by the City of Social Circle, accuracy of this information shall be verified by the Bidder. Failure to examine the site will not relieve the successful bidder of his obligation to furnish all products and labor necessary to carry out the provisions of his contract.

The Bidder shall notify the Owner of the date and time he proposes to examine the location of the work. The Bidder shall confine his examination to the specific areas designated for the proposed construction, including easements and public right-of-ways. If, due to some unforeseen reason, the Owner's proceedings for obtaining the proposed construction site (including easements), have not been completed, the Bidder may enter the site only with the express consent of the property owner. The Bidder is solely responsible for any damages caused by his examination of the site.

7. Subcontractors, Equipment and Material Bids: The Bidders shall conform to the four hour bid limit in accordance with the "Procedure for Giving and Receiving Bids on Subcontracts, Equipment and Materials", as adopted by the Georgia Utility Contractor's Association.

8. Proposals: All Proposals must be made on the Proposal forms contained herein. Proposals shall be completed in ink and shall not be detached from these Specifications. The Proposals shall be enclosed in a sealed envelope, addressed to the City of Social Circle, Georgia and labeled **PUBLIC WORKS VEHICLE MAINTENANCE FACILITY, CITY OF SOCIAL CIRCLE, GEORGIA"**. Envelopes containing Proposals shall clearly indicate the Bidder's name and address**. Only proposals submitted by registered Bidders will be opened.**

9. Bid and Contract Security: Each Proposal must be accompanied by a BID BOND in an amount equal to at least **five percent (5%)** of the amount bid. The BID BOND must be attached to the Proposal for the Proposal to be valid. Checks of any type will not be acceptable. As soon as the BID prices have been compared, the OWNER will return the BONDS of all except the three lowest responsible BIDDERS. When the AGREEMENT is executed the bonds of the two remaining unsuccessful BIDDERS will be returned. The BID BOND of the successful BIDDER will be retained until the PAYMENT BOND and PERFORMANCE BOND have been executed and approved, after which it will be returned.

The party to whom the contract is awarded will be required to execute the AGREEMENT and obtain the PERFORMANCE BOND and PAYMENT BOND within ten {10} calendar days from the date when NOTICE OF AWARD is delivered to the BIDDER. The NOTICE OF AWARD shall be accompanied by the necessary AGREEMENT and BOND forms. In case of failure of the BIDDER to execute the AGREEMENT, the OWNER may consider the BIDDER in default, in which case the BID BOND accompanying the proposal shall become the property of the OWNER.

The OWNER within ten {10} days of receipt of acceptable PERFORMANCE BOND, PAYMENT BOND and AGREEMENT signed by the party to whom the AGREEMENT was awarded shall sign the AGREEMENT and return to such party an executed duplicate of the AGREEMENT. Should the OWNER not execute the AGREEMENT within such period, the BIDDER may by WRITTEN NOTICE withdraw the signed AGREEMENT. Such notice of withdrawal shall be effective upon receipt of the notice by the OWNER.

The NOTICE TO PROCEED shall be issued within ten {10} days of the execution of the AGREEMENT by the OWNER. Should there be reasons why the NOTICE TO PROCEED cannot be issued within such period, the time may be extended by mutual AGREEMENT between the OWNER and CONTRACTOR. If the NOTICE TO PROCEED has not been issued within the ten {10} day period or within the period mutually agreed upon, the CONTRACTOR may terminate the AGREEMENT without further liability on the part of either party.

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

A conditional or qualified BID will not be accepted.

If for any reason whatsoever the Bidder withdraws from the competition after opening the bids, or if he refuses to execute the Contract, the Owner will proceed on the BID BOND.

The Surety of the BID BOND, PERFORMANCE BOND, and PAYMENT BOND shall be a surety company authorized to do business in the State of Georgia, shall be listed in the Department of the Treasury Circular 570, and shall have an underwriting limitation in excess of 100% of the bid amount. The Bonds and Surety shall be subject to approval by the Attorney for the Owner.

Attorneys-in-fact who sign bid bonds or contract bonds must file with each bond a certified and effectively dated copy of their power of attorney.

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

Further, the BIDDER agrees to abide by the requirements under executive Order No. 11246, as amended, including specifically the provisions of the equal opportunity clause.

10. Right To Reject Proposals: The Owner reserves the right to reject any or all proposals and to waive informalities. No proposals will be received after the time set for opening Proposals. Any unauthorized conditions, limitations or provisions attached to the Proposal, except as provided herein, will render it informal and may cause its rejection. Unbalanced proposals will be subject to rejection. Any bidder may withdraw his proposal, either personally or by telegraphic or written request, at anytime prior to the scheduled closing time for receipt of proposal. Telegraphic or written request for withdrawal must be in the possession of the Owner prior to the closing time for receipt of proposals.

11. Determination of Successful Bidder: The Contract will be awarded to the lowest, responsive, and responsible contractor submitting a proposal.

(a) Lowest Bids: The lowest bid will be determined by the addition of a Bidder's Proposal amounts listed in the proposal.

(b) Responsibility: The determination of the bidder's responsibility will be made by the Owner based on whether the bidder:

(1) maintains a permanent place of business,

(2) has the appropriate technical experience,

(3) has adequate plant and equipment to do the work properly and expeditiously, and

(4) has suitable financial means to meet obligations incidental to the work.

(c) Responsiveness: The determination of responsiveness will be made by the Owner based on a consideration of whether the bidder has submitted a complete Proposal form without irregularities, excisions, special conditions, or alternative bids for any item unless specifically requested in the Proposal form.

END OF SECTION

SECTION 00300

PROPOSAL

TO THE CITY OF SOCIAL CIRCLE, GEORGIA

FOR

PUBLIC WORKS VEHICLE MAINTENANCE FACILITY

Submitted: _____, 20____

The undersigned, as Bidder, hereby declares that the only person or persons interested in the Proposal as principal or principals is or are named herein and that no other person than herein mentioned has any interest in this Proposal or in the Contract to be entered into; that this Proposal is made without connection with any other person, company or parties making a bid or Proposal; and that it is in all respects fair and in good faith without collusion or fraud.

The Bidder further declares that he has examined the site of the work and informed himself fully in regard to all conditions pertaining to the place where the work is to be done; that he has examined the Drawings and the Specifications for the work and contractual documents relative thereto, and has read all instructions to Bidders and General Conditions furnished prior to the opening of bids; that he has satisfied himself relative to the work to be performed.

The Bidder proposes and agrees, if this Proposal is accepted, to Contract with the City of Social Circle, Georgia, in the form of Contract specified, to furnish all necessary products, machinery, tools, apparatus, means of transportation and labor necessary to complete the construction of the work in full and complete accordance with the shown, noted and reasonably intended requirements of the Specifications and Contract Documents to the full and entire satisfaction of the City of Social Circle, Georgia with a definite understanding that no money will be allowed for extra work except as set forth in the attached General Conditions and Contract Documents. The Bidder acknowledges that the work will be performed under contract for the amounts stated in this Bid Proposal.

Contractors are required to submit Bid Bond, Payment Bond, and Performance Bonds in the exact form as outlined herein.

The Bidder acknowledges receipt of the following addendum:

_____

_____

_____

_____

_____

_____

_____

_____

CITY OF SOCIAL CIRCLE, GEORGIA
PUBLIC WORKS VEHICLE MAINTENANCE FACILITY

For furnishing all materials and equipment and performing all labor necessary for construction of Vehicle Maintenance (Fleet) Facility for Social Circle Public Works Department as shown on the Drawings and as specified for the following unit prices and approximate quantities shown.

Item 1: PROPOSED SITE IMPROVEMENTS AND BUILDING CONSTRUCTION

For furnishing all equipment and performing all labor necessary for constructing the Site Improvements and Building Construction as shown on the bid drawings. Said improvements include (but are not limited to), erosion control measures, debris removal, grading, pavement, utilities, final stabilization, construction of fleet facility and truck sheds.

DOLLARS ($_____)

ITEM NO.	QTY.	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
2.	2,000	TON	Debris Removal - Additional debris removed will be at the same rate. Anything less than 2,000 tons will be credited to the Owner.		

Item 3: PROPOSED FUELING STATION

Equipment and Manufacturer		PRICE	BASE PRICE
Fuel Pump Station - Section 12			
Mfr.	Enviropro		
Mfr.			
Mfr.			

TOTAL AMOUNT BID, ITEMS 1 THRU 3, INCLUSIVE, THE AMOUNT OF:

DOLLARS ($_____)

Amounts are to be shown in numbers only. It is understood that the estimated quantities in the Bid Proposal are approximate and are used only for comparison of bids, and are subject to increase or decrease as required to properly complete the Contract work. Low bidder shall be determined on the basis of the TOTAL BID PRICE. Furthermore, the Contractor shall be responsible for including all items required to perform the project as indicated on the plans and specifications and including all costs into the most appropriate unit prices, if not explicitly described in the Payment paragraph of each section.

The Bidder agrees hereby to commence work under this contract, with adequate personnel and equipment, on a date to be specified in a written order of the Engineer, and to fully complete all Work under this Contract within Three Hundred Sixty Five (365) consecutive calendar days from and including said date. Bidder further agrees to pay as liquidated damages, the sum of $600.00 for each consecutive calendar day thereafter required to complete all work as heretofore provided in the Instructions to Bidders.

The Bidder declares an understanding that the quantities shown for unit price items are subject to either increase or decrease, and that should the quantities of any of the items of Work be increased, the Bidder proposes to do the additional Work at the unit prices stated herein; and should the quantities be decreased, the Bidder also understands that payment will be made on the basis of actual quantities at the unit price bid and will make no claim for additional costs or anticipated profits for any decrease in quantities; and that actual quantities will be determined upon completion of work, at which time adjustment will be made to the Contract amount by direct increase or decrease.

ALTHOUGH THE CONTRACT PRICE MAY BE DECREASED IF THE QUANTITIES OR UNITS DECREASE, THE CONTRACT PRICE MAY NOT BE INCREASED BY MORE THAN TWO THOUSAND DOLLARS ($2,000.00) WITHOUT WRITTEN APPROVAL OF MAYOR AND COUNCIL IN ADVANCE OF PERFORMING THE WORK OR PROVIDING THE MATERIALS.

In case of discrepancies between the figures shown in the unit prices and the totals, the unit prices shall apply and the totals shall be corrected to agree with the unit prices.

The Bidder furthermore agrees that, in the case of a failure to execute the Contract Agreement and Bonds within ten days after receipt of conformed Contract Documents for execution, the attached Bid Bond accompanying this Bid and the moneys payable thereon shall be paid into the funds of the Owner as liquidated damages for such failure.

BIDDER: _____

By: _____

Name: _____
(Please Print)

Title: _____

Address: _____

Phone: _____

ATTEST: _____

Name: _____
(Please Print)

Title: _____

Note: If the Bidder is a corporation, the Bid shall be signed by an officer of the corporation; if a partnership, it shall be signed by a partner. If signed by others, authority for signature shall be attached.

Note: Attest for a corporation must be by the corporate secretary; for a partnership by another partner; for an individual by a notary.

The full names and addresses of persons or parties interested in the foregoing Bid, as principals, are as follows:

NAME **ADDRESS**

_____
_____
_____
_____

END OF SECTION

SECTION 00410

BID BOND

STATE OF GEORGIA

COUNTY OF WALTON

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

WHEREAS, the Principal has submitted to the Owner a Proposal for PUBLIC WORKS VEHICLE MAINTENANCE FACILITY.

NOW THEREFORE, the conditions of this obligation are such that if the Bid be accepted, the Principal shall within ten (10) days after receipt of conformed Contract Documents execute a Contract in accordance with the Bid upon the terms, conditions and prices set forth therein, and in the form and manner required by the Owner and execute a sufficient and satisfactory Performance Bond and Payment Bond payable to the Owner, each in an amount of one hundred percent (100 %) of the total Contract Price, in form and with security satisfactory to the Owner, or in the event of the failure of the Contractor to execute and deliver the Contract Agreement and give said Performance and Payment Bonds, the Contractor shall pay the Owner the difference not to exceed the dollar amount stated above between the amount specified in said Proposal and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said Proposal, and execute the Special Assurances form, then this obligation shall be void; otherwise, it shall be and remain in full force and virtue in law; and the Surety shall, upon failure of the Principal to comply with any or all of the foregoing requirements within the time specified above, immediately pay to the aforesaid owner, upon demand, the amount hereof in good and lawful money of the United States of America, not as a penalty, but as liquidated damages.

This bond is given pursuant to and in accordance with all laws of the State of Georgia applicable hereto are hereby made a part hereof to the same extent as if set out herein in full.

IN WITNESS WHEREOF, the said principal has hereunder affixed its signature and said Surety has hereunto caused to be affixed its corporate signature and seal, by its duly authorized officers, on this _____ day of _____ , 20__.

PRINCIPAL_____

Signed and sealed in the presence of:

1. _____

By: _____

Title:_____

2. _____

By:_____

Title:_____

SURETY: _____

Signed and sealed in the presence of:

1. _____

By:_____

Title:_____

2. _____

By:_____

Title:_____

IMPORTANT - Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state of Georgia.

END OF SECTION

SECTION 00420

STATEMENT OF BIDDER'S QUALIFICATIONS

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

1. Name of Bidder:

2. Permanent main office address:

3. When organized:

4. If a Corporation, where incorporated:

5. How many years have you been engaged in the contracting business under your present firm or trade name?

6. Contracts on hand: (Schedule these, showing amount of each contract and the appropriate anticipated dates of completion. Attach copy of the contracts on hand).

7. General description of work performed by your company. Attach copy.

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

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

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

11. Experience in construction work similar in importance to this project. Attach copy.

12. Background and experience of the principal members of your organization, including officers: Attach copy

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

Dated this _____ day of _____, 20__.

_____
(Name of Bidder)

By: _____

Title: _____

State of _____

County of _____

_____ being duly sworn deposes and says that he or she is _____ of _____ and that the answers to the foregoing questions and all statements therein contained are true and correct. Subscribed and sworn to before me this _____ day of _____, 20__.

_____
(Notary Public)
My Commission Expires:

_____ (SEAL)
(Date)

END OF SECTION

SECTION 00480

NONCOLLUSION AFFIDAVIT OF PRIME BIDDER

STATE OF _____

COUNTY OF _____

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

1. He is _____ of_____

   _____, the Bidder that has submitted the attached Bid;

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

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

4. Neither the said Bidder nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affiant, has in any way colluded, conspired, connived or agreed, directly or indirectly with any other Bidder, firm or person to submit a collusive or sham Bid in connection with the Contract for which the attached Bid has been submitted or to refrain from bidding in connection with such Contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other Bidder, firm or person to fix the price or prices in the attached Bid or of any other Bidder, or to fix any overhead, profit or cost element of the Bid price or the Bid price of any other Bidder, or to secure through any collusion, conspiracy, connivance, or unlawful agreement any advantage against the **City of Social Circle, Georgia** (Owner) or any person interested in the proposed Contract; and

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

_____
(Signature of Bidder)

_____
(Printed Name)

_____
(Title)

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

_____(Notary)

My Commission expires _____

The Contractor shall not execute an agreement with any subcontractor or permit any subcontractor to perform any work included in this contract until he has submitted a noncollusion affidavit from the subcontractor in substantially the form below and has received written approval of such subcontractor from the Owner.

END OF SECTION

SECTION 00490

NONCOLLUSION AFFIDAVIT OF SUBCONTRACTOR

STATE OF_____

COUNTY OF_____

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

1. He is (owner, partner, agent) _____ of _____ _____, hereinafter referred to as the "Subcontractor";

2. He is fully informed respecting the preparation and contents of the subcontractor's Proposal submitted by the subcontractor to _____, the Contractor for certain work in connection with the Contract pertaining to the construction of PUBLIC WORKS VEHICLE MAINTENANCE FACILITY.

3. Such subcontractor's Proposal is genuine and is not a collusion or sham proposal;

4. Neither the subcontractor nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affiant, has in any way colluded, conspired, connived, or agreed, directly or indirectly, with any other Bidder, firm or person to submit a collusive or sham Proposal in connection with such Contract or to refrain from submitting a Proposal in connection with such Contract, or has in any manner, directly or indirectly, sought by unlawful agreement or connivance with any other Bidder, firm or person to fix the price or prices in said subcontractor's Proposal, or to secure against the **City of Social Circle, Georgia** (Owner) or any person interested in the proposed Contract; and

5. The price or prices quoted in the subcontractor's Proposal are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees, or parties in interest, including this affiant.

_____
(Signature)

_____
(Printed Name)

_____
(Title)

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

_____
(Notary)

My Commission expires _____

END OF SECTION

SECTION 00500

CONTRACT AGREEMENT

This Agreement made and entered into on the _____ day of _____, 20__ by and between the **City of Social Circle**, Georgia, party of the first part (hereinafter called the "Owner"), and _____, party of the second part, (hereinafter called the "Contractor"),

WITNESSETH:

That the Contractor, for the consideration hereinafter fully set out hereby agrees with the Owner as follows:

1. That the Contractor will furnish all products, tools, construction equipment, skill, and labor of every description necessary to carry out and to complete the PUBLIC WORKS VEHICLE MAINTENANCE FACILITY in a good, firm, substantial and workmanlike manner the construction of but is not limited to the following major items:

    1. All applicable site work for clearing, grading, and filling subject property
    2. Paving for roads and parking areas and building pads
    3. All applicable utilities
    4. Construction of Vehicle Maintenance Facility and other truck sheds
    5. Erosion Control Measures
    6. Work to be completed within 365 consecutive calendar days.

2. The term "CONTRACT DOCUMENTS" means and includes the following:

SECTION 0 BIDDING AND CONTRACT REQUIREMENTS

00020 Advertisement for Bids
00100 Instructions to Bidders
00300 Bid Proposal
00410 Bid Bond
00420 Statement of Bidder's Qualifications
00480 Noncollusion Affidavit of Prime Bidder
00490 Noncollusion Affidavit of Subcontractor
00500 Contract Agreement
00510 Notice of Award
00520 Notice to Proceed
00610 Performance Bond
00620 Payment Bond
00700 General Conditions
00800 Supplemental General Conditions
00805 Special Assurances
00830 U.S. Department of Agriculture
00850 Certificate of Owners Attorney
00900 Pay Request Form 1
00910 Contract Change Order

SECTION 1 GENERAL REQUIREMENTS

1.01 Location
1.02 Work to be Done
1.03 Schedule of Work
1.04 Drawings
1.05 Specifications

3. The following drawings and specifications are part of this contract:

PLANS
SOCIAL CIRCLE PUBLIC WORKS DEPARTMENT
NEW FLEET FACILITY

PLANS
CITY OF SOCIAL CIRCLE, GEORGIA
PUBLIC WORKS BUILDING – LAND DISTURBING PLAN

PROJECT MANUAL
SOCIAL CIRCLE FLEET FACILITY

CONTRACT DOCUMENTS AND SPECIFICATIONS
PUBLIC WORKS VEHICLE MAINTENANCE FACILITY

4. That the Contractor shall commence the work to be performed under this Agreement on a date to be specified in a written Notice to Proceed and shall fully complete all work within Three Hundred Sixty Five (365) consecutive calendar days. Time is of the essence and is an essential element of this Contract, and the Contractor shall pay to the Owner, not as a penalty, but as liquidated damages, the sum of Six Hundred Dollars ($600.00) for each working day that he shall be in default of completing the work within the time limit named herein. The Owner shall consider extensions to the Contract Time only if a formal request for extension is submitted in writing with back-up information, and the extension is due to circumstances beyond the Contractor's control. If the Contractor abandons the Contract before commencement of the work or defaults in completion of all the work after commencement thereof, the Contractor shall be liable for such liquidated damages. These fixed liquidated damages are not established as a penalty but are calculated and agreed upon in advance by the Owner and the Contractor due to the uncertainty and impossibility of making a determination as to the actual and consequential damages incurred by the Owner and the general public of the City of Social Circle, Georgia, as a result of the failure on the part of the Contractor to complete the work on time. Such liquidated damages referred to herein are intended to be and are cumulative and shall be in addition to every other remedy now or hereafter enforceable at law, in equity, by statute, or under the Contract.

5. The Owner hereby agrees to pay to the Contractor for the faithful performance of this Agreement, subject to additions and deductions as provided in the Specifications and Proposal, in lawful money of the United States the sum of _____ _____ _____ _____ _____ _____ _____ _____ _____ ____ ____ ____ _____ ___ _____ ____ _____ _____ ____ _____ _____ ___ _____ ____ ____ ____ ____ ____ ___ _____ ____ __ _____ _____ _____ ____ _____ ____ ___ ___ _____ _____ _____ _____ ____Dollars (_$____ _____ _____ _____ _____) which sum shall also pay for all loss or damage arising out of the nature of the work aforesaid, or from the action of the elements, or from unforeseen obstructions or difficulties encountered in the execution of the work, and for all expenses incurred by, or in consequence of the work, its suspension or discontinuance, and for well and faithfully completing the work and the whole thereof, as herein provided, and for replacing defective work or products for a period of one year after completion.

6. The Owner shall make monthly partial payments to the Contractor in accordance with the provisions of the Contract Documents.

7. Contractor shall perform all the work for this project, in accordance with the provisions of the Contract Documents.

8. This contract is conditioned on both parties' compliance with the requirements of O.C.G.A. § 13-10-91. The City of Social Circle employs 100 or more employees, and is in compliance with O.G.C.A. § 13-10-91. Contractor hereby states that it has complied with the requirements of O.G.C.A. § 13-10-91, as attested to by

the attached affidavit, and will obtain the employee-number category and eligibility verification from all subcontracts it uses regarding this project.

Sample affidavits for contractors and subcontractors are attached hereto as EXHIBIT "A" and EXHIBIT "B" respectively.

9. It is further mutually agreed between the parties hereto that if, at any time after the execution of this Agreement and the surety bonds hereto attached for its faithful performance, the Owner shall deem the sureties upon such bond to be unsatisfactory, or if, for any reason, such bond ceases to be adequate to cover the performance of the work, the Contractor shall, at his expense, within five (5) days after the receipt of notice from the Owner to do so, furnish an additional bond or bonds in such form and amount, and with such surety or sureties as shall be satisfactory to the Owner. In such event, no further payment to the Contractor shall be deemed to be due under this Agreement until such new or additional security for the faithful performance of the work shall be furnished in manner and form satisfactory to the Owner.

10. Disputes arising out of this contract shall be heard in the superior courts of Walton County, Georgia. The Owner and Contractor agree that jurisdiction and venue are proper in the superior courts of Walton County, Georgia, exclusively, and they hereby waive any defenses they may have to improper venue, lack of jurisdiction over their person, and lack of subject matter jurisdiction.

11. This agreement constitutes the entire agreement between the parties and supercedes all prior agreements or understandings between the parties.

12. In case any one or more of the provisions contained in this agreement shall for any reason be held to be invalid, illegal, or unenforceable in any respect, the invalidity, illegality or unenforceablility shall not affect the other provisons, and the remaining provisions of this agreement shall be given full effect.

13. The Contractor agrees to indemnify Owner and hold Owner and its agents and employees harmless from and against all actions, causes of action, suits, liabilities, claims, damages, losses, costs and expenses (including attorney's fees and costs) arising out of or resulting from (a) any act or omission of Contractor in the performance or non-performance of the Work or its obligations hereunder, (b) any breach of contract by Contractor, and (c) any claim for injury to person or property arising out of, or in the course of, the Work as contemplated by this Contract. The parties hereto agree that the terms of this Paragraph 5 shall survive any termination or expiration of the Contract.

    In any and all claims against the Owner, or any of their agents or employees, by any employee of the Contractor, any subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any subcontractor under workmen's compensation acts, disability benefit acts or other employee benefits acts.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement under their respective seals on the day and date first above written in six (6) counterparts, each of which shall without proof or accounting for the other counterparts, be deemed an original Contract.

CITY OF SOCIAL CIRCLE, GEORGIA

By: _____

Name: _____

Title: _____Seal

Attest: _____

Name: _____

Title:
_____

Approved As to Form Before Execution:

By: _____
Attorney for the Owner

Name:_____

CONTRACTOR:

By:_____

Name: _____

Title: _____Seal

Attest: _____

Name: _____

Title: _____

Signed and Sealed in the presence of:

By: _____
Notary Public

NOTE: If the Contractor is a corporation, the Agreement shall be signed by the President or Vice President, attested by the Secretary and the corporate seal affixed. If the Contractor is a partnership, the Agreement shall be signed in the partnership name by one of the partners, with indication that he is a general partner.

EXHIBIT "A"

CONTRACTOR AFFIDAVIT AND AGREEMENT

By executing this affidavit, the undersigned contractor verifies its compliance with O.G.C.A. § 13-10-91, stating affirmatively that the individual, firm, or corporation which is contracting with the City of Social Circle has registered with and is participating in the Employment Eligibility Verification (EEV)/Basic Pilot Program, or E-Verify, in accordance with the applicability provisions and deadlines established in O.G.C.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 Social Circle, contractor will secure from such subcontractor(s) similar verification of compliance with O.G.C.A. § 13-10-91 via sworm affidavit attesting to compliance. Contractor further agrees to maintain records of such compliance and provide a copy of each such verification to the City of Social Circle at the time the subcontractor(s) is retained to perform such service.

_____
EEV/Basic Pilot Program User Identification Number

Sworn to and subscribed
before me this _____ day
of _____, 20__.

_____ _____ _____
Notary Public Signature Date

_____
Printed Name

_____
My Commission Expires: Entity

_____
Title of Officer or Agent

EXHIBIT "B"

SUBCONTRACTOR AFFIDAVIT

By executing this affidavit, the undersigned subcontractor verifies its compliance with O.G.C.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 _____ on behalf of the City of Social Circle has registered with and is participating in the Employment Eligibility Verification (EEV)/Basic Pilot Program, or E-Verifiy, in accordance with the applicability provisions and deadlines established in O.G.C.A. § 13-10-91.

_____
EEV/Basic Pilot Program User Identification Number

Sworn to and subscribed
before me this _____ day
of _____, 20___.

_____ _____ _____
Notary Public Signature Date

_____
Printed Name

_____
My Commission Expires: Entity

_____
Title of Officer or Agent

END OF SECTION

SECTION 00510

NOTICE OF AWARD

TO:

PROJECT KNOWN AS: **PUBLIC WORKS VEHICLE MAINTENANCE FACILITY**

FOR OWNER: **THE CITY OF SOCIAL CIRCLE, GEORGIA**

The **OWNER** has considered the Proposal submitted by you for the above described Work in response to its Advertisement for Bids dated April 23, 2026.

You are hereby notified that your Bid in the amount of $ _____ _____ has been accepted for the works as described and delineated within the contract documents and plans as provided for this project.

You are required to furnish the required Contractor's Performance Bond, Payment Bond, and certificates of insurance to be included in the Agreement between the City of Social Circle and _____ ___ _____ ___ _____

You are required to return an acknowledged copy of this **NOTICE OF AWARD** to the **OWNER**.

Dated this _____ day of _____, 20____.

CITY OF SOCIAL CIRCLE, **GEORGIA**

By: _____

Printed Name: _____

Title: _____

ACCEPTANCE OF NOTICE

Receipt of this above NOTICE OF AWARD is hereby acknowledged by _____, a duly sworn agent of or an authorized representative for _____, this the ____ day of _____, 20____.

By: _____

Name: _____

Title: _____

END OF SECTION

SECTION 00520

NOTICE TO PROCEED

TO:

PROJECT KNOWN AS: **PUBLIC WORKS VEHICLE MAINTENANCE FACILITY**

FOR: **THE CITY OF SOCIAL CIRCLE, GEORGIA**

You are hereby notified to commence work in accordance with the Agreement dated _____, 20___ on or before _____, 20___ and you are to complete the work within Three Hundred Sixty Five (365) consecutive calendar days thereafter. The date of completion of all work is therefore _____, 20___.

You are required to provide the OWNER with a Proposed Schedule for the Project before any construction can commence.

You are required to return an acknowledged copy of this **NOTICE TO PROCEED** to the **CITY OF SOCIAL CIRCLE, GEORGIA**.

Dated this _____ day of _____, 20____

CITY OF SOCIAL CIRCLE, **GEORGIA**

By: _____

Name: _____

Title: _____

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO PROCEED is hereby acknowledged by _____, a duly sworn agent of or an authorized representative for _____, this the _____ day of _____, 20____

By: _____

Name: _____

Title: _____

END OF SECTION

SECTION 00610

PERFORMANCE BOND

STATE OF GEORGIA

COUNTY OF WALTON

KNOW ALL MEN BY THESE PRESENTS, that _____, as Principal, hereinafter called Contractor, and _____ as Surety, are held firmly bound unto The City of Social Circle, Georgia, hereinafter called Owner, as Obligee, in the amount of _____ Dollars ($ _____) for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly be these presents.

WHEREAS, Contractor has by written agreement dated _____, 20___, entered into a Contract with Owner for:

Those obligations and work described in said contract relating to the construction of the PUBLIC WORKS VEHICLE MAINTENANCE FACILITY.

In accordance with Drawings and Specifications provided by the City of Social Circle, which are by reference made a part of the Contract and a part hereof and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITIONS OF THIS OBLIGATION ARE SUCH that, if the Principal shall in all respects promptly and faithfully perform and comply with the terms and conditions of said Contract and his obligations thereunder and shall indemnify the Owner and their representative and save either or all of them harmless against and from all costs, expenses and damages arising from the performances of said Contract or the repair of any work thereunder, then this obligation shall be void; otherwise, this Bond shall remain in full force and effect, in accordance with the following terms and conditions:

A. The Principal and Surety jointly and severally agree to pay the Owner any difference between the sum to which the said Principal would be entitled on the completion of the Contract, and that sum which the Owner may be obliged to pay for the completion of said work by Contract or otherwise, and any damages, direct or indirect or consequential, which the said Owner may sustain on account of such work, or on account of the failure of said Contractor to properly and in all things, keep and execute all of the provisions of said Contract.

B. This Bond shall remain in full force and effect for a period of one (1) year from the date of acceptance of the project by the Owner or Owner's Representative shall provide that the Contractor guarantee to repair or replace for said period of one (1) year all work performed and materials and equipment furnished that were not performed or furnished according to the terms of the Contract, and shall make good defects thereof which have become apparent before the expiration of said period of one (1) year. If any part of the project, in the judgment of the Owner, for the reasons above stated needs to be replaced, repaired or made good during that time, the Owner shall so notify the Contractor in writing. If the Contractor refuses or neglects to do such work within five (5) days from the date of service of such notice, the Owners shall have the work done by others and the cost thereof shall be paid by the Contractor or his Surety.

C. The said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder, or the specifications accompanying the same shall in any way affect its obligations on this bond; and it does hereby waive Notice of any change, extension of time, alteration or addition to the terms of the Contract or to the work or to the Specifications.

D. The Surety represents and warrants to the Owner that they have a Best's Key Rating Guide General Policyholder's Rating of "_____" and Financial Category of "Class _____".

E. All claims and disputes under this Bond shall be subject to the Jurisdiction of the Superior Courts of Walton County, Georgia. Venue shall lie only in the Superior Courts of Walton County, Georgia. With respect to any claims or disputes under this bond, the Principal and Surety hereby waive any defenses of lack of personal or subject matter jurisdiction or lack of venue in the Superior Courts of Walton County and agree to have all disputes heard in the Superior Courts of Walton County.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State of Georgia.

IN WITNESS WHEREOF, the above bounded parties have executed this instrument under their several seals, this _____ day of _____, 20__, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

WITNESSES:
(If Sole Ownership or Partnership, two (2) witnesses required. If Corporation, Secretary only will attest and affix seal).

_____

_____

PRINCIPAL:

_____
Name of Firm

_____
Signature of Authorized Officer (Affix Seal)

_____
Title

_____
Business Address

_____
City State

SURETY:

WITNESS:

_____

_____
Corporate Surety

_____
Attorney-in-Fact (Affix Seal)

_____
Business Address

_____
City State

_____
Name of Local Insurance Agency

END OF SECTION

SECTION 00620

PAYMENT BOND

STATE OF GEORGIA

COUNTY OF WALTON

KNOW ALL MEN BY THESE PRESENTS, that _____, as Principal, hereinafter called Contractor, and _____ as Surety, are held firmly bound unto The City of Social Circle, Georgia, as Obligee, in the amount of _____ Dollars ($ _____) for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly be these presents.

WHEREAS, Contractor has by written agreement dated _____, 20___, entered into a Contract with Owner for:

Those obligations and work described in said contract relating to the construction of the PUBLIC WORKS VEHICLE MAINTENANCE FACILITY.

In accordance with Drawings and Specifications prepared by the City of Social Circle, and which are by reference made a part of the Contract and a part hereof and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITIONS OF THIS OBLIGATION ARE SUCH that, if the Principal shall promptly make payments to all claimants, as herein below defined, then this obligation shall be void; otherwise, the Bond shall remain in full force and effect, subject to the following terms and conditions:

A. A claimant is defined as any person supplying the Principal with labor, material and supplies, used directly or indirectly by the said Principal or any subcontractor in the prosecution of the work provided for in said Contract and as further defined under Georgia law.

B. The Principal and the Surety jointly and severally, shall repay the Owner any sum which the Owner may be compelled to pay because of a lien for labor or materials furnished for any work included in or provided by said Contract.

C. The Surety, for value received, hereby stipulates and agrees that no charge, extension of time, alteration of or addition to the terms of the Contract or to the work to be performed thereunder or the Specification applicable thereto shall in any way affect its obligation on this Bond, and the Surety hereby waives notice of any such change, extension of time, alterations of or addition to the terms of the Contract, or to the work or to the Specifications.

D. The Surety represents and warrants to the Owner that they have a Best's Key Rating Guide General Policyholder's rating of " _____ " and Financial Category of " Class _____ ". The Surety also warrants and represents that it is legally authorized to do business in the State of Georgia.

E. All claims and disputes under this Bond shall be subject to the jurisdiction of the Superior Courts of Walton County, Georgia. Venue shall lie only in the Superior Courts of Walton County, Georgia. With respect to any claims or disputes under this bond, the Principal and Surety hereby waive any defenses of lack of personal or subject matter jurisdiction or lack of venue in the Superior Court of Walton County and agree to have all disputes heard in the Superior Courts of Walton County.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State of Georgia.

IN WITNESS WHEREOF, the above bounded parties have executed this instrument under their several seals, this _____ day of _____, 20___, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

PRINCIPAL:

WITNESSES: (If Sole Ownership or Partnership, two (2) witnesses required. If Corporation, Secretary only will attest And affix seal.)

_____

_____

_____
Name of Firm

_____
Signature of Authorized Officer (Affix Seal)

_____
Title

_____
Business Address

_____
City State

SURETY:

WITNESS:

_____

_____
Corporate Surety

_____
Attorney-in-Fact (Affix Seal)

_____
Business Address

_____
City State

_____
Name of Local Insurance Agency

END OF SECTION

SECTION 00700

GENERAL CONDITIONS

TABLE OF CONTENTS

21. Protection of the Environment

22. Protection of Underground Utilities

23. Schedules, Reports

24. Drawings and Specifications

25. Surveys

26. Testing, Inspection and Rejection of Work

27. Time for Completion and Liquidated Damages

28. Changes in the Contract

29. Payments and Completion

30. Guarantee

31. Conflict of Interest

32. Remedies

33. Gratuities

34. Audit and Access to Records

35. Anti-Kickback

36. Violating Facilities

37. State Energy Policy

38. Equal Opportunity Requirements

SECTION 00700

GENERAL CONDITIONS

1. **Notice of Award of Contract**: Proposals submitted shall be good for a ninety (90) day period (any reference herein to "day" shall mean a calendar day). Within ninety (90) days after receipt of proposal, the Owner shall notify the successful bidder of the award of the Contract.

   Should the Owner require additional time to award a Contract, the time may be extended by mutual agreement between the Owner and the successful bidder. If an Award of Contract has not been made within ninety (90) days from the bid date or within the extension mutually agreed upon, the bidder may withdraw the bid without further liability on the part of either party.

2. **Execution of Contract Documents**: The OWNER and the CONTRACTOR, will furnish the OWNER'S Attorney such evidence as required so that the OWNER'S Attorney can complete and execute "Certificate of Owner's Attorney" before the OWNER submits the executed Contract Documents to the Contractor. With the notification of Award of Contract, the Owner shall furnish the Contractor four (4) conformed copies of Contract Documents for execution by him and his surety.

   Within (5) days after receipt the notification of Award of Contract, the Contractor shall return all the documents properly executed by himself and his surety. Attached to each document shall be the power of attorney for the person executing the bonds for the surety and certificates of insurance for the required insurance coverage.

   Within three (3) days after receipt of the documents executed by the Contractor and his surety with the power of attorney and certificates of insurance, the Owner shall complete the execution of the documents. The General Contractor will received one copy of the completed signed documents and 6 sets of plans and specifications.

   Should the Contractor and/or surety fail to execute the documents within time specified, the Owner shall have the right to proceed on the bid bond accompanying the bid.

   If the Owner fails to execute the documents within the time limit specified, the Contractor shall have the right to withdraw his bid without penalty.

   Should either party require an extension of any of the time limits stated above, this shall be done only by mutual agreement between both parties.

3. **Contract Security**: The Contractor shall furnish a Performance Bond and a Payment Bond in penal sums equal to the amount of the Contract Price, conditioned upon the performance by the Contractor of all undertakings, covenants, terms, conditions and agreements of the Contract Documents, and upon the prompt payment by the Contractor to all persons supplying labor and products in the prosecution of the work provided by the Contract Documents. Such bonds shall be executed by the Contractor and a corporate bonding company licensed to transact such business in the State of Georgia and named on the current list of "Surety Companies Acceptable on Federal Bonds" as published in the Treasury Department Circular Number 570, as amended. The expense of these bonds shall be borne by the Contractor. If at any time a surety on any such bond is declared a bankrupt or loses its right to do business in the State of Georgia or is removed from the list of Surety Companies accepted on Federal bonds, Contractor shall within ten (10) days after notice from the Owner to do so, substitute an acceptable bond (or bonds) in such form and sum and signed by such other surety as may be satisfactory to the Owner. The premiums on such bond shall be paid by the Contractor. No further payments shall be deemed due nor shall be made until the new surety shall have furnished an acceptable bond to the Owner.

   The person executing the bond on behalf of the surety shall file with the bond a general power of attorney, unlimited as to amount and type of bond covered by such power of attorney and certified to by an official of said surety.

4. **Insurance**: The Contractor shall not commence work under this Contract until all insurance described below has been obtained and such insurance has been approved by the Owner, nor shall the Contractor allow any subcontractor to commence work on his subcontract until all similar insurance required of the subcontractor has been so obtained and approved by the Contractor.

   (a) **Workmen's Compensation**: The Contractor shall procure and shall maintain during the life of the Contract Agreement, Workmen's Compensation Insurance for all of his employees to be engaged in work on the project under this Contract, and in case any such work is sublet, the Contractor shall require the subcontractor similarly to provide Workmen's Compensation insurance for all of the employees to be engaged in such work unless such employees are covered by the protection afforded by the Contractor's Workmen's Compensation insurance. Workmen's Compensation insurance shall include Broad Form All States endorsement.

   (b) **Comprehensive General Liability**: The Contractor shall procure and shall maintain during the life of the Contract Agreement, such Comprehensive General Liability insurance as shall protect him and any subcontractor performing work covered by this Contract from claims for damages for Bodily injury, including accidental death, as well as from claims for property damages, which may arise from operations under the Contract Agreement, whether such operations are by himself or by any subcontractor or by anyone directly or indirectly employed by either of them. The amount of insurance shall not be less than the following:

$2,000,000	Bodily Injury, including death, each occurrence.
$1,000,000	Property Damage, each occurrence.
$2,000,000	Property Damage, in the aggregate.

   The insurance shall include coverage of the following hazards:
   Products/Completed Operations
   Independent Contractors
   Contractual Liability
   Underground
   Explosion/Collapse

   (c) **Owner's Protective Liability**: The Contractor shall procure and shall maintain during the life of the Contract Agreement, Owner's Protective Liability Insurance with the same limits as the Comprehensive General Liability.

   (d) **Automobile Liability**: The Contractor shall procure and shall maintain during the life of the Contract Agreement, Comprehensive Automobile Liability insurance in amounts not less than the following:

$1,000,000	Bodily Injury or death to any one person.
$1,000,000	Bodily Injury, each occurrence.
$1,000,000	Property Damage, each occurrence.

   The insurance shall include coverage for non-owned and hired vehicles.

   (e) **Materials and Equipment Floater**: The Contractor shall procure and shall maintain during the life of the Contract Agreement, Materials, and Equipment Floater Insurance to protect the interests of the Owner, Contractor, and subcontractor against loss by vandalism, malicious mischief, and all hazards included in a standard All Risk Endorsement including a building risk insurance for the total amount of the building bid. The amount of the insurance shall at all times equal or exceed the full amount of the Contract. The policies shall be in the names of the Owner and the Contractor.

   (f) **Certificates of Insurance**: Certificates acceptable to the Owner shall be attached to the signed Contract Documents when they are transmitted to the Owner for execution. These certificates shall contain the statement that "Coverage afforded under the policies will not be canceled unless **AT LEAST THIRTY**

(30) days prior to cancellation written notice has been given to the Owner, as evidenced by receipts of registered or certified mail.

5. **Indemnification**: The Contractor agrees to indemnify Owner and hold Owner and its agents and employees harmless from and against all actions, causes of action, suits, liabilities, claims, damages, losses, costs and expenses (including attorney's fees and costs) arising out of or resulting from (a) any act or omission of Contractor in the performance or non-performance of the Work or its obligations hereunder, (b) any breach of contract by Contractor, and (c) any claim for injury to person or property arising out of, or in the course of, the Work as contemplated by this Contract. The parties hereto agree that the terms of this Paragraph 5 shall survive any termination or expiration of the Contract.

   In any and all claims against the Owner, or any of their agents or employees, by any employee of the Contractor, any subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any subcontractor under workmen's compensation acts, disability benefit acts or other employee benefits acts.

6. **Notice to Proceed**: The Notice to Proceed shall be issued following the pre-construction conference within three (3) days of the execution of the Contract Agreement by the Owner. If there are reasons why the Notice to Proceed should not be issued within this period, the time may be extended by mutual agreement between the Owner and Contractor. If the Notice to Proceed has not been issued within the three (3) day period or within the period mutually agreed upon, the Contractor may terminate the Contract Agreement without further liability on the part of either party.

7. **Suspension of Work, Termination and Delay**:

   (a) If the Contractor is adjudged bankrupt or insolvent, or if he makes a general assignment for the benefit of his creditors, or if a trustee or receiver is appointed for the Contractor or for any of his property, or if he files a petition to take advantage of any debtors act, or to reorganize under the bankruptcy or applicable laws, or if he repeatedly fails to supply sufficient skilled workmen, materials or equipment, or if he repeatedly fails to make prompt payments to subcontractors or for labor, materials or equipment or if he disregards laws, ordinances, rules, regulations or orders of any public body having jurisdiction of the work, or if he otherwise violates any provision of the Contract Documents, then the Owner may, without prejudice to any other right or remedy and after giving the Contractor and his surety a minimum ofseven (7) days from delivery of a written notice, terminate the services of the Contractor and take possession of the project and of all products, tools, construction equipment and machinery thereon owned by the Contractor, and finish the work by whatever method he may deem expedient. In such case the Contractor shall not be entitled to receive any further payment until the work is finished.

   If the unpaid balance of the Contract Price exceeds the direct and indirect costs of completing the project, including compensation for additional professional services such excess will be paid by the Contractor and/or his surety to the Owner. Such costs incurred by the Owner will be determined by the Owner and incorporated in a change order.

   (b) Where the Contractor's services have been so terminated by the Owner, said termination shall not affect any right of the Owner against the Contractor then existing or which may thereafter accrue. Any retention or payment of moneys by the Owner due to the Contractor will not release the Contractor from compliance with the Contract Documents.

   (c) After ten (10) days from delivery of a written notice to the Contractor, the Owner may, without cause and without prejudice to any other right or remedy, elect to abandon the project and terminate the Contract. In such case, the Contractor shall be paid for all work executed and any expense sustained.

8. **Assignments**: The Contractor shall not assign the whole or any part of this Contract or any moneys due or to become due hereunder without written consent of the Owner. In case the Contractor assigns all or any part of any moneys due or to become due under this Contract, the Instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any moneys due or to become due to the Contractor shall be subject to prior liens of all persons, firms and corporations for services rendered or materials supplied for the performance of the work called for in this contract.

9. **Subcontracting; Small, Minority And Women's Businesses**

If the CONTRACTOR intends to let any subcontracts for a portion of the work, the CONTRACTOR shall take affirmative steps to assure that small, minority and women's businesses are used when possible as sources of supplies, equipment, construction, and services. Affirmative steps shall consist of (1) including qualified small minority, and women's businesses on solicitation lists; (2) assuring that small, minority and women's businesses are solicited whenever they are potential sources; (3) dividing total requirements when economically feasible, into small tasks or quantities to permit maximum participation of small, minority and women's businesses; (4) establishing delivery schedules, where the requirements of the work permit, which will encourage participation by small, minority and women's businesses; (5) using the services and assistance of the Small Business Administration, and the Minority Business Development Agency of the U.S. Department of Commerce; (6) requiring each party to a subcontract to take the affirmative steps of this section; and (7) CONTRACTORS are encouraged to procure goods and services from labor surplus area firms.

(a) The Contractor shall not subcontract the complete work, or any major part thereof, and shall not award any work to any subcontractor without prior written approval of the Owner, which approval will not be given except upon the basis of written statements containing such information as the Owner may require.

(b) The Contractor shall utilize the services of specialty subcontractors on those parts of the work which, under normal contracting practices, are performed by specialty subcontractors.

If the Contractor desires to perform specialty work he shall submit a request to the Owner accompanied by evidence that the Contractor's own organization has successfully performed the work in question, is presently competent to perform the work, and the performance of the work by specialty subcontractors will result in materially increased costs or inordinate delays.

(c) The Contractor shall be as fully responsible to the Owner for the acts and omissions of his subcontractors, and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by him.

(d) The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the work to bind subcontractors to the Contractor by the terms of the General Conditions and other Contract Documents insofar as applicable to the work of subcontractors and to give the Contractor the same power as regards terminating any subcontract that the Owner may exercise over the Contractor under any provision of the Contract Documents.

(e) Nothing contained in this Contract shall create any contractual relation between any subcontractor and the Owner.

10. **Authority of the Owner**: The Owner will appoint a representative to act on its behalf during the construction period. The appointed representative shall decide questions which may arise, such as those pertaining to quality and acceptability of products furnished and work performed. He shall interpret the intent of the Contract Documents in a fair and unbiased manner. The representative will make visits to the site and determine if the work is proceeding in accordance with the Contract Documents. He shall judge as to the accuracy of quantities submitted by the Contractor in partial payment estimates and the acceptability of the work which these

quantities represent. The decisions of the Owner's representative shall be final and conclusive and binding upon all parties to the Contract.

11. **Separate Contracts**:

    (a) The Owner reserves the right to let other contracts in connection with this project. The Contractor shall afford other Contractors reasonable opportunity for the introduction and storage of their products and the execution of their work, and the Contractor and other Contractors shall properly connect and coordinate their work with each other. If the proper execution or results of any part of the Contractor's work depends upon the work of any other Contractor the Contractor shall inspect and promptly report to the owners representative any defects in such work that render it unsuitable for such proper execution and results.

    (b) The Owner may perform additional work related to the project with its own forces. The Contractor will afford the Owner reasonable opportunity for the introduction and storage of products and the execution of work, and shall properly connect and coordinate his work with theirs.

    (c) If the performance of additional work by other Contractors or the Owner is not noted in the Contract Documents prior to the execution of the Contract, written notice thereof shall be given to the Contractor prior to starting any such additional work. If the Contractor believes that the performance of such additional work by the Owner or others cost him an additional expense or time, he may be entitled to additional moneys or an extension of the Contract Time. The Contractor may make a claim therefore as provided in "Changes in the Contract."

12. **Laws and Regulations**: All applicable Federal, State, and County laws, municipal ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the project shall apply to the Contract throughout, and they will be deemed to be included in the Contract as though written out in full herein. The Contractor shall keep himself fully informed of all laws, ordinances and regulations of the Federal, State, County, and municipal governments or authorities in any manner affecting those engaged or employed in the work or the materials used in the work or in any way affecting the conduct of the work and of all orders and decrees of bodies or tribunals having any jurisdiction or authority over same. If any discrepancy or inconsistency should be discovered in these Contract Documents or in the Drawings or Specifications herein referred to, in relation to any such law, ordinance, regulation, order or decree, he shall promptly report the same in writing to the Owner. He shall at all times observe and comply with all such existing and future laws, ordinance and regulations and shall protect and indemnify the Owner and its agents against the violation of any such law, ordinance, regulation, order or decree, whether by himself or by his employees.

    Permits and licenses of a temporary nature, including building permits, necessary for the execution of the work shall be secured by Contractor.

13. **Taxes**: The Contractor will pay all sales, consumer, use and other similar taxes required by the law of the place where the work is performed. The Owner will be responsible for any sales or use tax due on products furnished by the Owner to the Contractor to be incorporated into the work.

14. **Notice and Service Thereof**:

    (a) All Notices, demands, requests, instructions, approvals, and claims shall be in writing.

    (b) Any notice to or demand upon the Contractor shall be sufficiently given if delivered at the office of the Contractor specified in the Bid (or at such other office as the Contractor may from time to time designate to the Owner in writing), or if deposited in the United States Mail in a sealed, postage, prepaid envelope, or delivered, with charges prepaid, to any telegraph company for transmission, in each case addressed to such office.

(c) All papers required to be delivered to the Owner shall, unless otherwise specified in writing to the Contractor, be delivered to the City of Social Circle, at the office of the City Clerk, _____, Social Circle, Georgia _____. Any notice to or demand upon the Owner shall be sufficiently given if delivered to the office of the City Clerk or if deposited in the United States Mail in a sealed, postage, prepaid envelope, or delivered with charges prepaid to any telegraph company for transmission, in each case addressed to said Clerk or to such other representative of the Owner or to such other address as the Owner may subsequently specify in writing to the Contractor for such purposes.

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

15. **Patents**: The Contractor shall pay all applicable royalties and license fees. He shall defend all suits or claims for infringement of any patent rights and save the owner and its officers, agents, and employees harmless from loss on account thereof, if the Contractor has reason to believe that the design, process or product specified is an infringement of a patent, he shall be responsible for such infringement unless he notifies the Owner prior to the bid date.

16. **Land and Rights of Way**: The Owner will provide, as indicated in the Contract Documents and prior to Notice to Proceed, the lands upon which the work is to be done, right-of-way for access thereto, and such other lands which are designated for the use of the Contractor. The Contractor shall confine his work and all associated activities to the easements and other areas designated for his use. The Contractor shall comply with any limits on construction methods and practices which may be required by easement agreements.

    If, due to some unforeseen reason, the necessary easements are not obtained, the Contractor shall receive an equitable extension of Contract Time and/or an equitable increase in the Contract Price to cover his additional costs as a result thereof. His claim therefor shall be handled as provided for under "Changes in the Contract."

17. **Products, Services and Facilities**:

    (a) It is understood that, except as otherwise specifically stated in the Contract Documents, the Contractor shall provide and pay for all products labor (including labor performed after regular working hours, on Sundays, or on legal holidays), equipment, tools, water, light, power, transportation, supervision, temporary construction of any nature, and all other services and facilities of any nature whatsoever necessary to execute, complete, place into operation, and deliver the work.

    It is further understood that the Contractor's proposed construction schedule is based on a normal 40 hour work week, less recognized holidays. If the Contractor desires to work in excess of this limit, he shall submit a written request to the Owner a minimum of five (5) days prior to the desired work date. The Contractor shall be responsible for any additional expenses incurred by the Owner as a result of the extended work hours.

    (b) Products shall be so stored in accordance with the manufacturer's recommendations to ensure the preservation of their quality and fitness for the work. Stored products to be incorporated in the work shall be located so as to facilitate prompt inspection.

    (c) Manufactured products shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturer.

    (d) Products shall be furnished in accordance with shop drawings and/or samples submitted by the Contractor and approved by the Owner.

(e) Products to be incorporated into the work shall not be purchased by the Contractor or the subcontractor subject to a chattel mortgage or under a conditional sale contract or other agreement by which any interest is retained by the seller.

(f) The Contractor shall maintain a local office with telephone and fax. The contractor shall be required to have a responsible representative on call at all times. The Contractor will also be required to maintain a crew with necessary tools and equipment available on call after normal working hours, on weekends during inclement weather and other times when work is not in progress to perform any necessary emergency repair work which may occur as a result of the work under this Contract.

18. **Supervision of Work**: The Contractor will supervise and direct the work. He will be solely responsible for the means, methods, techniques, sequences and procedures of construction. The Contractor will employ and maintain on the project site a qualified supervisor or superintendent who shall have been designated in writing by the Contractor as the Contractor's representative at the site. The superintendent shall be present on the site at all times as required to perform adequate supervision and coordination of the work.

The supervisor shall have full authority to act on behalf of the Contractor and to execute the orders or directions of the Engineer without delay. He shall have full authority to promptly supply products, tools, plant equipment and labor as may be required. His authority shall be such that all communication given to him shall be as binding as if given to the Contractor.

The Contractor shall employ only competent and skilled personnel.

The Contractor shall, upon demand from the Owner, immediately remove any Superintendent, Foreman or workman whom the Owner may consider incompetent or undesirable.

19. **Interruption of Facility Operations**: The Contractor shall provide the Owner with at least five (5) days written notice prior to any interruption in the City of Social Circle of any utility operations required by construction activity. The Notice shall include the date and time of the scheduled interruption; the length of time the interruption will be in effect; the procedures to be followed in effecting the interruption; a complete identification of all those processes, equipment and operations to be affected; and all other information the Owner may require. The Contractor shall provide any equipment, piping, auxiliary power or other means necessary to sustain facility operations or function for interruptions which have not been identified by the Specifications, or when interruptions must exceed the time allowed by the Specifications.

20. **Protection of Work, Property and Persons**:

(a) The Contractor will be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work. He will take all necessary precautions for the safety of, and will provide the necessary protection to prevent damage, injury or loss to all employees on the work and other persons who may be affected thereby, all the work and all products to be incorporated therein, whether in storage on or off the site, and other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

(b) The Contractor will comply with the Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91-596) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL 91-54). He will erect and maintain, as required by the conditions and progress of the work, all necessary safeguards for safety and protection. He will notify owners of adjacent utilities when prosecution of the work may affect them.

(c) The Contractor will remedy all damage, injury or loss to any property caused, directly or indirectly, in whole or in part, by him or any of his subcontractors or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable.

(d) In emergencies affecting the safety of persons or the work or property at the site or adjacent thereto, the Contractor without special instruction or authorization from the Owner, shall act to prevent threatened damage, injury or loss. He will give the Owner prompt written notice of any significant changes in the work or deviations from the Contract Documents caused thereby, and shall request a change order covering the changes and deviations involved.

(e) During unseasonable weather, the Contractor shall stop all work when so directed by the Owner. Completed work and stored products shall be suitably protected.

(f) The CONTRACTOR alone shall be responsible for the safety, efficiency, and adequacy of its plant, appliances, and methods, and for any damage that may result from their failure or their improper construction, maintenance or operation.

21. **Protection of the Environment**:

(a) All measures required to minimize water pollution to affected waters shall be undertaken in the proposed work. To achieve this end, regard shall be given to the protection of the watershed natural cover, measures instituted to assure minimal siltation and bank erosion from the construction, and other measures taken to reduce water pollution to a minimum.

(b) Any area used or involved in the project disturbed by the Contractor, shall be restored to present or better condition even though such area is outside the limits of that specified for grading, grassing or landscaping.

(c) All chemicals used during project construction or furnished for project operation whether herbicide, pesticide, disinfectant, polymer, reactant or of other classification, must show approval of either EPA or USDA. Use of all such chemicals and disposal of residues shall be in strict conformance with instructions.

(d) The Contractor shall so schedule his work that he does not interrupt the operation of any existing facility except as specifically allowed by the provisions of section 19, above.

Bypasses of untreated or partially treated wastes will not be permitted unless the Contractor has obtained prior approval from the Owner and the Environmental Protection Division. The Owner shall be notified in writing of the date, time and duration of such bypasses at least two weeks in advance. The Contractor shall pay all fines that may be imposed on the Owner for the bypassing of wastewater without prior approval.

(e) Necessary sanitary conveniences for the use of the laborers on the work shall be erected and maintained by the Contractor, in such a manner and at such points as shall be approved by the Owner. Their use shall be strictly enforced.

(f) Should the Contractor so desire, he may build shanties or other structures for housing tools, machinery, and supplies, but they will be permitted only at approved places, and their surroundings shall be maintained at all times in a sanitary and satisfactory manner. On or before the completion of the work, all such structures shall be removed, together with all rubbish and trash, at the expense of the Contractor.

(g) Indemnification from Environmental Claims. The Contractor shall indemnify and hold harmless the Owner from any claims for damages or penalties for environmental violations arising from the Contractor's work on the project. The Contractor shall defend and hold harmless the Owner from claims made by the Federal Environmental Protection Agency, the State Department of Natural Resources or Environmental Protection Division, and any owners of property or affected citizens for environmental damage allegedly caused by the contractor's performance of work on the project. This indemnity shall be in addition to other promises and indemnities contained herein. The Contractor covenants and agrees with the Owner that the work called for in the contract documents, including the General Conditions and project Specifications, do not

call for the contractor to perform any work or use any materials which would violate applicable state and federal environmental law.

22. **Protection of Underground Utilities**: The Contractor shall protect from damage all existing improvements or utilities at or adjacent to the site of the work, the location of which is made known to him by the Owner or his agent, and shall repair or restore any damage to such facilities resulting from failure to exercise reasonable care in the performance of work, provided these facilities are located on the drawing or located by the Contractor in cooperation with the Owner of such facilities or implied and obvious from adjacent structures or known utilities. If the Contractor fails or refuses to repair any such damage promptly, the Owner may have the work performed and charge the cost thereof to the Contractor. All Contractor cost caused by construction started by others after the bid date, shall be subject to adjustment by change order as provided elsewhere.

23. **Schedules, Reports and Records**: The Contractor shall submit to the Owner progress schedules, payrolls, reports, estimates, records and other data as the Owner may request concerning work performed or to be performed. Within three (3) days of the execution of the Contract by the Owner, the Contractor shall deliver to the Owner a construction progress schedule in form satisfactory to the Owner, showing the proposed dates of commencement and completion of each of the various tasks required under the Contract Documents and the anticipated amount of each monthly payment that will become due the Contractor in accordance with the Progress Schedule.

    The Contractor shall maintain on the project site throughout the Contract Time an up to date set of record drawings. Record Drawings shall depict the project as actually constructed; providing elevations, dimensions, angles, details, sections, etc., as required to locate all exposed or concealed features of the construction. Special attention shall be given to recording deviations from the Contract Drawings. The locations shall be referred to easily by identifiable, permanent landmarks or benchmarks, to allow future reproducibility of the measurements with a minimum of personnel and equipment.

24. **Drawings and Specifications**: The Drawings, Specifications, Contract Documents, and all supplemental documents, are considered essential parts of the Contract, and requirements occurring in one are as binding as though occurring in all. They are intended to define, describe and provide for all work necessary to complete the project in an acceptable manner, ready for use, occupancy, or operation by the Owner.

    In case of conflict between the Drawings and Specifications, the Specifications shall govern. Figure dimensions on Drawings shall govern over scale dimensions, and detailed Drawings shall govern over general Drawings. In cases where products or quantities are omitted from the Specifications, the description and quantities shown on the Drawings shall govern.

    Any discrepancies found between the Drawings and Specifications and site conditions or any inconsistencies or ambiguities in the Drawings or Specifications shall be immediately reported to the Owner, in writing, who shall promptly correct such inconsistencies or ambiguities in writing. Work done by the Contractor after his discovery of such discrepancies, inconsistencies or ambiguities and prior to the Owner's correction shall be done at the Contractor's risk.

    The Owner will furnish the Contractor six (6) copies of the Contract Drawings and the Specifications, one (1) copy of which the Contractor shall have available at all times on the job site.

25. **Surveys**: The Contractor shall survey and establish all base lines for locating all the components of the work according to bench marks provided by the Owner. From this survey, unless otherwise specified in the Contract Documents, the Contractor shall develop and make all details needed for construction including slope stakes, batter boards, stakes for pile locations and other working points, lines and elevations .

    The Contractor shall carefully preserve bench marks. In case of willful or careless destruction of the bench marks, the Contractor shall be charged with the resulting expense to restablish any bench mark.

26. **Testing, Inspection and Rejection of Work**:

(a) **Testing of Materials**: Unless otherwise specifically provided for in the Specifications, the inspection and testing of products to be incorporated in the work at the site shall be made by bureaus, laboratories, or agencies approved by the Owner and the cost of such inspection and testing shall be paid by the Contractor. The Contractor shall furnish evidence satisfactory to the Owner that the products have passed the required tests prior to their incorporation into the work. The Contractor shall promptly segregate and remove rejected products from the site of the work.

(b) **Inspection**: The Contractor shall furnish the Owner with every reasonable facility for ascertaining whether or not the work performed and products used are in accordance with the requirements and intent of the Specifications and Contract Documents. No work shall be done or products used without suitable supervision or inspection by the Engineer or his representative. Failure to reject any defective work or product shall not in any way prevent later rejection when such defect is discovered, or obligate the Owner to final acceptance.

(c) **Authority and Duties of the Resident Inspector**: Resident Inspectors shall be authorized to inspect all work done and all products furnished, including preparation, fabrication and manufacture of the products to be used, but they shall not be authorized to alter or waive any requirements of the Drawings, Specifications or Contract Documents. The Resident Inspector may reject products or suspend the work until any question at issue can be referred to and decided by the Owner. The responsibility of the Contractor is not lessened by the presence of the Resident Inspector.

(d) **Rejection of Work and Materials**: All products furnished and all work done that is not in accordance with the Drawings or Specifications or that is defective will be rejected. All rejected products or work shall be removed immediately. If rejected products or work is not removed within forty-eight (48) hours, the Owner shall have the right and authority to stop the work immediately and shall have the right to arrange for the removal of said rejected products or work at the cost and expense of the Contractor. All rejected products or work shall be replaced with other products or work which conform with the Drawings and Specifications.

(e) **Contractor's Responsibility**: Inspection of the work shall not relieve the Contractor of any of his obligations to fulfill his contract and defective work shall be made good regardless of whether such work has been previously inspected by the Owner and accepted or estimated for payment. The failure of the Owner to reject improper work shall not be considered a waiver of any defect which may be discovered later, or for work actually defective.

27. **Time for Completion and Liquidated Damages**: The Contract Time shall begin on a date specified in the Notice to Proceed issued by the Engineers.

The Contractor will proceed with the work at a rate of progress which will insure completion within the Contract Time. It is expressly understood and agreed by and between the Contractor and the Owner, that the Contract Time for the completion of the work described herein is a reasonable time, taking into consideration the average climatic and economic conditions and other factors prevailing in the locality of the work.

If the Contractor shall fail to complete the work within the Contract Time, or extended Contract Time if authorized by change orders, then the Contractor will pay to the Owner the amount of liquidated damages specified in the Contract Documents for each calendar day that the Contractor shall be in default after the time stipulated in the Contract Documents.

The Contractor shall not be charged with liquidated damages or any excess cost when the delay in completion of the work is due to the following and the Contractor has promptly given written notice of such delay to the Owner.

(a) To any preference, priority or allocation order duly issued by the Owner.

(b) To unforeseeable causes beyond the control and without the fault or negligence of the Contractor, including but not restricted to, acts of God, or acts of war, acts of the Owner, acts of another Contractor in the performance of a contract with the Owner, fires, floods, epidemics, quarantine restrictions, strikes, and freight embargoes.

(c) To any delays of subcontractors occasioned by any of the causes specified in paragraphs (a) and (b).

28. **Changes in the Contract**:

(a) **Changes in the Work**: The Owner may at any time, as the need arises, order changes within the scope of the work without invalidating the Contract Agreement. Although the contract price may be decreased, the contract price may not be increased by more that two thousand dollars ($2,000.00) without prior written approval of Mayor and Council in advance of performing the work or providing the materials. These changes shall be mutually agreed to by the OWNER and CONTRACTOR and a change order must be issued. The contract change order will include extra work, work for which quantities have been altered from those shown in the Bid Proposal, as well as decreases or increases in the quantities of installed units which are different than those shown in the bidding schedule because of final measurements. All changes must be recorded on a contract change order before they can be included in a partial Certificate of Payment.

The Owner, also, may at any time, by issuing a field order, make changes in the details of the work. The Contractor shall proceed with the performance of any changes in the work so ordered by the Owner unless the Contractor believes that such field order entitles him to a change in Contract Price or time or both, in which event he shall give the Owner written notice thereof within five (5) days after the receipt of the field ordered change, and the Contractor shall not execute such changes pending the receipt of an executed Change Order or further instruction from the Owner.

Should the Contractor encounter, or the Owner discover, during the progress of the work, subsurface or latent conditions at the site materially differing from those shown on the Drawings or indicated in the Specifications, or unknown conditions of an unusual nature differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Drawings and Specifications, the attention of the Owner shall be called immediately to such conditions before they are disturbed. The Owner shall thereupon promptly investigate the conditions. If he finds that they do so materially differ, and upon written request of the Contractor, an equitable adjustment shall be authorized by Change Order.

The Owner may, when changes are minor or when changes would result in relatively small changes in the Contract Price or Contract Time, elect to postpone the issuance of a Change Order until such time that a single change order of substantial importance can be issued incorporating several changes. In such cases, the Owner shall indicate this intent in a written response to the Contractor's request for a change.

(b) **Changes in Contract Price**: The Contract Price may be changed only by a Change Order. The value of any work covered by a Change Order or of any claim for increase or decrease in the Contract Price shall be determined by one or more of the following methods in the order of precedence listed below:

(1) By estimating the number of unit quantities of each part of the work which is changed and then multiplying the estimated number of such unit quantities by the price bid (which price shall include the Contractor's overhead and profit) for a unit quantity thereof.

(2) The Owner shall fix the total lump sum value of the change in the work of the Contractor and shall set out the price which shall be added to or deducted from the Contract Price (which price shall include the

Contractor's overhead and profit). On any change which involves a net credit to the Owner, no allowance for overhead and profit shall be figured.

(3) By ordering the Contractor to proceed with the work and to keep and present in such form as the Owner may direct a correct account of the cost of the change together with all vouchers therefor. The cost may include an allowance for overhead and profit not to exceed 15% of the net cost. The cost may also include all items of labor or materials, the use of power tools and equipment actually used, power and all items of cost such as public liability and Workmen's Compensation Insurance, pro rata charges for foremen, also Social Security, Old Age and Unemployment Insurance. If deductions are ordered, the credits shall be the net cost. Among the items considered as overhead are included insurance other than that mentioned above, bond or bonds, superintendent, timekeeper, clerks, watchmen, use of small tools, incidental job burdens and general office expenses.

Figuring changes, instructions for measurement of quantities set forth the Specifications shall be followed. The Contractor shall, when required by the Owner, furnish to the Owner an itemized breakdown of the quantities and prices used in computing the value of any change that might be ordered.

(c) **Changes in Contract Time**: The Contract Time may be changed only by a Change Order. Changes in the work described in section 28, part (a) and any other claim made by the Contractor for a change in the Contract Time (including those allowed under "Time for Completion and Liquidated Damages") shall be evaluated by the Owner and if the conditions warrant, an appropriate adjustment of the Contract Time will be made.

29. **Payments and Completion**:

(a) **Contract Price**: The Contract Price is the sum of the unit prices stated in the agreement for each item multiplied by the actual quantities installed of each item. The Contract Price is the total amount payable by the Owner to the Contractor for the performance of the work set forth in the Contract Documents.

(b) **Breakdown of Cost**: Before the first application for payment the Contractor shall submit to the Owner a breakdown of cost for the various portions of the work, including quantities if required by the Owner, aggregating the total Contract Price prepared in such form as specified or as the Owner and the Contractor may agree upon and supported by such data to substantiate its correctness as the Owner may reasonably require. This schedule, when approved by the Owner, shall be used only as a basis for the Contractor's application for payment.

(c) **Progress Payments**: Owner shall make progress payments on account of the Contract Price on the basis of Contractor’s application for payment as recommended by Engineer, within thirty (30) days of receipt by Owner of the application for payment. All progress payments will be on the basis of the progress of the work measured by the number of units completed:

1. Prior to substantial completion, progress payments will be made in an amount equal to the percentage indicated below, but, in each case, less the aggregate of payments previously made and less such amounts as the Engineer shall determine, or Owner may withhold, in accordance with the General Conditions **[OR CONTRACT?]**.

a, 95% of the value of the work completed (with the balance being retainage). If work has been 50% completed as determined by the Engineer, and if the character and progress of the work have been satisfactory to the Owner and the Engineer, the Owner, on recommendation of the Engineer, may determine that as long as the character and progress of the work remain satisfactory to them, there will be no additional

retainage on account or work completed, in which case the retainage shall continue as 10% of 50% of the value of the work.

b. 95% (with the balance being retainage) of the value of materials and equipment not incorporated in the work, but delivered and suitably stored (and accompanied by documentation satisfactory to the Owner as provided in the General Conditions **[OR CONTRACT?]**). Payment for such material and equipment will be accounted for on the application for payment as equivalent quantities or percentages of applicable work completed based on the Contract unit prices. The Contractor shall provide all necessary backup to support such estimates.

2. Upon substantial completion, the Owner shall pay an amount sufficient to increase total payments to the Contractor to the full Contract Price, less such amounts as the Engineer shall determine in accordance with the General Conditions **[OR CONTRACT?]** and less 200% of Engineer's estimate of the value of work to be completed or corrected as shown on the tentative list of items to be completed or corrected attached to the certificate of substantial completion **[CERTIFICATE?]**.

(d) Final Payment. Upon final completion and acceptance of the work in accordance with the General Conditions **[OR CONTRACT?]**, the Owner shall pay the remainder of the Contract Price including the retainage amount defined above, as recommended by Engineer. The remainder of the retainage will be paid to the Contractor at the end of the one-year correction period after substantial completion, as provided in the General Conditions **[OR CONTRACT?]**, as long as the required corrections are accomplished.

(g) **Failure of Payment** : If the Owner should fail to approve any Certificate for Payment, through no fault of the Contractor, within seven (7) days after receipt of the Contractor's Application for Payment, and if the Owner should fail to pay the Contractor within thirty (30) days after received the Certificate for Payment, then the Contractor shall receive interest on the balance due with the interest being the legal annual rate of five percent (5%). In addition, the Contractor may elect, upon seven (7) days written notice to the Owner, to stop the work until payment, including interest, has been received.

(h) **Completion of the Work**: Upon receipt of written notice from the Contractor that the work is complete or substantially complete (except for items specifically listed by the Contractor as incomplete) and ready to be placed into service for the operating test period, the Engineer will, within a reasonable time, inspect the work. Prior to initiating the operating test, all work required by the Contract Documents, Contract Drawings, and Specifications must be completed or substantially complete before the operating test period is performed. This includes, but is not limited to the following:

(l) Performing functional tests and providing manufacturer's required certification as required in Section 01027 "Testing" and what is defined in the Specifications for each item.

(2) Furnishing completed Record Drawings.

(3) Grassing and restoration of the work area.

If the Owner finds the work of the Contractor complete or substantially complete and acceptable in accordance with the provisions of the Contract Documents and the Record Drawings accurately depict the completed work, he shall recommend to the Owner that the operating test period begin.

The operating systems test period begins when the Owner finds the Contractor's work complete or substantially complete and runs for a period of thirty (30) days minimum. During this period, the Contractor shall complete all remaining items of work, make adjustments found to be necessary, and exercise all equipment and systems.

In the event that the final inspection reveals deficiencies in meeting the Contract requirements, the Contractor shall complete all remaining items of work, and make adjustments found to be necessary. Upon

receipt of written notice from the Contractor that the work is complete and ready for re-inspection, the Owner will make a final inspection.

After final inspection the Contractor will be notified in writing by the Owner of the final acceptance of the work. The date of final acceptance shall be the termination date for the Contractor's liability for the physical properties of the facilities and the beginning of the guaranty period.

Before final payment can be made, the Contractor must certify in writing to the Owner that all payrolls, materials bills, and other indebtedness connected with the project have been paid.

Contractor shall not be entitled to final payment if there is disputed indebtedness or if there are liens upon the property.

Upon completion of all work if there is disputed indebtedness or there are liens upon the property, semifinal payment may, at the Owner's option, be made in accordance with the following provisions:

(1) The Owner shall retain an amount equal to the disputed indebtedness and/or liens upon the property including all related cost and interest in connections with said disputed indebtedness and liens which the Owner may be compelled to pay upon and subsequent adjudication.

(2) The Contractor shall certify to those items of work not disputed that all payable, materials bills and other indebtedness connected with the work have been paid or otherwise satisfied.

The making and acceptance of the final payment shall constitute a waiver of claims by the Owner other than those for faulty work covered by and appearing within the warranty period.

The acceptance of final payment shall constitute a waiver of all claims by the Contractor except those previously made in writing and still unsettled.

30. **Guarantee**: The Contractor shall warrant and guarantee for a period of one year from the date of final acceptance that the completed system or work is free from all defects due to faulty products or workmanship and the Contractor shall promptly make such corrections as may be necessary by reason of such defects. The Owner will give notice of observed defects with reasonable promptness. In the event that the Contractor should fail to make such repairs, 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 through the guarantee period.

31. CONFLICT OF INTEREST

A. Unacceptable bidders. An ENGINEER or ARCHITECT (individual or firm including persons they employ) who has prepared plans and specifications will not be considered an acceptable bidder. Any firm or corporation in which such ENGINEER or ARCHITECT (including persons they employ) is an officer, employee, or holds or controls a substantial interest will not be considered an acceptable bidder. Contracts or purchases by the CONTRACTOR shall not be awarded or made to a supplier or manufacturer. Bids will not be awarded to firms or corporations who are owned or controlled wholly or in part by a member of the governing body of the OWNER or to an individual who is such a member.

B. The OWNER'S officers, employees, or agents shall not engage in the award or administration of this CONTRACT if a conflict of interest, real or apparent, would be involved. Such a conflict would arise when: (a) the employee, officer or agent; (b) any member of their immediate family; (c) their partner of (d) an organization which employs, or is about to employ, any of the above has financial or interest

in the CONTRACTOR. The OWNER'S officers, employees, or agents shall neither solicit nor accept gratuities, favors or anything or monetary value from the CONTRACTOR or subcontractor.

32. REMEDIES

Unless otherwise provided in this CONTRACT, all claims, counterclaims, disputes, and other matters in question between the OWNER and the CONTRACTOR arising out of or relating to this CONTRACT or the breach thereof will be heard in the Superior Court of Walton County, Georgia. All parties hereby waive any defenses of lack of personal or subject matter jurisdiction or lack of venue in the Superior Court of Walton County and agree to have all disputes heard in the Superior Court of Walton County.

33. GRATUITIES

A. If the OWNER finds after a notice and hearing that the CONTRACTOR, or any of the CONTRACTOR'S agents or representatives, offered or gave gratuities (in the form of entertainment, gifts, or otherwise) to any official, employee, agent of the OWNER, the State, or Walton County officials in an attempt to secure this CONTRACT or favorable treatment in awarding, amending, or making any determinations related to the performance of this CONTRACT, the OWNER may, by written notice to the CONTRACTOR, terminate this CONTRACT. The OWNER may also pursue other rights and remedies that the law or this CONTRACT provides. However, the existence of the facts on which the OWNER bases such findings shall be an issue and may be reviewed in proceedings under the Remedies clause of this CONTRACT.

B. In the event this CONTRACT is terminated as provided in paragraph A the OWNER may pursue same remedies against the CONTRACTOR as it could pursue in the event of a breach of the CONTRACT by the CONTRACTOR. As a penalty, in addition to any other damages to which it may be entitled by law, the OWNER may pursue exemplary damages in an amount (as determined by the OWNER) which shall be not less than three nor more than ten times the costs the CONTRACTOR incurs in providing any such gratuities to any such officer or employee.

34. AUDIT AND ACCESS TO RECORDS

For all negotiated contracts (except those of $10,000 or less), the City of Social Circle, the Comptroller General, the OWNER or any of their duly authorized representatives, shall have access to any books, documents, papers, and records of the CONTRACTOR, which are pertinent to the CONTRACT, for the purpose of making audits, examinations, excerpts and transcriptions. The CONTRACTOR shall maintain all required records for three years after final payment is made and all other pending matters are closed.

35. ANTI-KICKBACK

The CONTRACTOR shall comply with the Copeland Anti-kickback Act (18 USC 874) as supplemented in Department of Labor regulations (29 CFR, Part 3). This act provides that each CONTRACTOR shall be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public facilities, to give up any part of the compensation to which they are otherwise entitled. The OWNER shall report all suspected or reported violations to FmHA.

36. VIOLATING FACILITIES.

CONTRACTOR shall comply with all applicable standards, orders or requirements issued under section 306 of the Clean Water Air Act (42 U.S.C. 1857 (h)), section 508 of the Clean Water Act (33 U.S.C. 1368), Executive Order 11738, and Environmental Protection Agency regulations 40 CFR Part 15 which prohibit the awarding of non-exempt federal contracts, grants, or loans to facilities included on EPA's list of violating facilities, The CONTRACTOR will report violations to the EPA.

37. STATE ENERGY POLICY

The CONTRACTOR shall comply with the Energy Policy and Conservation Act (P.L. 94-163). Mandatory standards and policies relating to energy efficiency, contained in the State Energy Conservation Plan, shall be utilized.

38. EQUAL OPPORTUNITY REQUIREMENTS

For all contracts, the CONTRACTOR shall comply with Executive Order 11246, entitled "Equal Employment Opportunity," as amended by Executive Order 11375, and as supplemented in Department of Labor regulations (41 CFR Part 60).

END OF SECTION

SECTION 00800

SUPPLEMENTAL GENERAL CONDITIONS

The provisions of the City of Social Circle Supplemental General Conditions as described herein change, amend, or supplement the General Conditions and shall supersede any conflicting provisions of this CONTRACT. All provisions of the General conditions that are not changed, amended, or supplemented, remain in full force.

1.01 CONTRACT APPROVAL

A. The OWNER and the CONTRACTOR, will furnish the OWNER'S Attorney such evidence as required so that the OWNER'S Attorney can complete and execute "Certificate of Owner's Attorney" (Section 1.14) before the OWNER submits the executed Contract Documents to the Contractor.

B. Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State of Georgia.

1.02 CONTRACT CHANGE ORDER

A. Although the contract price may be decreased, the contract price may not be increased by more that two thousand dollars ($2,000.00) without prior written approval of Mayor and Council in advance of performing the work or providing the materials. These changes shall be mutually agreed to by the OWNER and CONTRACTOR and a change order must be issued. The contract change order will include extra work, work for which quantities have been altered from those shown in the Bid Proposal, as well as decreases or increases in the quantities of installed units which are different than those shown in the bidding schedule because of final measurements. All changes must be recorded on a contract change order before they can be included in a partial Certificate of Payment.

B. Section 00910, "Contract Change Order" or similar form approved by the City of Social Circle shall be used to record CONTRACT changes.

C. The CONTRACT sum is, in whole or in part, based on unit prices. The OWNER reserves the right to increase or decrease a unit price quantity as may be deemed reasonable or necessary in order to complete the Project.

1.03 **CERTIFICATE FOR PAYMENT FORMS**

A. Section 00900, "Certificate for Payment", or similar form approved by the City of Social Circle shall be used when estimating monthly payments due to the CONTRACTOR.

B. The OWNER may after consultation with the ENGINEER withhold or, on account of subsequently discovered evidence, nullify the whole or part of any approved partial payment estimate to such extent as may be necessary to protect the OWNER from loss on account of:

1. Defective work not remedied.

2. Claims filed.

3. Failure of CONTRACTOR to make payments properly to subcontractors or suppliers.

4. A reasonable doubt that the WORK can be completed for the balance then unpaid.

5. Damage to another CONTRACTOR.

6. Performance of WORK in violation of the terms of the CONTRACT DOCUMENTS.

C. Where WORK on unit price items is substantially complete but lacks testing, clean up and/or corrections, amounts shall be deducted from unit prices in partial payment estimates to amply cover such testing, clean-up and/or corrections.

D. When the items in B and C are cured, payment shall be made for amounts withheld because of them.

E. Payments will not be made that would deplete the retainage nor place in escrow any funds that are required for retainage nor invest the retainage for the benefit of the CONTRACTOR.

1.04 CONFLICT OF INTEREST

A. Unacceptable bidders. An ENGINEER or ARCHITECT (individual or firm including persons they employ) who has prepared plans and specifications will not be considered an acceptable bidder. Any firm or corporation in which such ENGINEER or ARCHITECT (including persons they employ) is an officer, employee, or holds or controls a substantial interest will not be considered an acceptable bidder. Contracts or purchases by the CONTRACTOR shall not be awarded or made to a supplier or manufacturer. Bids will not be awarded to firms or corporations who are owned or controlled wholly or in part by a member of the governing body of the OWNER or to an individual who is such a member.

B. The OWNER'S officers, employees, or agents shall not engage in the award or administration of this CONTRACT if a conflict of interest, real or apparent, would be involved. Such a conflict would arise when: (a) the employee, officer or agent; (b) any member of their immediate family; (c) their partner of (d) an organization which employs, or is about to employ, any of the above has financial or interest in the CONTRACTOR. The OWNER'S officers, employees, or agents shall neither solicit nor accept gratuities, favors or anything or monetary value from the CONTRACTOR or subcontractor.

1.05 PROTECTION OF LIVES AND PROPERTY

A. In order to protect the lives and health of its employees under the CONTRACT, the CONTRACTOR shall comply with all pertinent provisions of the Occupational Safety and Health Administration (OSHA) and any State Safety and Health agency requirements.

B. The CONTRACTOR alone shall be responsible for the safety, efficiency, and adequacy of its plant, appliances, and methods, and for any damage that may result from their failure or their improper construction, maintenance or operation.

1.06 REMEDIES

Unless otherwise provided in this CONTRACT, all claims, counterclaims, disputes, and other matters in question between the OWNER and the CONTRACTOR arising out of or relating to this CONTRACT or the breach thereof will be heard in the Superior Court of Walton County, Georgia. All parties hereby waive any defenses of lack of personal or subject matter jurisdiction or lack of venue in the Superior Court of Walton County and agree to have all disputes heard in the Superior Court of Walton County.

1.07 GRATUITIES

A. If the OWNER finds after a notice and hearing that the CONTRACTOR, or any of the CONTRACTOR'S agents or representatives, offered or gave gratuities (in the form of entertainment, gifts, or otherwise) to any official, employee, agent of the OWNER, the State, or Walton County officials in an attempt to secure this CONTRACT or favorable treatment in awarding, amending, or making any determinations related to the performance of this CONTRACT, the OWNER may, by written notice to the CONTRACTOR, terminate this CONTRACT. The OWNER may also pursue other rights and remedies that the law or this CONTRACT provides. However, the existence of the facts on which the OWNER bases such findings shall be an issue and may be reviewed in proceedings under the Remedies clause of this CONTRACT.

B. In the event this CONTRACT is terminated as provided in paragraph A the OWNER may pursue same remedies against the CONTRACTOR as it could pursue in the event of a breach of the CONTRACT by the CONTRACTOR. As a penalty, in addition to any other damages to which it may be entitled by law, the OWNER may pursue exemplary damages in an amount (as determined by the OWNER) which shall be not less than three nor more than ten times the costs the CONTRACTOR incurs in providing any such gratuities to any such officer or employee.

1.08 AUDIT AND ACCESS TO RECORDS

For all negotiated contracts (except those of $10,000 or less), the City of Social Circle, the Comptroller General, the OWNER or any of their duly authorized representatives, shall have access to any books, documents, papers, and records of the CONTRACTOR, which are pertinent to the CONTRACT, for the purpose of making audits, examinations, excerpts and transcriptions. The CONTRACTOR shall maintain all required records for three years after final payment is made and all other pending matters are closed.

1.09 SMALL, MINORITY AND WOMEN'S BUSINESSES

If the CONTRACTOR intends to let any subcontracts for a portion of the work, the CONTRACTOR shall take affirmative steps to assure that small, minority and women's businesses are used when possible as sources of supplies, equipment, construction, and services. Affirmative steps shall consist of (1) including qualified small minority, and women's businesses on solicitation lists; (2) assuring that small, minority and women's businesses are solicited whenever they are potential sources; (3) dividing total requirements when economically feasible, into small tasks or quantities to permit maximum participation of small, minority and women's businesses; (4) establishing delivery schedules, where the requirements of the work permit, which will encourage participation by small, minority and women's businesses; (5) using the services and assistance of the Small Business Administration, and the Minority Business Development Agency of the U.S. Department of

Commerce; (6) requiring each party to a subcontract to take the affirmative steps of this section; and (7) CONTRACTORS are encouraged to procure goods and services from labor surplus area firms.

1.10 ANTI-KICKBACK

The CONTRACTOR shall comply with the Copeland Anti-kickback Act (18 USC 874) as supplemented in Department of Labor regulations (29 CFR, Part 3). This act provides that each CONTRACTOR shall be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public facilities, to give up any part of the compensation to which they are otherwise entitled. The OWNER shall report all suspected or reported violations to FmHA.

1.11 VIOLATING FACILITIES.

CONTRACTOR shall comply with all applicable standards, orders or requirements issued under section 306 of the Clean Water Air Act (42 U.S.C. 1857 (h)), section 508 of the Clean Water Act (33 U.S.C. 1368), Executive Order 11738, and Environmental Protection Agency regulations 40 CFR Part 15 which prohibit the awarding of non-exempt federal contracts, grants, or loans to facilities included on EPA's list of violating facilities, The CONTRACTOR will report violations to the EPA.

1.12 STATE ENERGY POLICY

The CONTRACTOR shall comply with the Energy Policy and Conservation Act (P.L. 94-163). Mandatory standards and policies relating to energy efficiency, contained in the State Energy Conservation Plan, shall be utilized.

1.13 EQUAL OPPORTUNITY REQUIREMENTS

For all contracts, the CONTRACTOR shall comply with Executive Order 11246, entitled "Equal Employment Opportunity," as amended by Executive Order 11375, and as supplemented in Department of Labor regulations (41 CFR Part 60).

END OF SECTION

SECTION 00805

SPECIAL ASSURANCES
FOR UTILITY CONTRACT WORK
WITHIN PUBLIC RIGHT-OF-WAY

All work under this contract, which is to be performed on property under control and permit of the City of Social Circle shall be done in compliance with the terms and conditions of the City of Social Circle Right of Way permit, including its utility installation standards and specifications. The City of Social Circle shall have the right to inspect the work and to require any action necessary to correct all deviations from said terms and conditions.

Contractor agrees that the City of Social Circle shall not be held liable for any extra expenses or damages to the contractor as a result of the requirement for compliance with the City of Social Circle standards and specifications or any corrective action which the City of Social Circle may order in enforcement thereof.

_____
Company

_____
Contractor's Authorized Representative

_____
Printed Name

_____
Title

_____
Date

END OF SECTION

SECTION 00830

U.S. DEPARTMENT OF AGRICULTURE

CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION - LOWER TIER COVERED TRANSACTIONS

This certification is required by the regulations implementing executive Order 12549, Debarment and suspension, 7 CFR Part 3017, Section 3017.510, Participants' responsibilities. The regulations were published as Part IV of the January 30, 1989, Federal Register (pages 4722-4733). Copies of the regulations may be obtained by contacting the Department of Agriculture agency with which this transaction originated.

(BEFORE COMPLETING CERTIFICATION, READ INSTRUCTIONS)

(1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal, State, County or Municipal department or agency.

(2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

	Public Works Vehicle Maintenance Facility
Organization Name	PR/Award Number or Project Name

Name and Title of Authorized Representative

Signature	Date

INSTRUCTIONS FOR CERTIFICATION

1. By signing and submitting this form, the prospective lower tier participant is providing the certification set out on the previous sheet in accordance with these instructions.

2. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

3. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

4. The terms "lower tier covered transaction," "participant," "person," "primary covered transaction," "covered transaction," "debarred," "suspended," "ineligible," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.

5. The prospective lower tier participant agrees by submitting this form that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

6. The prospective lower tier participant further agrees by submitting this form that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion -- Lower Tier Covered Transactions," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

7. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.

8. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which does a prudent person in the ordinary course of business dealings normally possess.

9. If a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated, may pursue available remedies, including suspension and/or debarment, except for transactions authorized under paragraph 5 of these instructions.

END OF SECTION

SECTION 00850

CERTIFICATE OF OWNER'S ATTORNEY

I, the undersigned, Anthony O.L. Powell, the duly authorized and acting legal representative of THE CITY OF SOCIAL CIRCLE do hereby certify as follows:

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

_____
Anthony O.L. Powell

_____
Date

END OF SECTION

PARTIAL PAYMENT ESTIMATE	Contract No.
	Partial Payment Estimate No.
	Page

OWNER:	CONTRACTOR:	PERIOD OF ESTIMATE
CITY OF SOCIAL CIRCLE, GA		FROM _____ TO _____

CONTRACT CHANGE ORDER SUMMARY

No.	CITY Approval Date	Additions	Deductions
Totals			
Net Charge			

ESTIMATE

1. Original Contract	
2. Change Orders	
3. Revised Contract (1+2)	
4. Work Completed*	
5. Stored Materials *	
6. Subtotal (4+5)	
7. Retainage	
8. Previous Payments	
9. Amount Due (6-7-8)	
* Detailed breakdown attached	

CONTRACT TIME

Original (days) _____	___ yes	Starting Date_____
Revised _____	On Schedule ___ no	Projected Completion _____
Remaining _____		

CONTRACTOR'S CERTIFICATION:

The undersigned Contractor certifies that to the best of their knowledge, information and belief that work covered by this payment estimate has been completed in accordance with the contract documents, that all amounts have been paid by the Contractor for work for which previous payment estimates were issued and payments received from the Owner, and the current payment shown herein is now due.

Contractor _____

Name _____

By _____

Date _____

RECOMMENDED FOR PAYMENT:

TURNIPSEED ENGINEERS

BY: _____

DATE: _____

CERTIFIED AND APPROVED BY CITY OF SOCIAL CIRCLE:

Name _____

By _____

Date _____

END OF SECTION

CONTRACT CHANGE ORDER	ORDER No.
	DATE:
CONTRACT FOR:	STATE: Georgia
	COUNTY: Walton

OWNER The City of Social Circle, Georgia

To:

(Contractor)

You are hereby requested to comply with the following changes from the contract plans and specifications:

Description of Changes (Supplemental Plans and Specifications Attached)	DECREASE in Contract Price	INCREASE in Contract Price
	$	$
TOTALS	$	$
NET CHANGE IN CONTRACT PRICE	$	$

JUSTIFICATION:

The amount of the Contract shall be (Decreased) (Increased) by the sum of:_____
_____Dollars ($_____)

The Contract Total including this and previous Change Orders will be: _____ _____ _____ _____ _____
_____Dollars ($_____)

The Contract Period provided for completion will be (Increased) (Decreased) (Unchanged):_____Days

This document will become a supplement to the contract and all provisions will apply hereto.

Requested_____ _____
(City of Social Circle) (Date)

Recommended_____ _____
(Owner's Representative) (Date)

Accepted_____ _____
(Contractor) (Date)

Approved By City_____ _____
(Name and Title) (Date)

This information will be used as a record of any changes to the original construction contract.

SECTION 1
GENERAL REQUIREMENTS

1.01 Location: The work described in these Specifications is located in the City of Social Circle, Georgia.

1.02 Work to be Done: Project consists of the furnishing of all materials, labor and equipment for the complete construction of Public Works Vehicle Maintenance Facility for the City of Social Circle, Georgia consisting of:

All applicable site work for clearing, grading, and filling subject property, paving for roads and parking areas and building pads, all applicable utilities, construction of Vehicle Maintenance Facility and other truck sheds, and erosion control measures.

1.03 Schedule of Work: Schedule of work to be done during daylight hours.

The Contractor shall notify the Engineer and the Owner before starting any new phase of construction to verify that no interruption of service will be encountered.

1.04 Drawings and Specifications: The following list of Drawings and Specifications form a part of the Construction Agreement.

PLANS
SOCIAL CIRCLE PUBLIC WORKS DEPARTMENT
NEW FLEET FACILITY

PLANS
CITY OF SOCIAL CIRCLE, GEORGIA
PUBLIC WORKS BUILDING – LAND DISTURBING PLAN

PROJECT MANUAL
SOCIAL CIRCLE FLEET FACILITY

CONTRACT DOCUMENTS AND SPECIFICATIONS
PUBLIC WORKS VEHICLE MAINTENANCE FACILITY

1.05 Specifications: The Contract Documents and Specifications, Public Works Vehicle Maintenance Facility form a part of the Construction Agreement, and include this Section and Sections 2 through 12 as identified below:

Section Number	Title of Section
2	Control of Materials
3	Soil Erosion, Sediment Control and Stormwater Monitoring
4	Concrete
5	Reinforcing Steel, Structural Steel, and Miscellaneous Metal
6	Site Preparation, Excavation, Backfilling and Grading

Section Number	Title of Section
7	Pipe, Fittings, Valves and Drains
8	Electrical - Basic Materials and Methods
9	Generator Sets and Equipment
10	Fuel Pump Station
11	Subsurface Investigations
12	New Fleet Facility

1.06 Protecting Existing Utilities and Structures: Prior to any excavation, the Contractor shall call the Utilities Protection Inc. "Call Before You Dig" number (811). Any damage done to existing utility lines, drains, power and telephone cable, poles, and structures of every nature, not indicated to be replaced and/or abandoned shall be repaired or replaced by the Contractor at his own expense. The approximate position of certain known underground lines and structures are shown on the Drawings according to the best available information. Existing small lines are not shown. The Contractor shall locate, excavate and expose all existing underground lines in advance of trenching and other construction operations. Where connections are to be made at underground structures and pipe lines, elevations and locations shall be verified prior to construction of the pertinent work. Where underground utilities or obstructions are encountered which conflict with the new work, the location and/or alignment of the new or existing lines may be changed to avoid interference upon written concurrence by the Engineer.

1.07 Subsurface Investigations: A subsurface investigation has been provided by Larry Mullins with Geosystems Engineering, Inc. The prospective bidder must form his own opinion of the character of the subsurface materials to be encountered in excavating for and the construction of the various facilities. A copy is included in Section 11.

1.08 Easements: The Owner has obtained easements for all work on private property. The Contractor will be provided copies of all easement agreements to the Owner. The Contractor shall review any special conditions of any easement agreement and notify the Engineer of any condition which cannot be met under the Plans and Specifications without an increase in contract price.

1.09 Working Drawings: The Contractor's attention is directed to the requirements of the "Instructions to Bidders and Special Provisions" with reference to working drawings. The Contractor shall submit a digital copy of the drawings and details, covering Reinforcing Steel, Structural Steel, Miscellaneous Metals, Piping and such other items of work as may be necessary for successful completion of the work of the Project, to the Engineer for review. After review, the Engineer will return the digital copy to the Contractor. The Contractor will forward three printed copies, exactly as marked in the returned digital copy, to the Engineer.

A. The Contractor shall check all working drawings for accuracy of dimensions and details and for conformity with the Drawings and Specifications before submitting working drawings to the Engineer. The Contractor shall indicate that working drawings have been checked by him by affixing an appropriate stamp or notation on the face of each of the working drawings.

B. Responsibility for Accuracy: The Engineer's review stamp shall not relieve the Contractor of the responsibility for accuracy of dimensions and details. The Contractor shall be responsible for agreement and conformity of working drawings with the Drawings and Specifications.

C. Working drawings for any structure shall consist of such detailed plans as may be required for the prosecution of the work but not included in the plans. All necessary-working drawings shall be furnished by the Contractor. They shall include shop details, erection plans, masonry layout diagrams, and bending diagrams for reinforcing steel, review by the Engineer must be obtained before any work involving these plans may be performed. Plans for false work, centering, and form work may also be required and such cases shall be likewise subject to review by the Engineer.

D. It is expressly understood, however, the Engineer's review of the Contractor's working drawings does not relieve the Contractor of any responsibility for accuracy of dimensions and details. The Contractor shall be responsible for agreement and conformity of his working drawings with the Drawings and Specifications.

E. The contract price shall include the cost of furnishing all working drawings and the Contractor will be allowed no extra compensation for such drawings.

1.10 Shop Drawings: The Contractor shall submit shop drawings and details covering the required items of work and such other items which may be necessary for the successful completion of this Contract to the Engineer for checking and review before any fabrication, erection or installation shall commence. A reviewed set of shop drawings with Engineer's review stamp shall be kept on the job at all times.

The Contractor shall notify the Engineer in writing about any information in the shop drawings which deviates from the Contract Documents.

Shop drawings, product data and engineering calculations covering all equipment, material, fabrications and similar items shall be submitted to the Engineer for review. Submittals shall verify compliance with the contract documents with any deviations noted by the Contractor.

The Contractor shall submit a digital copy of drawings and details to adequately describe the function, performance characteristics, dimensions, arrangement, support, anchorage and other similar information to allow for installation, operation and maintenance. After review, the Engineer will return the digital copy to the Contractor. The Contractor will forward three printed copies, exactly as marked in the returned digital copy, to the Engineer within seven calendar days.

A. Submittal Identification: Each submittal shall cover items from one Specification Section unless multiple sections are required for clarity. Each submittal shall be accompanied with a cover sheet that bears the Project Name, Engineer's project number, and the Contractor's name along with the following information:

1. Submittal Date

2. Submittal Number: Submittal numbers shall be sequentially numbered without division by trades. Resubmittals shall be given the number of the original submittal followed by the letter A for the first resubmittal, the letter B for the second resubmittal, etc. (Example: 10A, 10B, etc.)

3. Item Name

4. Location: Identify the location(s) where the material or equipment is to be placed. (Example: RAS pump station, yard piping, construction joints greater than 12" thick.) The noted location shall be as specific as possible.

5. Subcontractor or Supplier: Identify the equipment or material provider.

6. Manufacturer: Identify the manufacturer of the material or equipment being submitted.

7. Drawing or Identification Number: When available, list the shop drawing or identification number given by the contractor, supplier or manufacturer. Such numbers are typically found shop drawings for piping details, reinforcing steel, miscellaneous metals, etc.

8. Specification Section: Identify the Specification Section(s) applicable to the equipment or material being submitted.

B. Contractor Review: The Contractor shall check all working drawings for accuracy of dimensions and details and for conformation with the Drawings and Specifications before submitting working drawings to the Engineer for review. The Contractor shall indicate that working drawings have been checked by him by affixing an appropriate stamp on the face of each of the working drawings and the submittal cover sheet. All notes by the contractor shall be in GREEN.

1. Pertinent Information: Where catalogs or data sheets include multiple listings, the Contractor shall highlight all entries that are pertinent to the submittal. Information that is not pertinent to the review shall be crossed out.

2. Deviations: The Contractor must clearly identify any deviations from the contract Specifications or Drawings and provide additional data that may be required for the Engineer's review. When applicable, the Contractor must identify any required modifications to other components resulting from the deviation and may include but not limited to structural components, piping systems, electrical systems, etc.

C. Engineer's Review: The Engineer shall review all shop drawings for general compliance with the contract documents. All corrections required by the Engineer will be noted in RED. The Engineer's review stamp shall be placed on the submittal cover sheet and/or the working drawing indicating the status of the returned submittal and date of review.

D. Responsibility for Accuracy: Verification of all dimensions, quantities, material, identification numbers and other similar details shall be the sole responsibility of the Contractor. The Contractor shall be responsible for agreement and conformity of working drawings with the Contract Drawings and Specifications. The

Engineer's review stamp shall not relieve the Contractor or these responsibilities, including errors and omissions.

E. Resubmittals: The Contractor shall verify that all corrections and additional information requested by the Engineer have been provided on the resubmittal. The Contractor shall clearly identify any additional revisions to the submittal that were not specifically called out or requested in the initial review. Resubmittals shall be numbered as noted in these Specifications.

F. Colors and Samples: Provide colors and samples as required by individual specification sections or when required for a complete and accurate review of the equipment or material. The samples should be submitted in the quantity required to be returned, plus one to be retained by the Engineer / Owner.

1. The Contractor shall provide samples that are identical to the proposed item. Where indicated in the Specifications or when requested by the Engineer, full size samples shall be provided.

2. Owner's Color Selection: All products requiring color selection shall be submitted as early as possible. The Engineer will coordinate selection with the Owner after all samples, colors and finishes for the accepted products have been received. The Engineer will provide the Contractor with a schedule of the Owner selected colors and finishes.

3. Sample Identification: Samples, color charts or similar data shall be identified as a decimal of the related submittal number. (Example: If the flooring submittal is Number 10, all samples related to the flooring submittal shall be numbered 10.1, 10.2, 10.3, etc.)

1.11 As-Built Drawings: As the work progresses, the Contractor shall regularly record on one set of Drawings all changes and deviations from the Contract Drawings and record the exact final locations of any deviation and original work. Upon completion, the Contractor shall have these drawings and records certified as to their completeness and correctness by the Resident Inspector and deliver them to the Engineer for incorporation in the tracings. Final as-built alignment, invert elevations and locations are to be supplied by the Contractor.

A. Monthly Submittal: As-built information for each item completed shall be provided monthly to the Engineer and submitted with partial pay request. Pay requests WILL NOT be processed without as-built records.

On stand-alone projects such as treatment plants, buildings or other similar projects, the Engineer may perform a monthly review of as-built drawings by the Resident Inspector in lieu of the monthly submittal requirement if discussed at the preconstruction conference.

B. As-Built Requirements: All submitted as-builts must meet the following requirements:

1. Contractor must present as-builts on a clean set of Drawings. All as-builts must be neat and legible. Revision or detail drawings, if required, may be included as additional sheets to plan set.

2. Items to be included on the as-built drawings include, but are not limited to the following:

   a. Any deviations to the contract drawings

   b. Additional details not originally shown on the Drawings

   c. Changes made by change orders, field orders, work directives or submittals

   d. Detail of all piping and pavement replacement

   e. Finish elevations and invert elevations of all structures

   f. Location and depth / elevation of utilities buried underground or concealed in concrete

3. Requirements for Utilities:

   a. All new buried utilities and other similar items will be located with a minimum of two distances from permanent points or by GPS coordinates meeting the requirements of these Specifications to all intersections, changes in direction and appurtenance locations. Any statement such as "Installed Per Plans" shall not relieve Contractor of these requirements.

   b. Utilities to be located include, but are not limited to, pipes, conduits, duct banks, wires, cables, fiber optic and other similar items.

   c. Appurtenances requiring location include, but are not limited to, manholes, fire hydrants, fittings, water taps, sewer taps, meters, valves, clean-outs, junction boxes, pull boxes, hand holes, and other similar items.

   d. A distance from centerline of road is required for all new water and sewer lines every 100'.

   e. The location of utilities installed below slabs or encased in concrete must be accurately dimensioned on the structure plans and sections.

   f. Provide ground elevation, top elevation and all invert elevations for each manhole, drop inlet, junction box, and other similar structures.

   g. For force mains or other pipes shown in a profile view, provide ground elevation and invert elevation at all high points, low points and change of slope. Additional elevations may be required to verify positive slope.

C. GPS Data Collection: Unless otherwise instructed by the Engineer, the Contractor shall provide GPS data on all new utilities and appurtenances as defined in the previous section. GPS / GIS data shall meet the following minimum requirements:

1. GPS field work must be performed by personnel that are trained in the use of GPS equipment. If needed, Contractor may subcontract with a surveyor to provide the required data.

2. The GPS receiver must be mapping grade or better. Survey or high accuracy grade receivers may be required to achieve tolerances noted in the following section of these Specifications. Recreational grade units, including smart phones and tablets, are not acceptable.

3. Spatial Reference:

   a. Units: US Survey Feet

   b. Horizontal Datum: State Plan Coordinates (Geographic zone where project is located)

   c. Vertical Datum: North American Vertical Datum (NAVD) 1988

4. Collected GPS data must be submitted to the Engineer in a raw data format file, including an export of data to a .txt or .csv file in the format of northing, easting, elevation, and description coordinates.

D. Dimension Tolerances for As-Built Drawings: Dimensions provided on as-built drawings, whether measured by GPS or conventional methods, shall meet the following requirements:

Project Type or Structure	***Horizontal (X,Y)***	***Vertical (Z)***	***Minimum GPS Grade***
1. Water Lines and Appurtenances	<1 meter	Not required	Mapping
2. Force Mains and Appurtenances	<1 meter	Not required	
3. Sewer Lines and Appurtenances (See manholes below)	<1'	<0.10'*	Mapping*
4. Force Mains and Appurtenances	<1'	<0.10'*	Mapping*
5. Storm Drains and Appurtenances	<1'	<0.10'*	Mapping*
6. Roadways, Sidewalks and Similar	<1'	<0.10'*	Mapping*
7. Location of Building and Structures	<1'	<0.05'	Survey
8. Actual Dimensions of Buildings and Structures and Finished Floor Elevations	<¼"	<0.01’*	Survey
9. Temporary Benchworks		<0.01'	Survey
10. Manhole and Wetwell Inverts and Rim Elevations	<1'	<0.01'*	Survey
11. Weirs and Other Critical Elevations	<1'	<0.01'*	Survey

** Where vertical tolerance exceeds mapping grade, elevations must be supplemented by differential leveling using surveyor’s level and grade rod.*

***Tolerances are for recording purposes only; actual construction may require closer tolerances than those noted.*

1.12 Operation and Maintenance Manuals: If applicable and before the work is 50% complete, the Contractor shall submit three printed copies and one digital pdf file of operation and maintenance manuals for equipment as specified. The digital file shall be provided on a single drive or disk. Each component shall be labeled per the specification section referenced, for example:

"8.22 Aluminum Gates.pdf" or "11.13 Mechanical Bar Screen.pdf"

1.13 Clean-Up: Upon completion of the work, all excess material and rubbish shall be removed from the job site and disposed of as directed by the Engineer. The surrounding construction area shall be left in essentially as good a condition as existed prior to construction.

All unsuitable excavated material must be properly disposed of in a manner acceptable to the Engineer and in a manner that will not adversely impact the environment.

1.14 Payment: No separate payment will be made for the work of this Section. The cost of the work and all cost incidentals thereto shall be included in the price bid for the item to which the work pertains.

SECTION 2
CONTROL OF MATERIALS

2.01 Source of Supply and Quality of Materials: The source of supply for all materials and equipment shall be submitted to the Engineer for review before orders are placed. Suppliers of reinforcing steel, fabricated metal work, and metal castings may be required to submit guarantees of conformity with Drawings and Specifications. Representative preliminary samples of the character and quantity prescribed shall be submitted by the Contractor or producer for examination and tested in accord with the methods referred to under the samples and testing materials section of these Specifications. Only materials conforming to the requirements of the Specifications and reviewed by the Engineer shall be used in the work. All materials proposed to be used may be inspected or tested at any time during their preparation and use. If, after trial, it is found that sources of supply which have been reviewed do not furnish a uniform product, or if the product from any source proves unacceptable at any time, the Contractor shall furnish materials from other reviewed sources. No material, which after approval has in any way become unfit for use, shall be used in the work.

2.02 Samples and Testing of Materials: Unless otherwise specified, standard tests of materials shall be made in accord with the Specifications and tests of the American Society for Testing Materials, by a commercial testing laboratory accepted by the Engineer. Reports of the tests shall promptly be furnished to the Engineer. Tests shall be arranged by the Contractor. The cost of all tests will be paid for by the Owner unless otherwise specified.

2.03 Schedule of Materials and Standard Tests: The following schedule of materials and the standard test to which each is to be subjected is given for the Contractor's guidance.

A. Cement (any quantity): Certificate of mill test to be furnished by producers of laboratory tests made as per ASTM C-1

B. Fly Ash: Independent laboratory test as per ASTM C 618

C. Sand (any quantity for use in cement concrete): Tests to indicate conformity with ASTM C-33

D. Stone and Gravel (any quantity for use in cement): Coarse Aggregate, similar to sand

E. Concrete: Cylinder compression tests of concrete placed in the work from 4 cylinders made for each day's placing of each class of concrete of each 50 cubic yards or fraction thereof. One cylinder shall be broken at 7 days, 2 cylinders shall be broken at 28 days, and one cylinder shall be held in reserve.

F. Brick (1 to 5,000): Visual inspection for shape, color soundness, freedom from cracks, balls of clay, and particles of lime

G. Concrete Masonry Units: Visual inspection for shape, soundness and freedom from cracks and fractures. Laboratory tests are required on at least 5 units as per ASTM C-140.

H. Structural Tile: Visual inspection for shape, soundness, color, texture and crazing. Laboratory tests are required on at least 5 units as per ASTM C-126.

I. Building Stone:

1. 1 to 5 Tons: Visual inspection for shape and color

2. For Each Additional 5 Tons or Part Thereof: Visual inspection for shape and color and test for compression as per ASTM C-97 and C-170

J. Cast Iron Pipe and Ductile Cast Iron Pipe:

1. Field Inspection: Visual inspection for dimensions, coating, cement lining, holes, hammer test, weights

2. Laboratory Tests: Certified test reports by foundry

K. Steel Pipe: ASTM A-134 and A-139

L. Polyvinyl Chloride Pipe:

1. Visual Inspection: To ensure that pipe is homogenous throughout, free from cracks, nicks, gouges, severe scratches, voids, inclusions and other defects, reasonably uniform in color density and other physical properties. Quality Control Certification Seal and markings to include manufacturer's name or trademark, nominal pipe size and size base, PVC Cell Classification or Material Code, Dimension Ratio or Standard Dimension Ratio Number, product type, pressure class or pressure rating standard specification designation, production records code.

2. Laboratory Tests: In amounts and character as per ASTM D-3034 for sewer pipe and AWWA C 900 for water pipe

M. Structural Steel:

1. Any Quantity: Field inspection for rust, shape, and dimensions

2. 25 to 200 Tons: Independent shop inspection and certified copies of mill tests

3. For Structures and Buildings: See ASTM A-36

N. Concrete Reinforcement Steel:

1. Up to 50,000 Pounds: Field inspection for rust, shape and dimensions

2. 50,000 Pounds and Up: Independent laboratory inspection as follows:

a.	Billet Steel:	ASTM A-615
b.	Roll Steel:	ASTM A-616
c.	Cold-Drawn Steel Wire:	ASTM A-82
d.	Wire Fabric:	ASTM A-185

O. Cast Iron Castings:

1. Field Inspection: For dimensions, coatings, holes, hammer test

2. Laboratory Tests: Certified test reports by foundry

2.04 Payment: No separate payment will be made for work under this Section of the Specifications. The cost of such work and all cost incidentals thereto shall be included in the price bid for the item to which the work pertains.

SECTION 3
SOIL EROSION, SEDIMENT CONTROL AND STORMWATER MONITORING

3.01 Soil Erosion and Sediment Control Program: Siltation and soil erosion shall be prevented by the installation of erosion control measures and practices prior to or concurrent with land-disturbing activities. The Contractor shall utilize silt fence, hay bales, mulch, grass, slope drains and other erosion control devices or machines as necessary. All soil erosion and sedimentation control measures must be installed prior to initiation of construction activity. Siltation and erosion control shall be in compliance with the "Georgia Erosion and Sedimentation Act of 1975" as amended to date and these Specifications. Erosion, sedimentation and pollution control may include temporary construction work outside the right of way where necessary as a result of construction operations, such as haul roads and equipment storage sites. Any violations of the Act shall be subject to those penalties and fines as defined by the Act.

3.02 Erosion Control Program: Vegetation and mulch will be applied to applicable areas **immediately** after grading is completed. Best management practices (BMPs) will be employed to prevent erosion in areas of bare soils and concentrated water flows. Diversions and dikes will be installed to divert sediment-laden runoff into the sediment barriers and to protect cut and fill slopes from erosive water flows.

3.03 Standards and Specifications: All designs will conform to and all work will be performed in accordance with the standards and specifications of the publication entitled "Manual for Erosion and Sediment Control in Georgia" and in compliance with the "Georgia Erosion and Sedimentation Act of 1975" as amended to date. All materials shall be first-class quality to withstand a 25-year storm event.

3.04 Limit of Progress: The Engineer will limit the area of excavation commensurate with the Contractor's capability and progress in keeping the finish grading, mulching, seeding and other such pollution control measures current in accordance with an accepted schedule. Should seasonal limitations make such coordination unrealistic, special erosion control measures shall be taken immediately to the extent feasible and justified. Excavation shall not exceed 100' in advance of pipe laying.

3.05 Construction in Rivers, Streams and Impoundments: Unless otherwise approved in writing by the Engineer, construction operations in rivers, streams and impoundments shall be restricted to those areas which must be entered for the construction of temporary or permanent structures. As soon as conditions permit, rivers, streams and impoundments shall be promptly cleared of all false work, piling which are to be removed, debris, and other obstructions placed therein or caused by the construction operations. Frequent fording of live streams with construction equipment will not be permitted; therefore, temporary bridges or other structures shall be used wherever an appreciable number of stream crossings are necessary. Unless otherwise approved in writing by the Engineer, mechanized equipment shall not be operated in live streams except as may be required to construct channel changes and temporary or permanent structures, and to remove temporary structures.

3.06 Temporary Erosion Control: Temporary erosion control shall consist of planting temporary grass of a quick growing species such as millet, rye grass or cereal grasses

suitable to the area. The Contractor shall use all means necessary to control dust on and near the work site and all offsite borrow areas. The Contractor should thoroughly moisten all surfaces as required to prevent dust from being a nuisance to the public, neighbors and concurrent performance of work on the site. Where the location of temporary erosion control structures are not indicated on the Drawings, the following guidelines shall be used: Install sedimentation structures at the toe of all disturbed earth slopes, around all drainage structure inlets, across constructed drainage ways at approximately 150' centers and at the tops of slopes and terraced slopes as indicated on the details. Siltation fences or hay bales only shall be used across constructed drainage ways. Hay bales only shall be used at drainage structure inlets. Perimeter barriers may be any of the types detailed. All areas left disturbed for a period greater than 14 days shall be stabilized with temporary seeding or straw mulch.

3.07 Silt Fence: Where shown on the Drawings and as directed by the Engineer, the Contractor shall furnish, install, maintain and remove water permeable self-supporting silt fencing to remove sediment laden runoff.

A. Fabric: Silt fencing shall be composed of strong rot-proof synthetic fibers formed into a fabric of either the woven or non-woven type. Either type of fabric shall be free of defects or flaws, coatings which may change its properties after installation, resist exposure to sunlight or heat and have finished edges to prevent fraying. Type fences shall be woven type.

In lieu of silt fence described above, the Contractor may use haybales. Haybales shall be placed as shown on the Drawings and secured with 2"× 4" wood post or No. 4 steel rebar.

1. Type “NS” Fence: Posts shall be a minimum of 4' long and either hardwood or steel may be used. If hardwood is used, the size may be 1.5" × 1.5" with a cross-section of 2.25-square inch. Steel posts shall be “U”, “T” or “C” shaped with a minimum weight of 1.15-pounds per foot with props for fastening the fence. Maximum post spacing shall be 6'. Type “NS” sediment barriers shall have a P-factor no greater than 0.045.

2. Type “S” Fence: Posts shall be a minimum of 4' long and either hardwood or steel may be used. If hardwood is used, the size may be 1.5" × 1.5" with a cross-section of 2.25-square inch. Steel posts shall be “U”, “T”, or “C” shaped with a minimum weight of 1.15-pounds per foot with props for fastening the fence. Maximum post spacing shall be 4'. Type “S” sediment barriers shall have a P-factor no greater than 0.030.

B. Posts and Woven Wire Supports: Post installation shall start at the center of the low point (if applicable) with remaining posts spaced a maximum of 6' apart from Type “NS” fence and 4' apart for Type “S” fence. Post shall be driven in a minimum of 18". Fabric shall be secured to post with nails, staples, wire or string. Toe of fabric shall be buried 6" in the soil with 2" turned back upstream. If fence is erected in sections, a minimum of 18" overlap will be required.

C. Payment: Payment for silt fence will be in accordance with the unit price bid in the proposal as installed and/or other locations as directed by the Engineer. In the event

repairing fence or removing silt deposit is required, the work shall be performed at no additional cost.

3.08 Check Dam: Stone or haybale check dams may be installed as shown. For stone check dams, the drainage area shall not exceed two acres. For hay bales, the drainage area shall not exceed one acre. The center of the check dam must be at least 9" lower than the ends and 2' tall maximum with 2:1 side slopes. A geotextile should be used as a separator between the stone and the soil base. Stone check dams should be graded sizes 2" to 10". Haybales should be staked with 2 × 2 wood post or No. 4 steel rebar and embedded a minimum of 4".

Payment for check dams will be in accordance with the unit price bid in the proposal as installed and / or other locations as directed by the Engineer. In the event repairing of the check dam or removing silt deposit is required, the work shall be performed at no additional cost.

3.09 Riprap: The Contractor shall furnish and place riprap as required and where shown. Riprap shall consist of stone or bagged sand-cement to a thickness of approximately 12". Stone shall be hard quarry or fieldstone of such quality that it will not disintegrate on exposure to water or weathering. Stone shall range in weight from a minimum of 25-pounds to a maximum of 150 pounds with at least 75% of the pieces weighing more than 50-pounds. Bagged sand-cement riprap shall consist of 1 part cement and 5 parts of sand in clean cloth bags approximately one cubic foot in size. Sand and cement shall be as specified for concrete work herein.

Riprap will be paid for based on the number of square yards measured in place to the thickness specified in the proposal at locations shown on the Drawings or other locations as directed by the Engineer.

3.10 Grassing of Disturbed Areas: The Contractor shall furnish and install all materials and provide all labor for grassing and sedimentation control as indicated on the Drawings and/or Specifications.

A. Preparation: The Contractor shall grass all areas that were disturbed by clearing or construction operations. Grassing shall be by conventional seeding or hydroseeding. Before seeding commences, the Contractor shall spread the stored stock piled top soil over the entire area, working the better top soil into the more rocky areas. The entire area shall be smoothed with a drag and all clods broken up. All deleterious material, large stones, roots, limbs and other debris shall be removed to leave a smooth area that would be suitable for mowing. Grassing (by seeding) shall be completed as soon as practical after finish grading is completed in order to minimize erosion from rainfall and runoff. Any erosion occurring in grassed areas shall be immediately repaired.

B. Grass Seed: Grass seed selection shall be in accordance with the "Manual for Erosion and Sediment Control in Georgia" as amended to date. Otherwise, the type of grass seed applied shall be determined by site and soil compatibility and Owner discretion.

C. Temporary and Permanent Seeding: Temporary seeding is required on any areas exposed longer than 14 days. Permanent seeding shall be done only if it can be

completed between March 1st and April 15th or August 15th and November 15th. Use temporary seeding during remaining periods. The Contractor shall provide for later permanent seeding by obtaining a signed proposal to the Owner from an approved local landscaper for the work specified. The Owner shall deduct the amount of the proposal from the final payment. The work of spreading and compacting topsoil shall be performed by the Contractor, as specified, prior to planting rye grass. Replacing or repairing of eroded topsoil shall be done as necessary by the local landscaper at time of later grassing, and this work shall be included in his proposal.

D. Hydro-seeding: Mix the seed (inoculated if needed), fertilizer and wood cellulose or wood pulp fiber mulch with water and apply in slurry uniformly over the area to be treated. Apply within one hour after the mixture is made.

E. Grassing Along Highway Right of Way: Grassing along highway right of way shall be in accordance with Department of Transportation, State of Georgia, Standard Specifications, Construction of Roads and Bridges, 2013 Edition, Section 700.

F. Grassing through Established Pastures and Lawns: Grassing through established pastures and lawns shall be by seeding with the same type of grass as was disturbed or, if acceptable to the Owner, seeding may be as recommended by the local Soil Conservation Agent.

G. Grassing of Other Areas: Grassing of other areas shall be by planting grass of a quick growing species that will also give a permanent cover. Permanent seeding shall be a mixture of Bermuda and centipede.

H. Planting: Preparation of soil along highway right of way shall be as set out in highway specifications. The Contractor shall use recognized equipment and materials in preparation of the soils. Before planting, a fertilizer of 6-12-12 composition or approved equal shall be evenly applied at the rate of 1,500-pounds per acre and disced or harrowed into the dampened soil.

I. Maintenance: Temporary grass may be intermixed with permanent grass. However, the Contractor shall cut and maintain the temporary grass such that the permanent grass will become established and not be choked out. The Contractor will be required to maintain the grass on the site until the job is accepted.

J. Payment: Grassing will be paid for on a lump sum basis and shall include all areas where the existing grass has been disturbed or destroyed by the Contractor's operation. Areas to be grassed shall be designated by the Engineer. Final acceptance and payment of grassing is defined as a full cover, over the seeded area of live and growing grass, when at least 98% of the total area has no bare spots exceeding 1 square foot, and the ground surface is fully stabilized against erosion. The cost of such work and all cost incidentals thereto shall be included in the unit prices bid for the item to which the work pertains.

3.11 Seed, Fertilizer, Mulch: Seed, fertilizer, mulch and periodic watering shall be applied in adequate quantities to assure a satisfactory ground cover over the entire disturbed area of construction operations. Water thoroughly as soon as completed and at least twice daily,

or more often if necessary to provide continuous growth without setback until all growth from seed is thoroughly established.

The mulching material will consist of dry straw or hay of good quality, free of seeds of competing plants, and at the rate of two or two and a half tons per acre, respectively. Straw or hay mulch will be applied uniformly over the disturbed areas to achieve 75% coverage. It must be spread within 24-hours after seeding is done. The spreading must be done by blower-type or other mulch-spreading equipment or by hand and anchored by pressing the mulch into the soil. Anchoring must be done immediately after the mulch is spread. A disk harrow with the disk set straight or a special "packer disk" may be used. The disk may be smooth or aerated and should be 20" or more in diameter and 8" to 12" apart. The edges of the disk should be dull enough not to cut the mulch but sharp enough to press into the soil leaving much of it in an erect position.

No separate payment will be made for the above work. The cost of such work, and all cost incidentals thereto, shall be included in the unit prices bid for the item to which the work pertains.

3.12 Slope Stabilization: Sedimentation shall be controlled by the use of hay mulch on all slopes. On slopes greater than 3:1, the Contractor shall install blankets. Prior to placing the blanket, the grassing shall have been completed and the area left in a smooth, uniform condition, free from stones, lumps, roots, and other material which would prevent the blanket from making snug contact with the underlying soil.

A. Fiberglass Blanket: The fiberglass blanket shall be machine produced consisting of uniform layer of continuous, randomly-oriented glass fiber strands. The blanket shall be at least 48" wide and weighing a minimum of 0.2 pounds per square yard when used on slopes and 0.4 pounds per square yard when in waterways.

1. Securing and Stapling: All staples shall be driven flush with the ground. Staples for securing the blanket shall be made from cold drawn wire not less than 6" lengths of 14-gauge, to form a "U" of 1" in width. Longer staples may be required for loose soil.

   Each strip of the blanket shall be held firmly in place by means of three rows of staples; one row along each edge and one row along the middle. The staples shall be spaced no more than 3' apart in each row with the staples in the middle row spaced alternately with those at the edges. The edge staples shall be placed in the 2" overlap. At the end of each blanket, staples shall be placed in a row with spacing of approximately 12".

   An anchor slot or trench, 9" in depth, shall be dug across the upgrade end of the site. The first 12" of the blanket shall be placed in the trench and the backfill tamped solidly in place. Adjacent strip ends shall overlap 2" and adjoining ends shall overlap 6" with the upstream section on top.

B. Organic Fiber Blanket:

1. Straw Blanket: The straw blanket shall be a machine-produced blanket of clean, weed-free straw from agricultural crops with consistent thickness and the straw evenly distributed over the entire area of the blanket.

a. Slopes: The top of each blanket shall be covered with a photodegradable plastic mesh having a maximum mesh size of 5/16" × 5/16" which is sewn to the straw using biodegradable thread. The blanket shall be at least 48" wide with a minimum thickness of ⅜" and a minimum dry weight of 0.5-pounds per square yard.

b. Waterways: The blanket shall be the same as for slopes except having the photodegradable plastic mesh on the top and bottom.

2. Excelsior Blanket: A machine produced mat of curled wood excelsior of which 80% has 6" or longer fiber length with consistent thickness and the fiber evenly distributed over the entire area of the blanket. The blanket shall be smolder resistant. The top of the blanket shall be clearly labeled.

a. Slopes: The top of each blanket shall be covered with a photodegradable plastic mesh having a maximum mesh size of 1½"× 3". The blanket shall be at least 48" wide with a minimum thickness of ¼" and a minimum dry weight of 0.8-pounds per square yard.

b. Waterways: The blanket shall be the same as for slopes except having the photodegradable plastic mesh on the top and bottom.

3. Securing and Stapling: Staples shall be driven vertically into the ground to anchor the plastic mesh. Staples shall be spaced approximately 2-yards apart on each side of the blanket and one row in the center alternately spaced between each side staple. Where blankets are laid side to side, the staples shall be placed with half of the staple anchoring mesh from each blanket. At the beginning of a blanket, staples shall be placed in a row with spacing of approximately 12".

In waterways, there shall be no longitudinal seams unless overlapped at least 6" with the upgrade section on top. The first 12" of the first row of blankets shall be placed in a 6" deep anchor slot stapled in the bottom, and the slot shall be backfilled and solidly tamped.

C. Payment: The cost of such work, and all cost incidentals thereto, shall be included in the lump sum bid for the item to which the work pertains

3.13 Final Stabilization: When monitoring is required, stabilized means at least 70% of the soil surface is uniformly covered in permanent vegetation unlike the NPDES Stormwater Discharges Associated with Construction Activities, General Permit (GAR 100001, 100002, 100003), which includes installation of equivalent permanent stabilization measures (such as the use of riprap, gabions, permanent mulches or geotextiles). Permanent vegetation consists of planted trees, shrubs, perennial vines; a crop of perennial vegetation appropriate for the season and region; or a crop of annual vegetation and a seeding of target crop perennials appropriate for the region such that within the growing season a 70% coverage by the perennial crop is achieved. For linear construction projects on agricultural or silvicultural lands, stabilized means stabilizing it for its agricultural or silvicultural use.

Final acceptance of grassing for payment is defined as a full cover, over the seeded area of live and growing grass, when at least 98% of the total areas has no bare spots exceeding 1-square foot, and the ground surface is fully stabilized against erosion.

3.14 Maintenance Program: Best management practices will be inspected daily. Any damages will be repaired by the end of the day. Cleanout of sediment control structures will be accomplished in accordance with the publication entitled "*Manual for Erosion and Sediment Control in Georgia*," latest edition and sediment disposal accomplished by spreading on the site. Sediment basins and barriers will remain in place until disturbed areas are stabilized. The sediment control barriers will then be removed and the areas by these structures grassed.

No separate payment will be paid for the above work, except silt fence, unless the work performed was in accordance with "Grassing of Disturbed Areas" paragraph, then payment would be made on a linear foot basis as specified. Otherwise, the cost of the above work and all cost incidental thereto shall be included in the unit prices bid for the item to which the work pertains. In case of failure on the part of the Contractor to adequately control erosion, pollution, and / or siltation, the Owner reserves the right to employ outside assistance or to use his own forces to provide the necessary corrective measures. Such incurred direct costs plus Project Engineering costs will be charged to the Contractor and appropriate deductions made from the Contractor's monthly progress estimate.

3.15 Stormwater Monitoring: Under the requirements of the NPDES Stormwater Discharges Associated with Construction Activities, General Permits (GAR 100001, 100002, 100003) for projects greater than 1.0 acres, the Contractor is required to act as a Primary Permittee. The Contractor shall submit the Notice of Intent (NOI) to the Georgia Environmental Protection Division (EPD) 14 days prior to the commencement of Construction activities using the Georgia EPD Online System (GEOS) for Permitting, Compliance and Facility Information. The General Contractor is responsible for GEOS system registration.

Prior to construction, a copy of the NOI shall be provided to the Engineer. The Contractor shall pay all Land Disturbing / NOI fees to the Georgia EPD and / or the Local Issuing Authority (LIA).

In addition, the Contractor shall submit "Monthly Records" by the 15th of each month following a sampling event utilizing GEOS. Any questions should be directed to the Georgia EPD and/or the LIA. In order to submit the Notice of Termination (NOT), the Contractor must meet all requirements of Final Stabilization, receive approval of Engineer, and meet all sampling requirements. A copy of the NOT shall be provided to the Engineer along with the final pay request.

A. Sampling Guidelines:

1. Rainfall must be recorded daily (once every 24 hours) at the site.

2. Samples must be collected as 'grab samples' and analyzed in accordance with 40 CFR Part 136, NPDES Stormwater Sampling Guidance Document EPA 833-B-92-001, and any guidance prepared by the Georgia EPD. Below is a list of approved test procedures for Turbidity included in 40 CFR Part 136:

a. Standard Methods, 18th Edition 2130B

b. ASTM D1889-88(A)

c. USGS I-3860-85

3. Sample containers should be labeled prior to sample collection.

4. Samples should be well mixed before transferring to a secondary container.

5. Collection containers should be large mouth, well-cleaned and rinsed glass or plastic.

6. Manual or automatic sampling may be utilized. Sample analysis should be done immediately but never longer than 48 hours after collection. Cooling of samples is not required.

7. Any sampling and analysis done beyond the minimum frequency required by permit must be reported to the Georgia EPD in same format as monitoring report.

8. Sampling shall be representative of the monitored activity and the water quality of the receiving water and/or stormwater outfall. Both upstream and downstream sampling shall be performed in accordance with these specifications and as may be required by the General Permits (GAR 100001, 100002, 100003) at each sample site location as indicated on Drawings. Monitoring multiple sample sites concurrently will only be required if multiple sites are disturbed and have not been stabilized as defined in the "Final Stabilization" section of these Specifications.

9. Upstream sample must be taken immediately upstream of first stormwater discharge from the permitted activity but downstream of any other stormwater discharges not associated with the permitted activity.

10. Downstream sample must be taken immediately downstream of last stormwater discharge from the permitted activity but upstream of any other stormwater discharge not associated with the permitted activity.

11. Several samples from across the receiving water may need to be taken and the arithmetic mean of the turbidity of the samples used to derive turbidity value, where appropriate.

12. Ideally, samples should be taken from the horizontal and vertical center of the stream or outfall channel being sampled.

13. Avoid stirring bottom sediments during sampling.

14. When sampling, hold sampling container with mouth facing upstream.

15. Keep samples free from floating debris.

B. Sampling Points:

1. For Non-Linear Construction: The Contractor must sample all receiving water(s), or all outfall(s), or a combination or receiving water(s) and outfall(s).

2. For Infrastructure Construction: The Contractor must sample all perennial and intermittent streams and other water bodies shown on the USGS topographic map and all other field verified perennial and intermittent streams and other water bodies. However, the Contractor may sample the representative perennial and intermittent streams, other water bodies or outfalls, or a combination thereof if approved by the Engineer who prepared the Plan and the Engineer certifies that an increase in the turbidity of a specific identified receiving water to be sampled will be representative of the increase in the turbidity of a specific identified un-sampled receiving water. If this option is selected, the Contractor shall furnish a written rationale and detailed analysis justifying representative sampling.

   a. The Contractor does not have to sample sheetflow that flows onto undisturbed natural areas or areas stabilized by the project.

   b. If at any time during the life of the project a selected receiving water no longer represents another receiving water, then the Permittee shall sample the latter receiving water until an alternate representative receiving water is selected.

   c. If at any time during the life of the project, receiving water is determined not to be represented as certified in the Plan, the Permittee shall sample that receiving water until a Notice of Termination (NOT) is submitted or until the applicable phase is stabilized.

   d. Monitoring obligations shall cease for any phase of the project that has been stabilized as defined in the "Final Stabilization" section of these specifications.

C. Sampling Frequency:

1. Contractor must sample at least once for each rainfall event described below. Samples must be taken within 45 minutes of:

   a. The accumulation of the minimum amount of rainfall, if the storm discharge to a monitored receiving water or from a monitored outfall has begun at or prior to the accumulation, or

   b. The beginning of any stormwater discharge to a monitored receiving water or from a monitored outfall, if the discharge begins after the accumulation of the minimum amount of rainfall

   However, where manual and automatic sampling are impossible or are beyond the Permittee's control, the Permittee shall take samples as soon as possible, but in no case more than 12 hours after the beginning of the stormwater discharge.

D. Qualifying Rainfall Events:

1. First rainfall event greater than or equal to ½" during normal business hours that occurs after all clearing and grubbing operations have been completed with implementation of BMP's. (Monday thru Friday, 8:00 A.M. to 5:00

P.M. and Saturday 8:00 A.M. to 5:00 P.M. when construction activity is in progress.)

2. First rainfall event greater than or equal to ½" during normal business hours occurring either 90 days after the first sampling event or after all mass grading operations have been completed, whichever comes first.

3. In addition to the above events, where BMPs have not been properly designed, installed, or maintained, corrective action shall be defined and implemented within 2 business days and turbidity samples shall be taken from discharges for each subsequent rainfall event greater than or equal to ½" during normal business hours until the selected turbidity standard is attained, or until post-storm event inspections determine BMPs have been properly designed, installed, and maintained.

4. Sampling may occur from any rainfall event that reaches or exceeds ½" and allows for monitoring at any time of the day or week.

E. Reporting Requirements:

1. The Contractor is required to submit a summary of the monitoring results to the Georgia EPD by the 15th of the month using GEOS and to the local issuing authority in jurisdictions authorized to issue a Land Disturbance Activity permit. For a monitoring period during which no qualifying rainfall events occur, a monitoring report must be submitted stating such. Monitoring periods are calendar months. Monitoring reports must be submitted to the Georgia EPD until the NOT is submitted. Enclosed are suggested forms for your use including a monthly monitoring summary report, a daily sampling form and a rainfall data log form. The Contractor may use other report forms; however, the format of all forms should be as prescribed by the Georgia EPD.

2. Upon written notification, the Georgia EPD may require the Contractor to submit the monitoring results on a more frequent basis.

3. Sampling and analysis of any stormwater discharge(s) or the receiving water(s) beyond the minimum frequency stated in Permit No. GAR 100001, 100002, 100003 must be reported in a similar manner to appropriate District Georgia EPD office.

4. The monitoring reports must be signed by an appropriate person as detailed in Part V.G Signatory Requirements in General Permit (GAR 100001, 100002, 100003).

5. As required by the General Permit (GAR 100001, 100002, 100003), the Contractor shall retain a copy of the Erosion, Sedimentation, and Pollution Control Plan at the construction site or be readily available at a designated alternate location from the date of project initiation to the date of final stabilization.

   Copies of all Notices of Intent, Notices of Termination, reports, plans, monitoring reports, monitoring information, including all calibration and

maintenance records and all original strip chart recordings for continuous monitoring instrumentation, Erosion, Sedimentation and Pollution Control Plans (ESPC), records of all data used to complete the Notice of Intent, and all other records required by General Permit (GAR 100001, 100002, 100003) shall be retained by the Permittee who either produced or used it for a period of at least three years from the date that the site is finally stabilized. These records must be maintained at the Contractor's primary place of business once the construction activity has ceased at the permitted site. This period may be extended by request of the Georgia EPD at any time upon written notification to the Permittee.

F. Inspection and Entry: Inspections must be done by qualified personnel provided by the contractor, a primary Permittee. Qualification involves successfully completing an erosion and sediment control short course eligible for continuing education units or an equivalent course approved by the Georgia EPD and the State Soil and Water Conservation Commission.

1. Inspections must be done at least once every 14 calendar days and within 24 hours of the end of a storm that is ½" or greater until a Notice of Termination is submitted on the following areas:

   a. Disturbed areas that have not undergone final stabilization

   b. Areas used for storage of materials that are exposed to precipitation that have not undergone final stabilization

   c. Structural control measures to ensure they are operating correctly. Where discharge locations are accessible, they should be inspected to see if measures of control are effective.

2. Inspections must be done each day when any type of construction activity has taken place of the following areas:

   a. Where petroleum products are stored, used, or handled for spills and leaks from vehicles and equipment

   b. Locations where vehicles enter or exit the site for evidence of off-site sediment tracking, this inspection must be done until the Notice of Termination is submitted.

3. Inspections must be done at least once per month during the term of the permit the areas that have undergone final stabilization for evidence of or the potential for pollutants entering the drainage system and the receiving water(s). Erosion and sediment control measures should be observed to ensure that they are operating correctly. Discharge points should be inspected to check effectiveness of control measures. As a result of inspection, the ESPC Plan should be revised no later than 7 days following the inspection to correct any problems.

4. A report documenting inspections should be kept on site until entire site or that portion of a project that has been phased has undergone final stabilization and an NOT submitted to the Georgia EPD. The report should

contain the name of personnel inspecting, date of inspections, observations, and any corrective actions taken. Any incidents of non-compliance should be identified. If there are none, the report should certify that there were none.

5. The Permittee shall allow the Director or an authorized representative of EPA, State or local government or, in the case of construction site which discharges through a municipal separate storm sewer, an authorized representative of the municipal operator of the separate storm sewer receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to:

   a. Enter upon the primary Permittee's premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of the permit;

   b. Have access to and copy at reasonable times, any records that must be kept under the conditions of this permit; and

   c. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment).

G. Violations: Failure to properly design, install, or maintain best management practices constitutes a violation for each day on which such a failure occurs. A discharge of stormwater runoff from disturbed areas where best management practices have not been properly designed, installed, or maintained constitutes a separate violation for each day on which such discharge results in the turbidity of receiving water(s) being increased by more than 10 nephelometric turbidity units for water classified as trout streams or more than 25 nephelometric turbidity units for water supporting warm water fisheries. When the Contractor has elected to monitor outfall(s), the discharge of stormwater runoff from disturbed areas where best management practices have not been properly designed, installed, and maintained constitutes a separate violation for each day on which the turbidity of the discharge exceeds the nephelometric turbidity unit (NTU) value as determined by the property Owner's Engineer.

H. Payment: Payment for implementation and maintenance of the Plan shall be in accordance with the unit prices as bid under the Erosion, Sedimentation, and Pollution Control Plan pay item. The Contractor shall be paid a unit price amount for establishing, constructing or putting into operation each monitoring site. A monitoring site indicated on the drawings and as described in these specifications shall include both an upstream and downstream sample point. This unit price amount should include all reports, rainfall measuring and inspection for each monitoring site. The Contractor will then be paid for each sampling event at each monitoring site. The sampling events shall be as defined in paragraphs C and D of this section. At each pay estimate for the project, the Contractor will be required to submit one (1) copy of all logs, reports, and sample data to justify payment. Final payment for this work cannot be issued until an NPDES Notice of Termination has been filed for all work and final sampling has been completed.

STORMWATER MONITORING

Daily Inspection Report

Inspection performed by certified personnel each day construction activity occurs on-site

Project Information	
Date:	Project Name:
Project Location:	
Inspection Observations	
Rainfall within past 24 hours (inches):	Is rainfall greater than 0.5"? Inspection Required ☐
Inspection Observations	
Petroleum Product Storage Areas: Are all the temporary and permanent controls contained in Plan in place? ☐ Yes ☐ No If no, describe the location(s) of deficiencies and corrective actions that must be taken.	
Vehicle Entrances and Exits: Is there tracking of sediment from locations where vehicles enter and leave the projects? ☐ Yes ☐ No If yes, describe the location(s) of the corrective actions that must be taken.	
Other Observations	
Is an Erosion, Sedimentation and Pollution Control Plan revision required? ☐ Yes ☐ No Date of revision:	
Corrective Actions and Date:	

"I Certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that certified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signature of Certified Personnel

Printed Name of Certified Personnel

NOTICE: THESE RECORDS MUST BE MAINTAINED BY THE PRIMARY PERMITTEE AT THE CONSTRUCTION SITE UNTIL FINAL STABILIZATION. AFTER FINAL STABILIZATION OF THE PERMITTED SITE, THESE RECORDS MUST BE KEPT AT THE PRIMARY PERMITTEE'S PLACE OF BUSINESS FOR A MINIMUM PERIOD OF THREE YEARS.

STORMWATER MONITORING
Daily Rainfall Log

Project Name: _____

Project Location: _____

Month: _____ Year _____

Type of Device Used to Measure Rainfall: _____

Device Location: _____

Daily Rainfall Monitoring Data

Date	Rainfall Amount (inches)	Time	Reported By
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
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NOTICE: THESE RECORDS MUST BE MAINTAINED BY THE PRIMARY PERMITTEE AT THE CONSTRUCTION SITE UNTIL FINAL STABILIZATION. AFTER FINAL STABILIZATION OF THE PERMITTED SITE, THESE RECORDS MUST BE KEPT AT THE PRIMARY PERMITTEE'S PLACE OF BUSINESS FOR A MINIMUM PERIOD OF THREE YEARS.

STORMWATER MONITORING

Weekly Inspection Report

Inspection performed by certified personnel at least once every seven calendar days and within 24-hours of the end of a storm that is 0.5 inches or greater

Project Information	
Date:	Project Name:
Project Location:	
Name of Inspector:	
Inspection Event	
Regular weekly Inspection: ☐	Inspection within 24 hours of 0.5" storm event ☐

Inspection Observations

Disturbed areas that have not undergone final stabilization:

Are all temporary and permanent controls contained in Plan in place and properly maintained? ☐ Yes ☐ No

If no, describe the location(s) of deficiencies and corrective actions that must be taken.

Corrective Action Taken and Date:

Material storage areas exposed to precipitation:

Are all of the temporary and permanent controls contained in Plan in place and properly maintained? ☐ Yes ☐ No

If no, describe the location(s) of deficiencies and corrective actions that must be taken.

Corrective Action Taken and Date:

Discharge locations or points.

Are erosion control measure preventing impacts to receiving waters? ☐ Yes ☐ No

If no, describe observations:

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Weekly Inspection Report (Continued)

Structural control measures.

Are all of the temporary and permanent controls contained in Plan in place and properly maintained? ☐ Yes ☐ No

If no, describe the locations(s) of deficiencies and corrective actions that must be taken.

Control Measures	Location	Deficiency	Date Corrected

Other Observations

Is an Erosion, Sedimentation and Pollution Control Plan revision required? ☐ Yes ☐ No Date of revision:

"I Certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that certified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signature of Certified Personnel

Printed Name of Certified Personnel

NOTICE: THESE RECORDS MUST BE MAINTAINED BY THE PRIMARY PERMITTEE AT THE CONSTRUCTION SITE UNTIL FINAL STABILIZATION. AFTER FINAL STABILIZATION OF THE PERMITTED SITE, THESE RECORDS MUST BE KEPT AT THE PRIMARY PERMITTEE'S PLACE OF BUSINESS FOR A MINIMUM PERIOD OF THREE YEARS.

STORMWATER MONITORING

Monthly Inspection Report

Inspection performed by certified personnel at least once per month

Project Information	
Date:	Project Name:
Project Location:	
Inspection Observations	
Rainfall within past 24 hours (inches):	Is rainfall greater than 0.5"? Inspection Required ☐

Inspection Observations

Areas that have undergone final stabilization:

Are all permanent stabilization controls contained in Plan in place? ☐ Yes ☐ No

If no, describe the location(s) of deficiencies and corrective actions that must be taken.

Other Observations:

Are pollutants entering the drainage system or receiving waters? ☐ Yes ☐ No

If yes, describe the location(s) of the corrective actions that must be taken.

Are all erosion and sediment control measure operating properly? ☐ Yes ☐ No

If no, describe the location(s) of the corrective actions that must be taken.

Other Observations

Is an Erosion, Sedimentation and Pollution Control Plan revision required? ☐ Yes ☐ No Date of revision:

Corrective Actions and Date:

"I Certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that certified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signature of Certified Personnel

Printed Name of Certified Personnel

NOTICE: THESE RECORDS MUST BE MAINTAINED BY THE PRIMARY PERMITTEE AT THE CONSTRUCTION SITE UNTIL FINAL STABILIZATION. AFTER FINAL STABILIZATION OF THE PERMITTED SITE, THESE RECORDS MUST BE KEPT AT THE PRIMARY PERMITTEE'S PLACE OF BUSINESS FOR A MINIMUM PERIOD OF THREE YEARS.

STORMWATER MONITORING

Site Inspection Report

(To be completed every 7 days AND within 24-hour of a qualifying rainfall event)

Erosion and Sedimentation Inspection Report

Project Name:	Date:	Time:
Inspector:	Accompanied By:	
Stage of Construction:		
Site:		
Observation:		
Recommendations:		
Contractor's Corrective Action (and Date):		
Site:		
Observation:		
Recommendations:		
Contractor's Corrective Action (and Date):		
Site:		
Observation:		
Recommendations:		
Contractor's Corrective Action (and Date):		

NOTICE: THESE RECORDS MUST BE MAINTAINED BY THE PRIMARY PERMITTEE AT THE CONSTRUCTION SITE UNTIL FINAL STABILIZATION. AFTER FINAL STABILIZATION OF THE PERMITTED SITE, THESE RECORDS MUST BE KEPT AT THE PRIMARY PERMITTEE'S PLACE OF BUSINESS FOR A MINIMUM PERIOD OF THREE YEARS.

STORMWATER MONITORING
Inspection Summary

Site: _____ LDA No. _____

Map Site	Violation	First Date	Date Corrected

NOTICE: THESE RECORDS MUST BE MAINTAINED BY THE PRIMARY PERMITTEE AT THE CONSTRUCTION SITE UNTIL FINAL STABILIZATION. AFTER FINAL STABILIZATION OF THE PERMITTED SITE, THESE RECORDS MUST BE KEPT AT THE PRIMARY PERMITTEE'S PLACE OF BUSINESS FOR A MINIMUM PERIOD OF THREE YEARS.

STORMWATER MONITORING
Summary Stormwater Discharge Data

Site: _____ LDA No. _____

Date	Rainfall (in.)	Location	Reading (NTU)	Comments

NOTICE: THESE RECORDS MUST BE MAINTAINED BY THE PRIMARY PERMITTEE AT THE CONSTRUCTION SITE UNTIL FINAL STABILIZATION. AFTER FINAL STABILIZATION OF THE PERMITTED SITE, THESE RECORDS MUST BE KEPT AT THE PRIMARY PERMITTEE'S PLACE OF BUSINESS FOR A MINIMUM PERIOD OF THREE YEARS.

STORMWATER MONITORING
MONTHLY RECORDS

Month: _____ **Year:** _____ **Sheet** _____ **of** _____

Submit to EPD by 15th of Following Month

Project Name: _____ **Project Location:** _____

Date Sampled	Rainfall Amount (Inches)	Exact Location of Samples	Time Sampled	Sampling Technique Manual for Automatic	Sampled By	Date of Analysis	Time of Analysis	Analyzed By	Analytical Method	Results (NTU)

_____ _____

Signature Date

SECTION 4
CONCRETE

4.01 General: The work described by this Section consists of furnishing all materials and equipment and performing all labor for the complete construction of all concrete work, including all work and appurtenances thereto, as shown or specified or both. Work shall include the installation of all sleeves, inserts, piping, hangers, anchors, frames and other items to be built into the concrete work, and all other work and appurtenances specified or required or both for proper execution of the work. All products to be built into concrete work shall be correctly positioned in the formwork. Positioning must be inspected and approved by the Engineer before concrete is placed.

4.02 Applicable Specifications and Quality Assurance: Concrete work shall conform to all requirements of ACI-318 *Building Code Requirements for Structural Concrete,* ACI-350 *Code Requirements for Environmental Engineering Concrete Structures* and ACI301 *Specifications for Structural Concrete.*

4.03 Concrete: Concrete shall be composed of cement, Class F fly ash (if required), admixtures (if required), fine aggregate, coarse aggregate and water proportioned and mixed to produce a plastic workable mix in accordance with the requirements of this Section and shall be suitable for the specific conditions of placement. Concrete shall be classified as 'A,' 'B' or 'C,' shall have normal setting characteristics (unless high early strength cement is specified); shall be used in the locations identified below and shall have 28-day compressive strengths not less than those listed below, except that concrete containing high early strength cement shall have 7-day compressive strengths not less than those listed below.

A. Class 'A-1' concrete shall have a compressive strength of not less than 4,000-psi, and shall be used for reinforced concrete work and for unreinforced footings not thicker than 8".

B. Class 'A-2' concrete shall be used for slabs and walls for all water containment structures. Class 'A-2' concrete shall have a compressive strength of not less than 4,000-psi.

C. Class 'B' concrete shall have a compressive strength of not less than 2,500-psi, and shall be used for blocking gravity type walls and for unreinforced footings and slabs thicker than 8".

D. Class 'C' concrete shall have a compressive strength of not less than 1,500 psi and shall be used for concrete sub foundations, pipe envelopes and concrete backfill where required.

4.04 Materials:

A. Admixture: Admixture may be added to Class 'A-1,' Class 'A-2' and Class 'B' concrete if its addition is approved by the Engineer. If approved, it shall be added in accordance with the admixture manufacturer's printed instructions. A standard dispenser shall be used to introduce the admixture into the mix, and the services of

the admixture manufacturer's representative to install and establish the operation of the dispenser shall be furnished by the Contractor.

B. Fine Aggregate: Fine aggregate shall be natural sand having fineness modulus of no less than 2.30 and no more than 3.00. Variation in fineness modulus shall be limited to +0.20 from the average of all tests.

Aggregate shall satisfy the requirements of ASTM C33, amended to date, except that gradation shall be as follows:

Sieve Size	***Percent Passing, by Weight***
No. 4, Sieve	95 – 100
No. 8, Sieve	80 – 90
No. 16, Sieve	50 – 85
No. 30, Sieve	25 – 60
No. 50, Sieve	10 – 30
No. 100, Sieve	2 – 10

C. Coarse Aggregate: Coarse aggregate shall be washed gravel or crushed stone consisting of hard, strong, durable and uncoated particles and shall contain neither vegetable matter nor soft, friable, thin and elongated particles in quantities considered deleterious by the Engineer. Coarse aggregates shall satisfy the requirements of ASTM C33, as amended to date, except that gradations shall be as follows:

Sieve Size	***Percent Passing, by Weight***
1-½" Sieve	100
1" Sieve	95 – 100
½" Sieve	25 – 60
No. 4, Sieve	0 – 10
No. 16, Sieve	0 – 5

D. Cement: The cement for concrete Class 'A-1,' Class 'A-2', Class 'B' or Class 'C' shall be Portland Cement. Blaine fineness shall be less than 2,000. Cement types shall be furnished in accordance with the following:

1. Portland Cement shall conform to ASTM C150 Type II.
2. High Early Portland Cement shall conform to ASTM C150 Type III.
3. If Type II cement is not commercially available, subject to prior approval by the Engineer the Contractor may use an approved mix of Type I cement with fly ash. Fly ash, if used, shall satisfy the requirements of ASTM C618, except that loss-on-ignition shall not be more than 6%.
4. Cement shall be ACI 318-11 exposure categories F, S, P and C, and exposure category classes F2, S3, P1 and C1. Additional requirements

include a maximum W/C ratio of 0.45, minimum compressive strength of 4,500 psi and total air content of 6%.

5. Other provisions of these Specifications, except for cement, shall be applicable to such concrete.

E. Fly Ash: Fly ash shall be Class F and conform with the requirements of ASTM C618, as amended to date, except that the loss-on-ignition shall not be more than 6%.

F. Admixtures:

1. Concrete directly exposed to the elements and to cycles of freezing and thawing shall contain 4% (+/-1%) entrained air.

2. Retarder shall be used when ambient air temperature of 75° F or higher is reached or expected during the day. Retarding admixtures shall conform to ASTM C-494.

3. Crystalline Waterproofing Admixture: Class A-2 concrete in liquid containment structure walls only shall contain Xypex C-1000 admixture or approved equal for concrete work containing liquids. Xypex C-1000 admixture shall be dosed at a rate equal to 2% by the weight of Portland cement. For concrete containing fly ash the dosage rate shall be 2% by the combined weight of cement and fly ash.

4. Type-F high-range water-reducing admixture may be added to Type A-1 and A-2 concrete for placement and consolidation. Type-F water-reducing admixture shall conform with ASTM C-494. The admixture shall be able to be "re-dosed" at the site if required, but only if the elapsed time from the time it was batched and the time the concrete is placed is less than 90 minutes. Concrete not placed at or sooner than 90 minutes from the time it was batched shall be returned to the ready mix plant.

5. Admixture to be used shall be approved by the Engineer prior to inclusion into the mix.

G. Water: Water shall be fresh, clean and free from injurious amount of oil and acidic, alkaline and organic materials.

H. Forms: Forms shall be of plywood or of tongue-and-groove lumber and shall be of grade and type which will provide the concrete finish required. Forms constructed of tongue-and-groove lumber shall be lined when used to form exposed-to-view surfaces; form lining, where used, shall be tempered fiberboard not thinner than ⅛". Metal forms and other types of manufactured forms shall not be used unless their use has been approved by the Engineer. Form oil shall be non-staining mineral oil. Form ties shall be of the cone nut threaded rod or standard snap-tie type and designed so that when removed, no metal will be left closer than 1" from the finished concrete surface. The cavities left in faces of concrete work by removal of form ties shall be pointed-up with non-shrink mortar. Form ties shall have a working strength of not less than 3,000 pounds when fully assembled and must be approved by the Engineer.

I. Grout: Grout shall be composed of 1 part Portland Cement to 1 part sand to 2 parts of aggregate no larger than ⅜" and to those parts of water which will produce a grout having a consistency approved by the Engineer.

J. Floor Hardener: Floor hardener shall be a silicious aggregate: Master Builders "Mastercron Aggregate," Devoe Paint Division of Cleanese Coatings Company "Hurundum," or equal.

K. Water Stops: Water stops shall be of those configurations and types shown on the Drawings.

L. Nonshrink Cement Based Grout: The work covered in this Specification consists of furnishing all manufactured nonshrink cement-based grout where called for on the Drawings. Grout shall be Five Star Grout as manufactured by U.S. Grout Corporation or equal. Nonshrink grout shall contain only premeasured, prepackaged materials supplied by the manufacturer. Water to be used for mixing Portland Cement manufactured grout shall be potable.

1. Requirements for Nonshrink Cement-Based Grout: Manufacturer must submit certified information verifying:

   a. Plastic Volume Change: The grout shall show no shrinkage (0.0%) and a maximum of 4.0% expansion at any time before initial set when testing according to ASTM C827.

   b. Hardened Volume Change: The grout shall show no shrinkage (0.0%) and a maximum of 0.2% expansion on the hardened state.

   c. Compressive Strength: All nonshrink cement-based grout shall show a minimum 28 day compressive strength of 5,000 psi at standard laboratory temperatures when tested according to ASTM C109.

   d. Placeability: All nonshrink cement-based grouts shall be capable of a flowable consistency (124 – 145 flow) when tested according to ASTM C109. Standard nonshrink cement-based grout shall have a minimum initial set time of 60 minutes when tested according to ASTM C191.

   e. Soundness: The grout shall contain no metallic substances, aluminum powder or other materials known to compromise long-term durability.

   f. Technical Service: Technical service shall be made available by the manufacturer upon request of the Contractor for purposes of advising on proper procedures dealing with grout installation.

2. Expansion Joint Filler: Expansion joint filler and sealer shall be as shown in the Drawings.

M. Sand-Cement Repair Mortar: Mortar used for filling voids in concrete surfaces shall consist of not more than one part Portland cement to two and one-half parts sand by damp, loose volume.

N. Smooth Steel Rods for Expansion Joints: ASTM A 36, smooth, round dowels shall be sawed to the length indicated; shearing of dowels will not be allowed. Dowels shall be of size, length and spacing indicated on the drawings.

O. Supports for Reinforcing Bars: Bar supports including bolsters, chairs, spacers and other devices for slabs and mats cast on earth shall be of the height necessary to position the reinforcing bars as indicated on the drawings and shall have sand plates or other similar devices to prevent the supports from sinking into the earth grade. Materials for the manufacture of bar supports may consist of steel wire, plastic or precast concrete. Bar supports for elevated slabs and mats shall have plastic coated legs. Concrete bricks may be used to support reinforcing bars for slabs and footings for non-liquid-containment structures cast on grade. Compressive strength of bricks shall not be less than 4,000 psi.

P. Fiber Reinforcement: High zirconia (minimum 16%) alkali-resistant glass fibers specifically designed for use with Portland cement and conforming to ASTM C1666/C1666M and Appendix F, ½"length typical shall be provided.

4.05 Storage: Cement and fly ash shall be stored immediately upon receipt at the jobsite in a thoroughly dry, weather tight and properly ventilated building having adequate provisions for preventing cement from absorbing moisture. Storage shall permit ease of access for inspection and permit definite identification of each shipment.

Fine and coarse aggregate shall be stored separately in a manner which will avoid the inclusion of foreign material. Stockpiles of coarse aggregate shall be built in horizontal layers in a manner which will minimize or eliminate segregation.

4.06 Sampling and Testing: Sampling and testing of aggregate, cement, and concrete cylinders shall be as specified in the "Control of Materials" section, and shall be made by an independent laboratory approved by the Engineer. Costs of all concrete testing shall be paid by the Owner. The Owner shall have access to all places where concrete materials and concrete are manufactured, stored, proportioned, mixed, placed and tested. *Modification 8.2, Standard Minimum Specification for Ready Mix Concrete* shall apply.

A. Aggregate: The Contractor shall select the source of the concrete aggregates which he proposes to use in the work. The Contractor shall furnish suitable samples of those aggregates to the testing laboratory for testing and preparation of design mix not more than 60 days and no less than 30 days in advance of the time of proposed use.

B. Cement: Cement which has been stored for more than 4 months after being tested shall be re-tested before use.

C. Required Concrete Tests: Four cylinders from the same batch of concrete shall be made for each day's placing of each class of concrete of each 50 cubic yards or fraction thereof. Each cylinder shall comprise a test under the definition of this Specification, with 1 cylinder being broken at the age of 7 days, 2 cylinders broken at the age of 28 days and 1 cylinder held in reserve.

D. Owner's Duties in Inspection: All sampling, molding, transportation, storing, curing, preparation for breaking and testing of cylinders shall be the responsibility

of the Owner and shall be performed by qualified personnel observing all requirements of ASTM C31 and ASTM C39. The Owner shall make and record slump test in connection with each sampling of concrete. The Owner shall determine the air content of the concrete delivered to the jobsite. The Owner representative shall visit the batching plant, observe and report on the compliance of procedures used therein with all provisions of this Specification and of applicable ASTM and ACI Standards, observe job conditions in the handling and placing of concrete and report any items of noncompliance with these Specifications to the Engineer.

E. Contractor's Duties in Inspection: The Contractor shall deliver to the laboratory and Owner all materials to be used in tests required by these Specifications. The Contractor shall supply test cylinders, wheelbarrows, shovels, mixing boards, shaded work space for molding cylinders and similar equipment required by the Owner's representative for molding test cylinders. Contractor shall provide stable, insulated storage boxes equipped with thermostatically controlled heat for storage of cylinders for the first 24 hours after molding in accordance with ASTM C31. He shall keep slump cone available for use on the job at all times.

F. Evaluation of Tests: Evaluation of test results shall be in accordance with ACI 214-65. Concrete shall be deemed satisfactory if the average of all 28 day tests representing one design strength is equal to or greater than the design strength and if the following additional conditions are met for 28 day tests.

1. No one test shall be less than 85% of the design strength.
2. The average of any two consecutive tests shall not be less than 92.5% of the design strength.
3. The average of any three consecutive tests shall be equal to or greater than the design strength.
4. Not more than one test in 25 consecutive tests shall fall below the design strength.

G. Faulty Concrete: Failure to measure up to any of the specified conditions constitutes faulty concrete. Unless otherwise directed by the Engineer, faulty concrete shall be removed and replaced with concrete as specified at no expense to the Owner.

H. Additional Tests: Any additional tests must be approved by the Engineer prior to testing at no expense to the Owner. Load test, if permitted by the Engineer, shall be conducted in accordance with the loading criteria as required by the design of the structure as determined by the Engineer.

I. Slump Tests: Slump tests of each concrete placement shall be made in the field with an accurately made sheet iron test cone and shall be made by the Contractor in accordance with the procedure described in ASTM C-143. The slump of concrete to be placed in piers and wall shall not be less than 4", nor greater than 7". The slump for concrete to be placed in slabs on earth shall not be less than 1", nor greater than 4".

J. Leakage Tests: All water holding structures shall have a leakage test performed prior to acceptance. The test shall be performed in accordance with ACI 350.1-01. The testing shall conform to the following:

1. Fill structure to be tested to the normal operating liquid level. Filling rate shall not exceed 4' of water per hour and shall be at continuous uniform rate with continuous monitoring.

2. The exterior surface of the tank shall be monitored for flowing leaks. Repair any flowing leaks which occur before continuing filling.

3. The water shall be kept at the test level for at least 3 days prior to the actual test.

4. Measure the vertical distance to the water surface from a fixed point on the tank above the water surface. Record measurements at 24-hour intervals. The test shall be performed for a minimum of 3 days

5. A drop of the water surface exceeding 1/10 of 1% of the normal volume of contained liquid will be considered failing.

6. The structure will have also been considered to have failed the test if flowing or seeping water is observed, or if moisture can be transferred to a dry hand from the exterior surface.

7. Independently measure change in water volume due to evaporation and precipitation using a 24" deep white, watertight container not less than 10 square feet of surface area. Position the container to experience environmental conditions similar to the structure being tested. The volume change of the structure shall be corrected based on the water volume change in the sample container.

8. Failing tanks which exhibit no visible signs of leaking or seepage may be permitted to be immediately retested.

9. Failing tanks will be drained, repaired and retested until the tank has met the test requirements.

10. Methods for repairing concrete should be submitted as shop drawings for review by the Engineer.

11. Repairs and retesting of tanks shall be accomplished at no additional cost to the Owner.

4.07 Design Mix: Design mix for each classification of concrete to be used in the work shall be prepared and tested by the laboratory. The design mix shall be prepared, proportioned and mixed using samples of the cement, fly ash (if required), admixture (if required) and the aggregates to be used in the work. Not fewer than 4 cylinders shall be made from the design mix for each classification of concrete: 2 shall be tested at 7 days, and 2 shall be tested at 28 days. Cylinders shall be made and tested in accordance with ASTM C-31 and C-39. If an existing design mix that was recently prepared using the same source of proposed materials is demonstrated to conform to this Specification, the Engineer may approve its use in the work.

4.08 Proportioning and Mixing: Proportioning and mixing shall be accomplished either at the jobsite or at a central mix plant. If proportioning and mixing is accomplished at the jobsite, the Contractor shall provide the equipment necessary to positively determine and control the actual amounts of ingredients entering the mix. If proportioning and mixing is accomplished at a central mix plant, the Contractor shall, through the testing laboratory, furnish a laboratory representative who shall control the proportioning and mixing of Class 'A-1' or Class 'A-2' concrete except as may be otherwise approved by the Engineer.

A. Proportioning of materials shall be accomplished in a manner which will produce a workable mixture having a slump within the required limits and having minimum water content.

1. The exact proportion of materials to be used in concrete shall be identical to that established by the design mix except that the proportions of materials shall be changed whenever, in the opinion of the Engineer, a change is necessary to obtain the required strength and the desired density for uniformity and workability. In structures intended to be watertight, good workability will be considered to be primary importance. The equipment necessary to positively determine and control the amounts of materials entering the concrete shall be furnished by the Contractor.

   All materials shall be measured by weight, except for water, which may be measured by volume. One bag of Portland Cement shall be considered to weigh 94 pounds.

2. Cement and Fly Ash Content:

   a. Each cubic yard of concrete containing Type I or Type III cement shall contain not less than the following quantities of cement and fly ash.

      - Class 'A-1' or Class 'A-2': 470 pounds (5 bags) of cement and 100 pounds of Class F fly ash.
      - Class 'B': 376 pounds (4 bags) of cement and 100 pounds of Class F fly ash.
      - Class 'C': 376 pounds (4 bags) of cement; no fly ash required.

   b. Each cubic yard of concrete containing Type II cement shall contain not less than the following quantities of cement:

      - Class 'A-1' or Class 'A-2': 564 pounds (6 bags)
      - Class 'B': 470 pounds (5 bags)
      - Class 'C': 376 pounds (4 bags)

3. In calculating the total water content of mixes, the amount water borne on the surfaces of the aggregates shall in all cases be the least amount necessary to produce a plastic mix having the required strength and the desired density, uniformity, workability and characteristics, yet being within the limits of slump.

4. The total volume of aggregates to be used in each cubic yard of concrete and proportion of fine aggregate to coarse aggregate shall be that amount necessary to produce a dense mixture having the required workability.

B. Jobsite Mixing: Mixing, if accomplished at the jobsite, shall be accomplished with a batch mixer of approved design and of a type which will insure a uniform distribution of the ingredients. The entire contents of the drum shall be discharged before recharging. The volume of each batch shall not exceed the rated capacity of the mixer. The Contractor shall during the mixing and placing of concrete have no fewer than 2 mixers on the jobsite to maintain continuity of the placing in the event of mechanical failure of 1 of the mixers. The mixing of each batch shall continue not less than 1-½ minutes after all ingredients have been placed in the mixer. During mixing the mixer shall rotate at peripheral speed of no fewer than 200' per minute.

C. Central Plant Mixing: Mixing, if accomplished at a central mix plant, shall be accomplished by a plant which has had its layout, equipment and trucks approved by the Engineer. Concrete shall be mixed and transported to the jobsite in accordance with the requirements of ASTM C94. Loading tickets for Class 'A-1' or Class 'A-2' concrete shall be initialed by the laboratory representative and shall bear the time of loading. Tickets shall be handed to the inspector when the trucks arrive at the jobsite and before the load is discharged.

4.09 Installing Smooth Dowels in Construction Joints: Smooth steel dowels shall be smooth, straight and free of any bends or tabs that would prevent the dowels from functioning. Dowels shall be clean and free of dirt, grease, rust, or mill scale. Dowels shall be installed parallel with the surface of the slab, mat or wall and shall be installed square to the face of the joint. The half of the dowel that will be in the second concrete pour shall be lightly greased.

4.10 Placing: Before concrete is placed, the depth and character of the foundations, the adequacy of forms and falsework and the placing of reinforcing steel and inserts must be inspected and approved by the Engineer. Approval, however, shall not relieve the Contractor from the responsibility to produce the required work. Handling and placing of concrete and the preparation for placing concrete shall be as follows:

A. Accumulated water and debris must be removed from excavations and from forms into which concrete is to be placed. Flow of water into those places shall be diverted into side drains or sumps and be removed without disturbing newly placed concrete. Forms, unless lined, shall be thoroughly wetted with water before concrete is placed so as to tighten the joint. Runways for buggies and wheelbarrows, if used, shall not be supported by forms. Concrete shall be conveyed in a manner which will not disturb forms.

B. Concrete shall be placed in daylight. Placing of concrete in a portion of the work shall not be started if that portion of the work cannot be completed during daylight unless otherwise specifically approved by the Engineer. That approval, however, will not be given unless an adequate lighting system is provided and lighting system is approved by the Engineer.

C. Concrete shall not be placed when the atmospheric temperature is cooler than 35°F. If, after placing concrete, the atmospheric temperature becomes cooler than 35°F, the Contractor shall enclose, heat and protect the concrete in a manner which will keep the air surrounding the fresh concrete at a temperature not cooler than 45°F for a period of 5 days after concrete is placed. In addition, all requirements specified in ACI 306.1-90 *Standard Specification for Cold Weather Concreting* shall apply. The Contractor shall assume all risk of protecting the concrete. Unsatisfactory concrete shall be rejected.

D. When the ambient temperature is 90°F or above, special precautions shall be taken during mixing, placing and curing. In no case should the temperature of the concrete, when placed, be above 90°F. Attention shall be given to coordinating the dispatching of trucks with the rate of placement to avoid delays in delivery. When elapsed time from batching to placement is so long as to result in significant increases in mixing water demand or in slump loss, mixing in the trucks should be delayed until only sufficient time remains to accomplished mixing before the concrete is placed. On truck arrival at the jobsite, addition of water shall not be allowed other than that required to adjust the specified slump. The forms and reinforcing steel should be cooled to a temperature of not more than 90°F by spraying with fog nozzles. Admixtures for retardation shall conform to ASTM C494-17, Type B or Type D. Water curing is preferred, but prompt application of curing compound meeting ASTM C309-11 may be used. In addition, all requirements specified in ACI 305.1-06 *Specification for Hot Weather Concreting* shall apply.

E. Concrete shall be transported from the mixer to the point of deposit with a crane-handled bottom-dump concrete bucket, concrete buggies or wheelbarrows. In the event the quality of the concrete as it reaches the forms and the method and placing thereof in the opinion of the Engineer is not satisfactory, the Contractor shall change his method of operation so as to place concrete in a manner approved by the Engineer.

F. Concrete shall be placed in a manner which will prevent the segregation of aggregates and prevent displacing, reinforcing, coating and splattering the concrete reinforcing which is in place. Troughs, pipes, hoppers, chutes and canvas tremies shall be arranged and used in a manner which will insure the concrete is placed in the manner specified. The placing of concrete within formwork shall be regulated in a manner which will insure that the pressure within the formwork, caused by that placing, shall not exceed the design pressure of the formwork. Concrete shall be placed in continuous horizontal layers, the thickness of which in general shall not exceed 4'. Each batch and each layer shall be placed immediately following the preceding batch and layer, so there will be no “cold joints” in the work. Care shall be used to fill each part of the forms. Concrete shall be deposited as near final position as possible. After the concrete has taken its initial set, care shall be used to avoid jarring the formwork and placing strain and vibration on the ends of projecting concrete reinforcements. If concrete must be dropped more than 5', it shall be deposited through a tremie.

1. Concrete when placed shall be compacted with mechanical internal-vibrating equipment. Compaction shall be supplemented with hand spading using a steel-splicing rod. Vibrating equipment shall not be used to transport concrete within forms. Vibrating equipment shall maintain an impulse rate of no less than 5,000 impulses per minute when submerged in concrete. No less than 1 spare vibrator shall be maintained on the jobsite as a relief. The duration of vibration shall be limited to that time necessary to satisfactorily consolidate the concrete without causing objectionable segregation. The vibrator shall not be inserted into lower layers which have begun to set.

2. Thin-section work shall be thoroughly worked with a steel rod. Faces of thin-section work shall be shaped and mortar flushed to the surface. Small diameter holes shall be drilled in formwork beneath large wall sleeves and inserts to prevent the entrapment of air beneath those sleeves and inserts when concrete is placed.

G. Concrete shall be placed and compacted in a manner which forms a dense, compact, impervious structure having smooth faces on exposed surfaces. Concrete work found to be porous, plastered and otherwise defective in the opinion of the Engineer shall be removed and replaced in whole or in part as directed by the Engineer at no additional expense to the Owner.

4.11 Joints:

A. Construction Joints: Construction joints shall be located where shown and where directed and approved by the Engineer. Placing of concrete, once started, shall continue without interruption so that the placement will be monolithic. No less than 72 hours shall elapse between casting of adjoining units unless otherwise approved by the Engineer. The Contractor shall submit to the Engineer for approval the detailed location of construction joints not shown on the Drawings but required for the execution of the work prior to the detailing of any reinforcing steel.

1. Construction joints in footings and walls required for proper execution of the work but not shown shall be located where directed by the Engineer and across regions of low shearing stress so as to least impair the strength and appearance of the work. Special provisions shall be made for joining successive units as shown and as directed by the Engineer.

2. Construction joints in slabs, required for proper execution of the work but not shown, shall be located where directed by the Engineer. Special provisions, including concrete footing for construction joints in slabs on earth, shall be made for joining successive units as shown and as directed by the Engineer.

3. Keys shall be constructed in construction joints where shown and where directed by the Engineer. Keys and water stops shall be placed in those construction joints which will be subject to water pressure.

B. Expansion Joints: Expansion joints, when required, shall be as shown on the Drawings.

C. Bonding: Before placing new concrete work on and against concrete work which has recently set and that which has cured, the surfaces of recently set and cured concrete work shall be thoroughly roughened and made free from all foreign matter and laitance, the forms shall be placed and tightened, and the surfaces of the recently set and cured concrete shall be slushed with grout. New concrete shall be placed before the grout has attained its initial set. Bonding shall be accomplished in a manner which will insure complete bonding. Grout 2" to 4" shall be applied to construction joints.

Bonding of new concrete work to existing hardened concrete shall be accomplished with a multi-component epoxy adhesive complying with ACI 503R and construction procedures complying with ACI 503.2.

4.12 Forms: Forms shall be constructed, braced and removed in accordance with the following:

A. Forms shall be built to conform to the shape, lines and dimensions of the concrete work. Forms shall be set to line and grade and shall be braced, tied and secured in a manner which will withstand placing of the concrete and which will maintain shape and position. Forms shall be tight and be substantially assembled to prevent bulging and the leaking of concrete. Chamfer strips shall be placed in exterior corners of forms. Joints shall be arranged vertically or horizontally. Temporary openings shall be provided, where required, at the bottoms of wall forms and elsewhere to facilitate cleaning and inspecting. Lumber used once in forms shall have nails removed, and the surfaces in contact with concrete work shall be thoroughly cleaned before reusing the lumber for forms. Wall sleeves, inserts and openings shall be properly set in forms.

B. Shores shall be used where necessary. If adequate foundations for shores cannot be obtained, trussed supports shall be provided. Structural members, another work which will be subject to additional loads during construction, shall be adequately shored to protect that work from distortion and damage.

C. Forms shall not be removed until the member supported thereby has acquired sufficient strength to safely support its own weight and the load imposed on it. Tie rod clamps shall be loosened 24-hours after concrete has been placed. Standard snap ties shall be removed when forms are stripped. Care shall be taken to avoid spoiling the concrete surface. Cutting ties back from the face of the wall will not be permitted. Under normal conditions, the time elapsing before the forms may be stripped shall not be less than that shown in the following schedule.

1.	Slabs:	14 days
2.	Columns and Pedestal:	7 days
3.	Walls and Vertical Faces Not Supporting Other Work:	2 days

The use of the schedule shall not relieve the Contractor from his responsibility for the safety of the structure. Wood forms shall be completely removed from all portions of the work, so no material will remain for termite infestation.

4.13 Finishing: Exterior concrete surfaces shall be finished to levels no less than 12" below finish grade levels. Interior concrete surfaces below grade and concrete surfaces exposed

to view shall be finished. Interior of basins shall be finished to a level not less than 12" below normal water level. Concrete not exposed to view shall have rough edges tooled off. Irregularities shall be filled, pointed-up with non-shrink sand, cement, mortar, and spot finished. All imperfect concrete shall be removed to dense solid concrete and repairs made as directed by the Engineer.

When concrete has set sufficiently to permit, forms and form ties shall be carefully removed. Depressions resulting from removal of form ties and other holes and rough places shall be thoroughly wetted with water and pointed-up.

A. Walls and Vertical Surface:

1. Procedures:

a. Surface Preparation: Grind all seams and form joints level with surrounding concrete. Patch any holes, honeycomb, tie holes, and similar imperfections with non-shrink construction grout, including bonding admixture, and allow to dry. Wall surface must have smooth level finish, approved by the Engineer's inspector, prior to beginning the finish coat.

b. Finish Coat: Apply bonding agent in front of grout application, not allowing to dry before grout is applied. Apply thin coat of non-shrink grout mix with rubber coarse sponge. Follow sponge application with carborundum stone, rubbing grout in a circular motion not allowing the grout to dry. Before grout dries, apply a light broom finish using a soft bristle brush.

2. Products:

a. Bonding Agent: Provide acrylic latex liquid bonding admixture compliant with ASTM C1059, Type II, non-yellowing, UV resistant as manufactured by Euclid, WR Meadows, or equal.

b. Non-Shrink Grout: Provide non-shrink, non-staining, non-metallic cement based grout compliant with CRD C 621 and ASTM C 1107 as manufactured by Euclid, WR Meadows, or equal.

B. Slabs on Earth: Before constructing concrete slabs on earth, all piping which will be under those slabs shall have been tested, approved and encased in Class 'C' concrete. The sub-grade shall provide a solid bearing and shall be brought to a true and even plane. Where floor drains occur, floors shall be pitched as shown on the Drawings. The concrete shall have comparatively dry consistency and shall be screeded level or to the proper grade. After compacting and vibrating the concrete, the surface shall be prepared to receive the specified finish.

C. Wood Float Finish: All floors, walks, platforms stairs and other slab work shall have a wood float finish. After screeding to the required grade while the concrete is still green but has hardened sufficiently to bear the finisher's weight, the concrete surface shall be floated with a wood float to a true and even plane, have no visible coarse aggregate and be sufficiently rough to prevent slipping.

D. Floor Topping: Floor topping shall be applied where shown. Sub-base shall be wire-brushed before sub-base has hardened, shall be swept clean, shall be thoroughly wetted and shall be slushed with bonding grout. Topping shall be floated and troweled twice in a manner which will prevent the fine material from being drawn-up. Floor hardener shall be applied in strict accordance with the hardener manufacturer's printed instructions. Other type finishes shall be as shown on the Drawings.

E. Trowel Finish: Apply trowel finish on interior slabs to receive floor coverings or where indicated on Drawings. Troweling shall follow the float finish as previously described and when the surface has sufficiently hardened. Trowel until the surface is free of trowel marks and has a uniform appearance and texture. Any defects that may project through surface coatings or coverings shall be ground smooth.

4.14 Curing and Protecting: Freshly placed concrete shall be protected from rain and flowing water. Concrete shall not be allowed to dry-out from the time it is placed until the expiration of the specified curing period. Methods of curing unless otherwise approved by the Engineer shall be as follows:

A. Concrete shall be kept wet with clean water for period of 7 days after placing. Each day forms are left in place shall suffice for wetting.

B. Curing may be accomplished by leaving forms sufficiently wet to prevent opening of joints.

C. If formwork is removed prior to seven days following placement concrete surfaces shall be wet cured by covering the concrete with a 4-mil white polyethylene sheet. Immediately prior to installing the sheeting thoroughly wet all concrete surfaces by spraying with clean water. The sheeting shall be held close to the surface and all joints continuously taped to prevent air from getting under the sheeting. The concrete surface shall be checked once a day and concrete surfaces showing drying shall be sprayed with clean water. The sheeting may be removed after a total of 7 days have elapsed following concrete placement.

4.15 Imperfect and Damaged Work and Materials: Imperfect and damaged work and materials shall be satisfactorily removed. New work and new materials which are in accord with the requirements of the Drawings and Construction Specifications shall be furnished and installed at no additional expense to the Owner. Removal of imperfect and damaged work and materials and the installation of new work and materials shall be accomplished in a manner which will not impair the strength of the structure.

4.16 Cleaning: Upon completion of work, all forms, equipment, protective covering and rubbish resulting from the work shall be removed from the premises. Finished concrete surfaces shall be left in a condition satisfactory to the Engineer and Owner.

4.17 Payment: No separate payment will be made for the work under this Section except as may be specifically set forth in the Proposal. The cost of the work of this Section and all costs incidental thereto, except that work which may be specifically set forth in the Proposal, shall be included in the price bid for the items to which the work pertains.

SECTION 5
REINFORCING STEEL, STRUCTURAL STEEL AND MISCELLANEOUS METAL

5.01 Scope: The work covered by this Section of Specifications consists of furnishing all materials and equipment and performing all labor necessary for furnishing and installing all reinforcing steel, structural steel, miscellaneous metal and appurtenances as indicated on the Drawings, as specified, and as required for completion of all work under this contract.

5.02 Drawings: The Contractor shall furnish to the Engineer for review bending and placing details for steel bar reinforcing which shall show bar size, spacing, bending and tagging identification and drawings covering structural steel work showing details of fabrication and erection of structural steel in accordance with the General Requirements of these Specifications. No manufacturer or fabrication shall commence until such drawings have been reviewed. The Contractor shall submit to the Engineer for review the detailed location of construction joints not shown on the Drawings but required for the execution of the work prior to the detailing of any reinforcing steel.

5.03 Reinforcing Steel: Bar reinforcement and wire mesh reinforcement shall be furnished by domestic steel mills and shall conform to the applicable ASTM specifications and ACI Building Code, as amended to date, and in accordance with the following:

A. Bar Reinforcement: Materials, fabrication and placement of steel bar reinforcement shall be in accordance with the following:

1. Materials: Bar reinforcement shall be deformed bars and conform to the requirements of ASTM A- 615 Grade 60. The steel for bars shall be made by the open hearth, basic oxygen or electric furnace process, and the bars shall be rolled from billets or ingots of properly identified heats. The steel shall be made and the bars rolled in the United States. The use of cold twisted bars will not be permitted.

2. Fabrication: Steel bar reinforcement shall be cold bent to shapes indicated on the Drawings. Bending shall be done in the shop before shipment unless otherwise specified. Bending details for steel bar reinforcement shall conform to the requirements of the ACI Building Code (ACI-318) unless otherwise indicated on the Drawings or specified. Steel bar reinforcement shall be bent, bundled and tagged in accordance with details furnished by the fabricator.

a. Splices: Steel bar reinforcement shall be furnished full length unless otherwise indicated on the Drawings. Splices, where permitted, shall be well distributed or located at points of low tensile stress. Splices and dowels, except when used in cantilever wall or slab construction, shall lap not be less than 30 times the diameter of the bar. Splices and dowels used in cantilever wall or slab construction shall lap 40 diameters. Splices in horizontal reinforcement shall be staggered. The minimum clear distance between spliced bars, except when bar clamps are specified, shall

be 1½ bar diameters. In no case shall the minimum clear distance between spliced bars be less than 1" or less than 1½ times the maximum size of coarse aggregate.

1) Design is based upon "non-contact" type vertical splices lapped and specified above as required under the applicable sections of the ACI code. Tied "contact" lapped splices will be allowed for ease in establishing the basic framework for the vertical rebar mats. However, no more than 20% of the required vertical lap splices may be "contact" type splices. All other lap splices shall conform to the minimum and maximum clear distance requirements as specified above and in the applicable sections of the ACI code.

b. Hooks: Hooks of 180° shall have a radius of bend on the axis of the bar of not less than 3 bar diameters plus an extension of 4 bar diameters at the free end. Hooks of 90° shall have a radius of bend on the axis of the bar of not less than 4 bar diameters plus an extension of 12 bar diameters at the free end.

c. Openings: Openings 12" and larger through concrete walls and slabs shall have a minimum of 8 extra diagonal bars in each face of the wall or slab of the same size as the largest bar in the wall or slab. The length of extra diagonal bars at openings shall be as shown on the Drawings or diameter of opening plus 24 bar diameters each end of bar.

d. Minimum Reinforcing: Minor concrete walls, slabs and other Class "A" concrete sections, where no reinforcement is shown on the Drawings, shall have a minimum area of steel bar reinforcing equal to 0.0025 times the cross-sectional area of the concrete work.

3. Placing: Steel bar reinforcement shall be placed in the locations shown on the Drawings and held securely in place during the placing of concrete. The pushing of short bars into new concrete work will not be permitted. Bar reinforcing in walls shall be spaced the proper distance from the face of the wall by the use of approved precast concrete mortar blocks. Precast mortar blocks used for bar reinforcement spacing shall have a minimum compressive strength equal to the concrete being placed. Bar reinforcing in slabs or beams shall be spaced the proper distance from the bottom of the slab or beams by use of precast concrete mortar blocks, steel chairs with plastic coated legs or plastic tips, or stainless steel chairs. Vertical stirrups shall always pass around main tension members and be securely attached thereto. Bar spacing, covering, minimum clearance, bond and anchorage shall conform to the requirements of the ACI Building Code (ACI-318), except as otherwise indicated on the Drawings or specified.

4. Fastening, Reinforcing and Placing Concrete: Steel bar reinforcing, when properly placed, shall be securely wired together at intersections with 18

gauge black annealed wire. Prior to the placing of concrete, all mortar and other foreign matter which may reduce or destroy bond shall be removed from the reinforcement. No concrete shall be deposited until the placement of the reinforcing has been reviewed by the Engineer or his representative.

B. Wire Mesh Reinforcement: Wire mesh reinforcement, when shown on the Drawings or specified to be required in the work to be done, shall be furnished and placed in accordance with the following:

1. Materials: Wire mesh reinforcement shall conform to the requirements of ASTM A-185 and unless otherwise indicated in the Drawings shall be 4" by 4" mesh of 6-gauge wire.

2. Placement: Wire mesh reinforcement shall be secured in position by spacer bars and chairs. Spacer bars shall be lapped not less than 5". Precast concrete mortar blocks may be used in lieu of metal chairs in slabs on ground. Mesh shall be checked for position during placing of concrete and any displacement corrected. Mesh shall overlap 1" at edges unless otherwise indicated on the Drawings and shall be securely tied at ends and overlap.

C. Reinforcement – Storage and Protection: Steel reinforcement shall be stored above the surface of the ground upon platforms, skids or other supports, and shall be protected as far as is practicable from mechanical injury and surface deterioration. When placed in the work, it shall be free from rust, dirt, scale, paint, oil or other foreign matter which may reduce or destroy bond.

5.04 Iron Castings: The Contractor shall furnish all miscellaneous iron castings, including catch basins, manhole frames and covers, steps, floor drains, bolt inserts, brackets, supports and such other iron castings as are shown on the Drawing in accordance with the applicable ASTM Specifications, as amended to date. All materials furnished shall be installed in a good workmanlike manner.

A. Castings: Castings, unless otherwise specified, shall be of gray-iron conforming to ASTM A-48. Manhole and step castings shall be the Owner's standard unless otherwise specified.

B. Malleable Castings: Malleable castings shall conform to ASTM A-47.

C. Quality: All castings shall be tough, close-grained and smooth and free from blow holes, blisters, shrinkage stains, cracks, cold shots and like defects. No plugging of defective castings will be permitted.

D. Workmanship: All castings shall be made accurately to dimensions shown on the Drawings or ordered and shall be planned or ground where necessary whether marked or not to secure perfectly flat bearing surfaces. Allowance shall be in the patterns, so the specified thickness of metal will not be reduced.

E. Weights: No castings, the weight of which is less than the theoretical weight based on required dimensions by more than 5%, will be accepted.

F. Cleaning and Painting: All castings shall be thoroughly cleaned and painted before rusting begins. All castings except those to be embedded in concrete shall be cleaned and given a priming coat of paint in the shop. Castings, which will be exposed in buildings, shall be painted in accordance with the painting section of these Specifications. Castings which are to be installed outdoors, such as manhole frames, covers and steps, shall be given one coat of an asphaltic or bituminous paint which results in a smooth and tough well-bonded coating.

5.05 Nosings for Concrete Treads: Nosings of all concrete steps, interior and exterior, shall be 3" in width and shall be Wooster Type 101 Alumogrit or American Abrasive Metal Company Style A or equal abrasive safety treads, securely anchored to concrete.

5.06 Stainless Steel: Unless otherwise specified, all fabricated work indicated on the Drawings and/or specified to be stainless steel shall be Type 316, in accordance with ASTM A-276 as amended to date.

5.07 Bolts, Nuts and Screws: Steel bolts and nuts for jointing miscellaneous steel shall conform to ASTM A-325 or A-490 and shall be American National Standard dimensions. Anchor bolts, in general, shall be placed in forms prior to placing concrete. When expansion bolts must be used, they shall be Rawl, National, or equal. Anchor bolts and expansion bolts shall be Type 302, 304, or 316 stainless steel. Steel and aluminum weir plates, aluminum railing, miscellaneous aluminum, galvanized steel and stainless steel jointing shall be fastened with Type 302 or 304 stainless steel bolts, nuts, and screws as required.

5.08 Aluminum: Aluminum shall be of the following alloys:

- Sheet or plate: 6061-T6
- Structural or rolled shapes: 6061-T6
- Extruded shapes: 6061-T6
- Tubing or pipe: 6061-T6 or 6063-T6
- Nuts and bolts: 2024-T4 with #205 aluminum finish

A. Aluminum Grating and Treads: All grating, except otherwise shown, shall be equal to Borden Aluminum Plank "Standard," or Liskey extruded aluminum grating, "Duro-Grip," with rectangular punch. The grating shall be of the depth shown and shall be of aluminum alloy 6061-T6 or 6063-T6. Weld end plates to all bearing bars and band all cutouts. Exposed welds and welding beads on the exposed top surface of the grating and/or end plates and bands will not be acceptable. Samples, which represent the finished product, shall be submitted to the Engineer for review. Seat angles in concrete shall be ¼" thick aluminum angles of a size which will properly accommodate the depth of the grating bars. Stair treads shown as being of aluminum shall be of the same aluminum alloys as the grating. The types shall be as shown or equivalent. Field paint all aluminum surfaces which will be in contact with concrete or carbon steel with suitable asphaltic paint.

B. Aluminum Pipe Railing: All rails and posts shall be fabricated size 1½" Schedule 40 aluminum pipe of 6061-T6 or 6063-T6 alloy. Railing may be shop fabricated with continuous welded joints and mill finish or may be assembled from factory fabricated one piece extrusion machined fittings and pipe with 305 stainless steel blind rivets and self- tapping screws all with 7 mil anodized finish. Welding shall be by inert gas shielded arc method with all welds ground smooth.

C. Aluminum Gates and Frames: Aluminum gates and frames shall be built of structural or extruded shapes as shown on the Drawings and shall be given an anodizing finish.

5.09 Welding/Inspection and Testing: Welders working on job shall meet the following qualifications.

A. Experience of Welders and Welding Operators: Shop and field welders and welding operators shall be qualified by an independent laboratory using test procedures covered in AWS D1.1 and shall have been employed as a welder / welding operator using the positions for which they are qualified during the previous 90 days. The Contractor shall provide the Engineer and laboratory inspector with the (a) names of welders and/or welding operators to be employed in the shop and field, (b) certification of the position, (c) date of the last qualification test and (d) the name of the qualifying laboratory.

1. All welders employed in the field on the erection of the steel work shall be qualified for the most difficult welding position during field erection.

2. The Contractor shall require any welder to retake the test, when in the opinion of the Engineer, the work of the welder creates a reasonable doubt as to the proficiency of the welder. Recertification of the welder shall be made to the Engineer only after the welder had taken and passed the specified test. The Engineer may require radiographic or ultrasonic testing or may require coupons to be cut from any location in any joint for testing.

3. All section of welds found defective shall be chipped or cut out to base metal and rewelded before proceeding with the work.

4. Costs of all qualifications, tests and retests shall be borne by the Contractor.

B. Joint Qualification: All joints shall comply with AWS D1.1.

C. Inspection and Testing: Inspection and testing shall be as follows:

1. Inspections and Tests: Inspection and tests shall be performed by an independent laboratory complying with ASTM E-329. The testing laboratory shall be directed by the Engineer. All material to be furnished shall be subject to inspections and tests in the shop and field.

2. Shop Inspections: Shop inspections and tests shall include fit-up, preparation of surfaces and welding.

3. Field Inspections: Field inspections and tests shall include fit-up, preparations of surfaces, welding and bolting.

4. Reports: Reports of shop and field inspections and testing shall be made by the laboratory on a weekly basis. One copy of each shop and field inspection report shall be submitted directly to each of the following: Engineer, Inspector, Contractor, Fabricator and Erector.

5.10 Structural Steel:

A. Shop Drawings and Erection Procedures:

1. The Contractor shall prepare and submit shop and erection plans covering all structural steel and related items. All dimensions for checking of structural steel details shall be shown on the drawings.

2. The Contractor shall be responsible for the confirmation of all steel details to the typical and special details shown on the drawings and for all details, notes and schedules appearing on the drawings. The Contractor shall be responsible for giving information for the fabrication and erection of the structural steel. Related items shall be shown on the erection or shop drawings. Drawings shall include all shop and erection details including cuts, copes, connections, hole, bolts and welds. For bolted, the type, size and length of bolts including washers shall be shown. All welds, both shop and field, shall be indicated by standard welding symbols as noted by AWS D1.1. Drawings shall show the size, length and type of each weld.

3. The Contractor shall prepare and submit 2 copies of a detailed erection procedure with the shop and erection drawings. The procedure shall include the sequence of erection with temporary staying and bracing. No copies of such procedure will be returned.

B. Applicable Specifications and Codes: The following specifications and codes form a part of this section of these Specifications:

1. American Institute of Steel Construction Publications, Manual of Steel Construction, Eighth Edition

a. Code of Standard Practice for Steel Buildings and Bridges

b. Specification for the design, Fabrication and Erection of Structural Steel for Buildings with commentary

2. American Society for Testing and Materials: As amended to date.

a. A 36, Specifications for Structural Steel

b. A 572, Specifications for High-Strength Low Alloy Columbium-Vanadium Steels for Structural Quality

c. A 325, Specifications for High-Strength Steel Bolts for Structural Steel Joints. Including Suitable Nuts and Bolts and Washers

d. A 490, Specifications for Quenched and Tempered Alloy Steel Bolts for Structural Steel Joints

e. E 329, Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as Used in Construction

3. American Welding Society, AWS: Shall be D1.1 as amended to date, Structural Welding Code

4. Specifications for Structural Joints: Using ASTM A 325 or A 490 bolts

5. Fabrication and Erection of Structural Steel for Buildings: Unless otherwise indicated on the drawings or in the Specifications for the design, the publication, Fabrication and Erection of Structural Steel for Buildings of the American Institute of Steel Construction, hereafter designated AISC, shall govern structural steel work. Welding shall be in accordance with American Welding Society Standard Code D1.1.

C. Substitutions of Sections: Substitutions of sections and / or modifications of details and the reasons for such substitutions or modifications shall be submitted with the shop drawings in accordance with these Specifications. Substitutions, modifications, and/or changes in related portions of the work shall be coordinated by the Contractor and shall be accomplished at no additional cost to the Owner.

D. Responsibility for Errors: The Contractor shall be responsible for all errors of detailing, fabrication and for the correct fitting of the structural members. The Contractor shall make all measurements in the field to verify or supplement dimensions shown on the Drawings and shall assume responsibility for fitting new work to existing work.

E. Templates: Templates with instructions for the setting of anchors, anchor bolts and bearing plates shall be furnished by the Fabricator to the job. The Contractor shall ascertain that the items are set during the progress of the work.

F. Qualifications:

1. Experience of Fabricator: Fabrication shop and erector shall have fabricated and erected projects of similar size and complexity for at least ten years.

2. Experience of Welders and Welding Operators: Welders and welding operators, shop and field, shall be qualified by an independent laboratory using test procedures covered in AWS D1.1, and shall have been employed as a welder / welding operator using the positions for which they are qualified during the previous 90 days. The Contractor shall provide the Engineer and laboratory inspector with the (a) names of welders and/or welding operators to be employed in the shop and field, (b) certification of the position, (c) date of the last qualification test and (d) the name of the qualifying laboratory.

   a. All welders employed in the shop on the fabrication of the steel work shall be qualified for the most difficult welding position during shop fabrication.

   b. All welders employed in the field on the erection of the steel work shall be qualified for the most difficult welding position during field erection.

c. The Contractor shall require any welder to retake the test, when in the opinion of the Engineer, the work of the welder creates a reasonable doubt as to the proficiency of the welder. Recertification of the welder shall be made to the Engineer only after the welder had taken and passed the specified test. The Engineer may require radiographic or ultrasonic testing or may require coupons to be cut from any location in any joint for testing.

d. Should any 2 radiographic or ultrasonic tests or coupons cut from the work of any welder show strengths or undertests less than that of the base metal, it will be considered evidence of negligence or incompetence and such welder shall be removed from the work.

e. When coupons are removed from any part of a structure:

1) The members cut shall be repaired at no additional cost to the Owner in a neat and workmanlike manner.

2) Joints will be of a type to develop the full strength of the members.

f. Joints will be cut with peening to relieve residual stress.

g. All sections of welds found defective shall be chipped or cut out to base metal and re-welded before proceeding with the work.

h. Costs of all qualifications, tests and retests shall be borne by the Contractor.

3. Joint Qualification: All joints shall comply with AWS D1.1.

G. Inspection and Testing:

1. Inspections and Tests: Inspections and tests shall be performed by an independent laboratory complying with ASTM E-329. The testing laboratory shall be directed by the Engineer. All material to be furnished shall be subject to inspections and tests in the shop and field.

2. Shop Inspection: Shop inspections and tests shall include fit-up, preparation of surfaces and welding.

3. Field Inspections: Field inspections and tests shall include fit-up, preparations of surfaces, welding and bolting.

4. Reports of Inspections: Reports of shop and field inspections and testing shall be made by the laboratory on a weekly basis. One copy of each shop and field inspection report shall be submitted directly to each of the following: Engineer, Resident Engineer, Inspector, Contractor, Fabricator and Erector.

H. Materials: Materials shall be of domestic manufacture, within trade tolerances, new, undamaged and without splices. Structural material, plain or fabricated, shall be stored above the ground upon platforms, skids or supports. Materials shall be kept free of dirt, grease and foreign matter and shall be protected from corrosion.

1. Structural Steel:

   a. Structural steel shall comply with ASTM A-36 unless indicated otherwise on the Drawings.

   b. The Contractor shall furnish two copies of all mill reports covering the chemical and physical properties of the steel used.

2. Bolts, Nuts and Washers:

   a. All bolts, nuts and washers shall comply with ASTM A-325 or A-490.

   b. ASTM A-325 and A-490 bolts shall be used for connections as indicated on the Drawings.

3. Welding Electrodes and Flux:

   a. Electrodes and flux used for submerged arc welding shall be of the same manufacture. The flux shall be free of the contamination of dirt, mill scale and foreign material. Fused flux used in welding shall not be reused. Bare electrodes and flux used in combination shall conform to the requirements of AWS D1.1.

   b. Electrodes for manual shielded metal-arc welding shall conform to AWS D1.1.

4. Grout: Non-shrink grout beneath base and bearing plates shall be Embeco by the Master Builders Company, Five Star Grout by U.S. Grout Corp., or equal.

I. Welding Equipment: Welding equipment shall be capable of providing the welding required by the Drawings and/or Specifications and in compliance with the requirements of joint qualification in AWS D1.1.

J. Fabrication:

1. Structural Material: Structural material shall be fabricated and assembled in the shop. Assembled pieces shall be taken apart for the removal of burrs, and shavings produced by the reaming operation. Parts not connected in the shop shall be secured by bolts to prevent damage in shipment and handling.

2. Connections: Connections shall be as shown on the Drawings. Connections not indicated shall be made to conform with the AISC Specification. One-sided or other types of eccentric connections will not be permitted. Surfaces of joints for welded and bolted connections shall be clean bright metal. Fit up of the parts shall be inspected and approved by the laboratory inspector prior to making final connection.

   a. Holes shall be cut, drilled or punched at right angles to the surface of the metal and shall not be made or enlarged by burning. Holes in base or bearing plates shall be drilled. Holes shall be clean-cut without torn or ragged edges. Outside burrs resulting from drilling

or reaming operation shall be removed. Holes for bolts shall be $^{1}/_{16}$" larger than the diameter of the bolt except as noted on the drawing.

b. Welded connections will be permitted only where indicated on the Drawings. Welded construction shall conform to the AISC and AWS Specifications.

c. Bolted connections using ASTM A-325 or A-490 bolts shall conform to the Specifications for Structural Joints using ASTM A-325 or A-490 bolts. Indicator washers shall be used to show that bolts are properly tightened. Both threads shall be excluded from the shear planes of the contact surfaces between the connected parts. Load indicator washers shall be Cornet Load Indicator by Cooper + Turner, Inc. or equal.

3. Milled Surfaces: Milled surfaces shall comply to the AISC Specification and the Drawings.

4. Allowance: Allowance shall be made for draw in all tension bracing.

K. Erection:

1. Splices: Splices and field connections shall be made as shown or noted on the Drawings. Errors in shop fabrication or deformation resulting from handling and transportation that prevent the assembly and fitting of parts shall be reported immediately to the Engineer for directions as to the method of correction. Corrections shall be made at no additional cost to the Owner.

2. Leveling Plates: Leveling plates shall not be used under base plates.

3. Anchor Bolts: Anchor bolts and anchors shall be located and built into connecting work. Bolts and anchors shall be preset by the use of templates to locate the anchors and anchor bolts.

4. Column Bases: Column bases and bearing plates may be attached or loose as shown on the reviewed shop drawings. Plates shall be supported and aligned on steel wedges or shim. After the supported members have been plumbed and positioned and the anchor nuts tightened, the entire bearing area under the plate shall be dry-packed solidly with non-shrink grout. Wedges and shims shall be cut off flush with the edge of the column base and bearing plates, and shall be left in place.

5. After Assembly: After assembly, the various members forming parts of a completed frame or structure shall be aligned and adjusted before being fastened. Tolerance shall conform to AISC. Fastening of splices of compression members shall be done after the abutting surfaces have been brought completely into contact. Bearing surfaces and surfaces that will be in permanent contact shall be cleaned before the members are assembled. As erection progresses, the work shall be fastened to take care of all dead load, wind and erection stresses. Splices will be permitted only

where indicated on the Drawings. Erection bolts used in welded construction shall be tightened and left in place. Welding for redrilling will not be permitted.

6. Driftpins: Driftpins may be used only to bring together the several parts and shall not be used in such manner as to distort or damage the metal.

7. Gas Cutting Torch: The use of a gas cutting torch in the field for correcting fabrication errors is prohibited unless the Engineer has specifically provided such procedure for each case individually in writing.

L. Painting:

1. Cleaning: All steel work shall be cleaned of loose mill scale, loose rust, accessible weld slag or flux deposit, dirt and foreign matter. Oil and grease deposits shall be removed by solvent. No paint shall be applied when steel temperature is below the dew point of the atmosphere.

2. After Cleaning: After cleaning and connections are approved by the laboratory inspector, all steel work except surfaces to be fireproofed, or surfaces to be welded shall be given a shop coat of primer. The primer shall be applied at a rate to provide a minimum dry film of 2.0 mils. The primer shall be applied without holidays or paint runs.

3. After Erection: After erection all field connections shall be cleaned. All connections, including welds and bolts, and all abraded surfaces on the shop primer shall be painted to give one complete coat of primer. Paint for field touch-up shall be the same paint used for the shop coat.

5.11 Payment: No separate payment will be made for the work of this Section. The cost of the work, and all costs incidental thereto, shall be included in the amount bid in the Proposal for every item to which the work pertains.

SECTION 6
SITE PREPARATION, EXCAVATION, BACKFILLING, GRADING AND FENCING

6.01 Scope: The work covered by this Section of the Specifications consists of furnishing all materials and equipment, and performing all labor necessary for clearing, excavating, backfilling and grading for site development, and to permit construction of the structures, buildings, roads and embankment construction in strict conformity with the contract Drawings, the Specifications and the directions of the Engineer.

6.02 Site Conditions and Soil Investigation: The Contractor's attention is directed to the Instructions to Bidders, the General Requirements and special provisions relating to Site Examination. Contours and existing topography shown on the Drawings are believed to be reasonably correct. It shall be the Bidder's responsibility to determine any major difference which would affect his bid and make allowance for such differences in his bid.

The Contractor shall visit the site and satisfy himself to the soil conditions anticipated. In addition, the bidder must form his own opinion of the character of the sub-surface materials to be encountered in excavating for and the construction of the various facilities

The General Requirements of these Specifications identify any reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site.

6.03 Clearing Site: The area shall be cleared and grubbed of all existing structures, pavements and other obstructions interfering with, or in the way of construction of new work. The area shall be cleared of trees, stumps, root systems, brush, rubbish and other such materials to limits at least 10' outside of limits of tops of cuts and toes of fill. Trees and shrubs designated to be left in place and those outside of limits shall not be damaged. Top soil and vegetable matter shall be carefully stockpiled and preserved for surfacing completed slopes.

A. Disposal of Waste Material: All waste materials resulting from clearing operations shall be disposed of in accordance with applicable regulations of the Georgia Department of Natural Resources, Environmental Protection Division.

B. Damage to Existing Facilities: Any structure, pavement, fences or other such work removed for construction purposes or damaged by reason of construction operations; but not in the way of new work, shall be replaced or repaired.

6.04 Grading: Before the beginning of construction operations, the Contractor will grade the site to the proposed elevations above as indicated on the Drawings. The Drawings show both existing contour elevations and finished contour elevations.

A. Finish Grading: Upon completion of construction operations, the area shall be finish graded in accordance with 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. The tops of all cuts shall have berm ditches.

B. Additional Material: If additional material other than that to be obtained from excavation is required for backfilling and grading, the Contractor shall obtain such additional material from borrow at his own expense.

C. Excess Material: Any excess earth excavation and all rock excavation shall be placed on or near the site as directed by the Engineer. Surfaces on slopes of waste fills shall be left smooth and free to drain.

D. Borrow Material: Borrow material if required shall be obtained on site where indicated. The borrow site shall be graded and regrassed as directed by the Engineer.

6.05 Excavations: The Contractor shall perform all excavating of every description and of whatever substances encountered to the dimensions and levels shown on the Drawings and/or as specified. Excavation may be accomplished by any customary method.

A. Earth Excavation: Earth excavation shall include all substances to be excavated other than rock.

B. Rock Excavation: Rock excavation shall comprise of solid rock in the original bed or in well-defined ledges, the removal of which in the opinion of the Engineer requires drilling, blasting or the use of jack hammers and bull points, and shall also include all boulders and detached pieces of rock 8-cubic feet or more in content.

C. Blasting: All blasting operations shall be conducted in accordance with existing ordinances and regulations and as directed by the Engineer. Exposed structures shall be protected from the effects of blasts, and blasts shall be covered with suitable mats and shall be restricted to the extent that no appreciable shock will be transmitted to existing structures, pipe lines, sewers or other public or private facilities. No blasting shall be started without the approval of method and quantity of explosive to be used by the Engineer.

D. Damage to Existing Facilities: Any damaged structures, pipe lines, sewers or other private or public facilities shall be immediately repaired or replaced at the expense of the Contractor. Any damage to such facilities which will impair or restrict the operation of the water supply system shall be immediately repaired or replaced with no stoppage of work until such repairs or replacements are complete.

6.06 Compaction: Compaction for all fill shall be a minimum of 95% Standard Proctor

6.07 Excavation for Structures: The limits of excavation for structures shall be in accordance with the following:

A. Earth Excavation: Earth excavation for structures shall be to limits not less than 2' outside wall lines, to allow for formwork and inspection; and further, as necessary, to permit the trades to install their work. Excavations for footings shall be to footing dimensions. Excavation for slabs shall be to near bottom slab level. Earth excavation for structures shall not be machine dug below a level 6" above bottom elevations of slabs or footings unless otherwise shown or as directed by the geotechnical engineer.

B. Rock Excavations: Rock excavations for structures shall be to limits not less than 2' outside of wall lines, with a vertical tolerance of 3" in or out, and further if necessary to allow for inspection and to permit trades to install their work. Excavation for footings shall be to a minimum depth and width not less than the footing dimensions. Excavation for slabs shall be not higher than bottom slab level.

C. Blasting: All blasting operations shall be conducted in strict accordance with existing ordinances and regulations and shall be done subject to the Engineer's approval of the method and quantity of explosive to be used. Exposed structures shall be protected from the effects of blasts, and all blasts shall be covered with blasting mats, dirt, heavy timbers or other suitable material. They shall be restricted to the extent that no appreciable shock will be transmitted to existing structures, pipe lines, sewers or other public or private facilities. All blasting supplies shall be stored in a magazine which complies with all local, state and federal laws. In no case shall caps or other exploders be kept at the place where dynamite or other explosives are stored.

6.08 Check Valves: Check valves shall be constructed of heavy cast iron with bronze and stainless steel fittings. It shall prevent reverse flow back through the valve when the inlet pressure decreases below the delivery pressure. The valve must be tight sealing and must operate without hammer or shock. The seat ring must be renewable and shall be securely held in place by a threaded joint. The valve disc shall be of cast iron and shall be hinged above its seat so that perfect closure is always attained. Check valves for all pump discharge lines shall have outside spring and lever. The high point of the valve shall be tapped and provided with a stopcock for bleeding of air.

6.09 Iron Pipe and Fittings: Pipe size 3" and larger shall be ductile iron and fittings shall be gray or ductile iron, except any plain end fitting or follower ring used with retainer glands shall be ductile iron and mechanical joints shall be restrained. Pipe and fittings shall be as shown on the Drawings and/or specified in these Specifications.

Flanged pipe shall be Class 53. Flanges for pipe and fittings shall be Class 125 in accordance with ANSI A 21.10, as amended to date, drilled and faced in accordance with American Standard B 16.1 with ⅛" thick rubber gaskets, either ring or full face. Flanges for ductile iron pipe may be either gray or ductile iron.

6.10 Dewatering: The site shall be kept free of surface water at all times. **Dewatering shall be accomplished as recommended in the soils report.** The Contractor shall install drainage ditches and dikes and shall perform all pumping and other work necessary to divert or remove rainfall and all other accumulations of surface water from the excavations. The diversion and removal of surface water shall be performed in a manner that will prevent the accumulation of water behind temporary structures or at any other locations within the construction area where it may be detrimental. The Contractor shall provide, install and operate sufficient trenches, sumps, pumps, hose, piping, wellpoints, deep wells, etc., necessary to depress and maintain the groundwater level at least 2' below the base of the excavation during all stages of construction operations. The groundwater table shall be lowered in advance of excavation and maintained a minimum of 2' below

the lowest excavation subgrade made until the structure has sufficient strength and weight to withstand horizontal and vertical soil and water pressures.

Groundwater control is the sole responsibility of the Contractor. The Contractor must submit a dewatering plan to the Engineer for approval prior to excavation. After construction is completed and all backfill has been placed, the temporary groundwater controls should be removed and any pipes or barrels shall be grouted or filled.

6.11 Shoring and Sloping: Temporary construction slopes or temporary shoring will be required. The Contractor should incorporate all appropriate requirements of OSHA into the design of the temporary construction slopes and shoring systems.

A. In areas next to existing foundations, we recommend that open excavations not be performed within a 45º plane extended downward from the bottom edge of adjacent foundations of any existing structures without a properly designed and installed shoring system.

B. If temporary slopes are used, typically they can be constructed no steeper than 1 ½ to 1 (horizontal to vertical) for slopes less than 15' high.

6.12 Underdrain System: Furnish and install underdrain systems where shown on the Drawings. The underdrain system shall consist of clean uniform ¾" stone, perforated PVC pipe and non-woven fabric. A detail of construction is shown on the Drawings.

A. Placement: Material for the underdrain shall be placed uniformly in layers. No special compaction of the drain fill is required. The layers shall be 6" in depth.

B. Perforated Pipe: Perforated pipe shall be PVC, shall be bell and spigot, and shall be in lengths not exceeding 20'. The spigot end and bell shall be unperforated for a length equal to the socket or shoulder. Pipe shall be laid with perforations down and oriented symmetrically about a vertical centerline. Perforated PVC pipe and fittings shall conform to ASTM F 758 with a minimum stiffness of 46.

C. Filter Cloth: Filter cloth shall be a non-woven fabric consisting of long chain polymeric filaments formed into a stable network. The fabric shall be inert to commonly encountered chemicals and non- biodegradable. The fabric shall have a pore size (EOS) equivalent to a 70 sieve, water permitting coefficient of at least 1.4 cm/sec, grab tensile strength of 160 pounds, and trapezoidal tear strength of 60 pounds. The fabric shall be TenCate Mirafi 160N, US Fabrics US160, or equal.

6.13 Structural Fill: After clearing and excavation operations have been completed, all structure locations shall be proof-rolled with a loaded pan or heavy pneumatic tired vehicle to densify upper soils and to locate possible areas which will require undercutting, removal and/or recompaction. This operation shall be conducted under the surveillance of an experienced soil inspector.

A. Fill Material: Fill shall be clean inorganic natural soil. Structural fill below building areas (and the upper 2' of fill beneath pavements) shall contain no rock fragments larger than 3" in longest dimension. Soils proposed for fill shall have a maximum density of 98 pounds per cubic foot or greater in Standard Proctor Compaction Test ASTM D698. Excavated materials which contain large

quantities of rock or weathered rock fragments shall not be used in building areas. Fill below floors, foundations and paved areas shall be compacted at least 95% of the ASTM D698 maximum density.

Excavated materials which contain large quantities of rock or weathered rock fragments shall not be used in building areas. Fill below floors, foundations and paved areas shall be compacted at least 95% of the ASTM D698 maximum density. The upper foot of fill which will support pavements, foundations or slabs should be compacted to at least 98% of the Soils Standard Proctor maximum dry density. In areas which are at or above the finished grade and which will support pavements, foundations or slabs, the upper 8″ immediately below these systems should be scarified and recompacted to the 98% criteria. Fill material required to replace undercut areas or achieve the finish grade within a tank footprint must consist of hard, clean, graded aggregate such as No. 57 crushed stone. The exterior slope of any structural fill shall be no steeper than 2H:1V.

Structural fill shall extend horizontally beyond the outer edge of structure foundations at least 10' or a distance equal to the height of the fill to be placed, whichever is greater. In paved areas, fill slopes should extend at least 5' beyond the edge of pavement.

Aluvial soils and any other organic laden soils encountered at the site should be placed in non-structural areas or hauled off-site.

B. Compaction: Fill shall be placed in loose layers 8" or less in thickness unless noted otherwise elsewhere in these Specifications. Each layer shall be compacted by sheepsfoot or rubber tired roller operating independently of the dozer used to spread fill. If the fill soils are clayey or silty sands or sandy silts with Unified Classifications of SC, SM, SP or ML, the compaction of each fill layer shall be completed by two coverages of rolling with a loaded earth moving scraper, dump truck or large rubber tired roller before more fill is placed.

In confined areas such as utility trenches, the use of portable compaction equipment and thin lifts of 3" to 4" may be required to meet compaction.

C. Testing: Fill compaction shall be verified by field density testing conducted throughout the period of fill placement and compaction. Subgrade preparation shall be inspected by an experienced soil engineer. Field density tests shall be performed to verify that the specified degree of compaction is achieved. For building areas, a frequency of passing tests of at least 1 test per 1,500 square feet for each 18" of new fill thickness is required.

D. Geotextile Fabric: Contractor shall furnish and install construction fabric to stabilize soil surfaces for structural fill placement where indicated in these Specifications. Construction fabric shall be a polyester continuous filament needle punched nonwoven engineering fabric such as Mirafi 500X as manufactured by Celanese, Inc. or equal.

6.14 Yard Fills: Yards shall be graded to widths, gradients and limits shown on the Drawings. The fill shall be thoroughly compacted. The Contractor shall place all sub-fills to approximately 8" lower than the finish elevations shown on the Drawings for areas to be

surfaced. Areas outside the surfaced areas shall be graded to the elevations shown on the Drawings. Fill shall be of selected clay materials obtained from excavation suitable for compaction to form an unyielding sub-base. All fills shall be properly compacted by the use of sheepsfoot or other approved roller. The fills shall be compacted and rolled until a solid sub-base is provided. If necessary, the fill shall be sprinkled and brought up to provide satisfactory compaction conditions. Yard fills shall be compacted to at least 90% of the ASTM D698 maximum density.

6.15 Storm Drainage Piping: The location, size and type of storm drainage piping shall be as shown on the Drawings. All storm drainage shall be designed to provide adequate drainage of the areas so that no low spots holding water can develop. Corrugated steel drain pipe shall be used in storm drainage and shall be as follows:

A. Corrugated Steel Drain Pipe: Corrugated steel drain pipe shall be furnished and constructed in accordance with the Department of Transportation, State of Georgia, Standard Specifications Constructions of Roads and Bridges, latest edition, and these Specifications. Pipe shall be galvanized and fully bituminous coated with a paved invert filling the corrugations for at least 25% of the circumference. The bituminous coating shall be a minimum thickness of 0.05″, measured to the crest of corrugations. Pipe corrugations shall be 2-⅔" x ½". Band shall be in accordance with WW-P-405-B 3.3.4.2. The projections of the bands shall conform substantially to the shape and depth of the pipe corrugations and shall be in circumferential rows with no less than seven projections per row. Required nuts and bolts shall be furnished with the band. Culvert pipe shall be 16-gauge through 24" diameter, 14 gauge for 30" and 36" diameter, 12 gauge for 42" through 54" diameter, 10 gauge for 50" through 72" diameter, and 8 gauge for 78" and 84" diameter.

The pipe shall have a duct tape (a type that will adhere and leave the heat number legible when removed) placed over one complete heat number before the bituminous coating is applied. This tape shall be located as close to the end of the pipe as the heat number will allow and from under the paved invert. All individual joints of pipe require this procedure.

Copies of certified mill test reports showing heat numbers, the chemical analysis and weight of spelter coated for each heat, lift of coil number, case, size and type of material used to fabricate this pipe will be mailed to the Engineer, Owner and Contractor within 5 calendar days of the delivery date of the pipe. Each copy will reference pipe size, number of sections, date of actual delivery to the job so that a positive identification can be made.

B. Reinforced Concrete Drain Pipe: Class III Reinforced Concrete pipe shall be used for all storm drainage pipe where indicated on the drawings. Pipe may be either ball and spigot or tongue and groove.

1. Quality and Inspection: Latitudes in workmanship and finish allowed by ASTM notwithstanding, all pipe shall have smooth exterior and interior surfaces; be first quality, be free from cracks, blisters, and other imperfections, and be true to theoretical shapes and forms throughout each length. Pipe shall be subject to inspection by the Engineer at the pipe

plant, job site, and other points of delivery for the purpose of culling and rejecting pipe, independent of laboratory tests, which does not conform to the requirements of this Section. Pipe which does not conform will be so marked by the Engineer and shall not be used in the work. Onsite repairing of rejected pipe will not be permitted.

2. Experience of Manufacturer: The pipe manufacturer shall submit evidence, if requested by the Engineer, of having consistently produced pipe and joints of the quality specified herein, and which have exhibited satisfactory performance results in service over a period of not fewer than 2 years. The pipe manufacturer and the pipe manufacturing process shall be subject to approval by the Engineer.

3. Testing and Stamping: All pipe, joint materials, and made-up joints shall be tested by an independent laboratory approved by the Engineer. Pipe shall be stamped with laboratory's stamp. Such stamp shall be an indication that it was accepted in accordance with applicable ASTM Specifications, and that it was inspected and accepted in accordance with the requirements of this Section for special tests and for pipe quality. The results of required independent laboratory tests shall be promptly submitted to the Engineer.

4. Pipe shall be as follows and shall conform to the following ASTM Specifications:

   a. Size 15" and Larger: All pipe shall be reinforced and shall be 'B' wall. Pipe 15" shall be furnished in lengths of at least 5'. Pipe 18" and above shall be furnished in lengths of at least 8'.

   b. Cement and Coarse Aggregate: Cement shall be Type II or approved equal. Coarse aggregate shall be crushed granite or limestone.

   c. Wire Reinforcement: Wire reinforcement used in the pipe shall conform to the standard Specifications.

   d. Steam Curing: Steam curing of concrete pipe shall conform to the standard Specifications with the following exceptions:

      1) When temperatures fall below an average of 40° F, curing shall be continuous for 24-hour period, except for the interval when forms and/or rings are removed.

   e. Minimum Crushing Strength: All pipe, when tested by the 3-edge bearing method in accordance with ASTM C 497, shall be minimum strength (defined as the load to produce a 0.01" crack for reinforced pipe) of not less than the following values:

MINIMUM STRENGTHS, POUNDS PER LINEAR FEET

Reinforced Pipe

Pipe Size	Table 3 Class III	Table 4 or 5 Class IV	Table 4 or 5 Class V
15"		2,500	3,750
18"	2,025	3,000	4,500
21"	2,360	3,500	5,250
24"	2,700	4,000	6,000
30"	3,375	5,000	7,500
36"	4,050	6,000	9,000
42"	4,725	7,000	10,500
48"	5,400	8,000	12,000
54"	6,075	9,000	13,500
60"	6,750	10,000	15,000
66"	7,425	11,000	16,500
72"	8,100	12,000	18,000

f. Absorption: Absorption shall not exceed 6% when determined in accordance with ASTM C 497.

g. Joints: Pipe may have O-ring rubber gasket type joints conforming with the applicable provisions of ASTM C 443, or pipe may be tongue and groove with mastic or mortar joint.

h. Repaired Pipe: Repaired and patched pipe will not be acceptable unless each individual pipe, so repaired or patched, shall have first been inspected and approved by the Engineer for repair and patching at the pipe plant.

i. Shear Loading Test: Made-up gasketed joints shall be tested for shear loading at a total load of 100 pounds per inch of diameter including the weight of the pipe, water and test apparatus.

C. Roadways:

1. Excavation for roadways shall be made to the lines, grades and typical sections shown. Proper allowances shall be made for specified thickness of roadbed below the finish grade shown. Should rock be encountered in the subgrade, the road shall be excavated to a depth of 6" below subgrade and the resulting space backfilled with suitable material.

2. Roadway Surfacing: All paved access roads and parking areas where shown on the Drawings shall have a crushed stone base course, prime coat and sand asphalt surface course. The compacted depth of the base course shall be 8", and widths shall be as shown on the Drawings. Surface course shall be 2" thick. Materials and construction methods shall conform to the

Standard Specifications for Highway Construction of the Georgia Department of Transportation as follows:

Section 310: Base Course, except as specified

Section 412: Prime Coat

Section 400: Surface Course, Asphaltic Concrete Type "F"

Shoulders shall be constructed of selected topsoil in accordance with typical sections shown and shall be grassed as specified elsewhere. Local quarry waste material may be used for base material meeting Section 310 of Highway Specifications except for material passing No. 60 sieve which may be from 15% to 85%.

3. Where roadways are constructed on fill, the embankment shall be placed in layers not over 6" deep as measured before compaction and be thoroughly rolled to a density of 98% of the Standard Proctor Dry Density with sheepsfoot or pneumatic tired roller. The work shall be executed in a manner which will insure that no places too steep to roll are left in the embankment. Portions inaccessible to the roller shall be rammed by hand. All materials shall be visibly damp. Water shall be applied as directed to obtain close adhesion between layers and all parts of the material.

   a. Sheepsfoot roller shall be of self-cleaning type, have feet projecting 7" from the shell and be of a weight so that the load of each tamper foot with the drum empty will be not less than 100 pounds per square inch of area in contact with a plane surface. Rolling shall be executed until the feet leave no appreciable imprint when the shell is filled to a maximum weight.

   b. Pneumatic tired rollers shall be suitable for ballast loading which will give a compression, under working conditions, of not less than 325 pounds per inch width of tire tread. Forward and rear tires shall make separate tracks. Compaction shall be equivalent to that required for the sheepsfoot roller.

   c. Within the limits of the roadbed, the fill shall be constructed of selected clay materials from excavation and borrow, and be free from stones larger than 4" in diameter. Slopes of roadway outside the above limits may be constructed of alternate layers of rock and clay. In no case shall rock be allowed in nests. The stones shall be uniformly distributed over the preceding clay layers, and the voids shall be completely filled with clay so as to form a solid compaction embankment.

6.16 Earth Fills:

A. Materials: All fill materials shall be obtained from required excavations and designated borrow areas. The selection, blending, routing and disposition of materials in the various fills shall be subject to approval by the Engineer.

All fill material should be clean, soil, free of any organic and deletrious materials and rocks or stones over 3" in diameter. It should also have a Plasticity Index (PI) less than 30. The fill should be compacted to a minimum of 95% of the standard Proctor maximum dry density (ASTM D 698) with moisture contents being maintained between the soil's optimum moisture and 3% over optimum.

B. Foundation Preparation: Foundations for earth fill shall be stripped to remove vegetation and other unsuitable materials or shall be excavated as specified.

Except as otherwise specified, earth foundation surfaces shall be graded to remove surface irregularities and shall be scarified parallel to the axis of the fill or otherwise acceptable scored and loosened to a minimum depth of 2". The moisture content of the loosened material shall be controlled as specified for the earth fill as specified for subsequent layers of earth fill.

Earth abutment surfaces shall be free of loose, uncompacted earth in excess of 2" in depth normal to the slope and shall be at such a moisture content that the earth fill can be compacted against them to effect a good bond between the fill and the abutments.

Foundation and abutment surfaces shall not be steeper than 1 horizontal to 1 vertical unless otherwise specified. Test pits or other cavities shall be filled with compacted earth fill conforming to the Specifications for the earth fill to be placed upon the foundation.

C. Placement: Fill shall not be placed until the required excavation and foundation preparation has been completed, and the foundation has been inspected and approved by the Engineer. Fill shall not be placed upon a frozen surface, nor shall snow, ice or frozen material be incorporated in the fill.

Fill shall be placed in approximate horizontal layers. The thickness of each layer before compaction shall not exceed 8" in thickness. Materials placed by dumping in piles or windows shall be spread uniformly to not more than an 8" thickness before being compacted. Hand compacted fill, including fill compacted by manually directed power tampers, shall be placed in layers whose thickness before compaction does not exceed 4". Fill must be adequately keyed into existing foundation materials. Benching and scarification of existing materials is required to provide adequate bonding.

Fill adjacent to structures shall be placed in a manner which will prevent damage to the structures and will allow the structures to assume the loads from the fill gradually and uniformly. The height of the fill adjacent to a structure shall be increased at approximately the same rate on all sides of the structure.

Earth fill shall be placed so as to meet the following additional requirements:

1. The distribution of materials throughout each zone shall be essentially uniform, and the fill shall be free from lenses, pockets, streaks or layers of material differing substantially in texture or gradation from the surrounding material.

2. If the surface of any layer becomes too hard and smooth for proper bond with the succeeding layer, it shall be scarified parallel to the axis of the fill to a depth of not less than 2" before the next layer is placed.

3. The top surfaces of embankments shall be maintained approximately level during construction, except that a crown or cross-slope of not less than 2% shall be maintained to insure effective drainage, and except as otherwise specified for drain fill zones. If the Drawings or Specifications require or the Engineer directs that fill be placed at a higher level in one part of an embankment than another, the top surface of each part shall be maintained as specified above.

4. Embankments built at different levels as described above shall be constructed so that the slope of the bonding surfaces between embankment in place and embankment to be placed is not steeper than 3' horizontal to 1' vertical. The bonding surface of the embankment in place shall be scarified, moistened and recompacted when the new fill is placed against it to insure a good bond with the new fill and to obtain the specified moisture content and density in the junction of the in place and new fill.

5. No fill should be placed on frozen or wet ground. Any placed fill that becomes frozen, saturated or excessively dry should be undercut and replaced. Any unsuitable or damaged fill should not be covered with additional fill. The surface of each fill lift should be left in an unsmooth condition to provide adequate bonding with subsequent fill lifts. All fill lifts should be graded to prevent surface water ponding. The fill pad should be sealed at the end of each day by proof-rolling with rubber-tired rollers.

D. Control of Moisture Content: During placement and compaction of fill, the moisture content of the materials being placed shall be maintained within the specified range.

The application of water to the fill materials shall be accomplished at the borrow areas insofar as practicable. Water may be applied by sprinkling the materials after placement on the fill, if necessary. Uniform moisture distribution shall be obtained by disking, blading or other approved methods prior to compaction of the layer.

Material that is too wet when deposited on the fill shall either be removed or be dried to the specified moisture content prior to compaction.

If the top surface of the preceding layer of compacted fill or a foundation or abutment surface in the zone of contact with the fill becomes too dry to permit suitable bond it shall be scarified and moistened by sprinkling to an acceptable moisture content prior to placement of the next layer of fill.

A heavy duty harrow shall be on site while earth fill is being placed to provide the necessary disking for moisture control.

E. Compaction: Fill adjacent to structures shall be compacted to the required density by means of hand tamping or manually directed power tampers or plate vibrators. Heavy equipment shall not be operated within 2' of any structure. Vibrating rollers shall not be operated within 5' of any structure. Compaction by means of drop weights operating from a crane or hoist will not be permitted.

1. The passage of heavy equipment will not be allowed over the following:

   a. Cast-in-place conduits prior to 14 days after placement of the concrete

   b. Cradled precast conduits prior to 7 days after placement of the concrete cradle

   c. Any type of conduit until the backfill has been placed above the top surface of the structure to a height equal to ½ the clear span width of the structure or pipe or 2', whichever is greater.

2. Compaction of fill adjacent to structures shall not be started until the following time intervals have elapsed after placement of the concrete:

Structure		Time Interval
a.	Retaining walls and counterforts	14 days
b.	Walls backfilled on both sides simultaneously	7 days
c.	Conduit and spillway risers, cast-in-place (with inside forms in place)	7 days
d.	Conduit and spillway risers, cast-in-place (inside forms removed)	14 days
e.	Conduits, precast, cradled	2 days
f.	Conduits, precast, bedded	1 day
g.	Antiseep collars	3 days

F. Removal and Placement of Defective Fill: Fill placed at densities lower than the specified minimum density or at moisture contents outside the specified acceptable range of moisture content or otherwise not conforming to the requirements of the Specifications shall be reworked to meet the requirements or removed and replaced by acceptable fill. The replacement fill and the foundation, abutment and fill surfaces upon which it is placed shall conform to all requirements of this Specification for foundation preparation, approval, placement, moisture control and compaction.

6.17 Roadways and Walks: Excavation for roadways and walks shall be made to the lines, grades and typical sections shown. Proper allowances shall be made for specified thickness of roadbed and walkway below the finish grade shown. Should rock be encountered in the subgrade, the road shall be excavated to a depth of 6" below subgrade and the resulting space backfilled with suitable material.

A. Walks: Walks shall be constructed of Class 'B' concrete, and shall be 4" deep. Transverse contraction joints shall be formed with a tool designed for forming a groove ⅓ the depth of the sidewalk, and on not more than 6'-0" centers. All edges shall be rounded with a 1-¼ edger. Expansion joints shall be located on not more than 20'-0" centers and at all intersections.

B. Roadway Surfacing: All paved access roads and parking areas, where shown on the Drawings, shall have a crushed stone base course, prime coat and sand asphalt surface course. The compacted depth of the base course shall be 8", and widths shall be as shown. Surface course shall be 1 ½" thick. Materials and construction methods shall conform to *the Standard Specifications for Highway Construction of the Georgia Department of Transportation* as follows:

1. Section 310: Base Course, except as specified
2. Section 412: Prime Coat
3. Section 400: Surface Course, Asphaltic Concrete Type 'F'

C. Shoulders: Shoulders shall be constructed of selected topsoil in accordance with typical sections shown and shall be grassed as specified elsewhere. Local quarry waste material may be used for base material meeting Section 310 of Highway Specifications, except for material passing No. 60 sieve which may be from 15% to 85%.

D. Embankment: Where roadways are constructed on fill, the embankment shall be placed in layers not over 6" deep as measured before compaction and be thoroughly rolled to a density of 98% of the Standard Proctor Dry Density with sheepsfoot or pneumatic tired roller. The work shall be executed in a manner which will ensure that no places too steep to roll are left in the embankment. Portions inaccessible to the roller shall be rammed by hand. All materials shall be visibly damp. Water shall be applied as directed to obtain close adhesion between layers and all parts of the material.

1. Sheepsfoot roller shall be of self-cleaning type, have feet projecting 7" from the shell and be of a weight so that the load of each tamper foot with the drum empty will be not less than 100 pounds per square inch of area in contact with a plane surface. Rolling shall be executed until the feet leave no appreciable imprint when the shell is filled to a maximum weight.
2. Pneumatic tired rollers shall be suitable for ballast loading which will give a compression, under working conditions, of not less than 325 pounds per inch width of tire tread. Forward and rear tires shall make separate tracks. Compaction shall be equivalent to that required for the sheepsfoot roller.

E. Materials: Within the limits of the roadbed, the fill shall be constructed of selected clay materials from excavation and borrow and be free from stones larger than 4" in diameter. Slopes of roadway outside the above limits may be constructed of alternate layers of rock and clay; in no case shall rock be allowed in nests. The stones shall be uniformly distributed over the preceding clay layers,

and the voids shall be completely filled with clay so as to form a solid compaction embankment.

6.18 Unauthorized Excavation: Footings or slabs shall be set on undisturbed earth or rock to insure proper bearing. Therefore 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 with crushed stone, gravel or other approved materials under slabs. Should excavation be carried beyond outside lines of footings, such excess excavation should be filled with concrete, or formwork shall be provided, as directed by the Engineer. Additional costs of corrective work made necessary by unauthorized excavation of earth or rock shall be borne by the Contractor.

6.19 Water: The Contractor shall, by the use of wellpoints, pumps, tile drains or approved methods, prevent the accumulation of water in excavated areas. Should water accumulate, the Contractor shall remove it promptly.

6.20 Preloading of Structures: All tanks shall be preloaded with water prior to making final pipe connections. Elevations of structures shall be monitored until settlement has virtually ceased.

6.21 Slabs on Earth Fill: Where slabs are to be constructed on earth fill, all loam, organic matter and other objectionable material shall be stripped from the area. In the event material excavated during construction operations from other locations is not suitable for use in compacted fill, the Contractor shall obtain select material from borrow on or near the site as directed by the Engineer. The fill shall be of select material placed in layers of not more than 6" compacted thickness and compacted by the use of heavy rolling or power tamping equipment to secure at least 95% of the Standard Proctor Dry Density. An experienced soil engineering technician shall take adequate density tests during placement of fill to verify that the specified degree of compaction is being achieved.

6.22 Backfilling Around Structures: Backfills around structures shall be properly placed and compacted. The fills shall be brought up in layers. The layers shall be thoroughly compacted to at least 95% of Standard Proctor Dry Density, each layer to be not deeper than 6" compacted thickness. Compaction around structures shall be by use of heavy power tamping equipment. Areas to be backfilled at structures shall be free from trash and wood.

6.23 Grassing and Sedimentation Control: The Contractor shall furnish and install all materials and provide all labor for grassing and sedimentation control as indicated on the Drawings and/or Specification. Grassing in all disturbed areas and all finish grade areas, including cut and fill slopes and other areas as indicated on the Drawings, shall be established and maintained until Engineer acceptance. All pipe lanes and distribution pipe lanes shall be grassed.

A. Grassing: The Contractor shall grass all areas that were disturbed by clearing or construction operations. Grassing shall be by seeding. Before seeding commences, the Contractor shall spread the stored stock piled top soil over the entire area, working the better top soil into the more rocky areas. The entire area shall be smoothed with a drag and all clods broken up. All deleterious material,

large stones, roots, limbs and other debris shall be removed to leave a smooth area that would be suitable for mowing.

1. Grass Seed: Grass seed shall be 35% blue grass, 60% creeping fescue, and 5% white clover. Fertilizer shall be 16:16:16, total nitrogen, available phosphoric acid, and water-soluble potash. Grass 1,000 square feet. Fertilizer shall be applied and mixed into the top soil at the rate of 25 pounds per 1,000 square feet. Ground limestone shall be applied at the rate of 75 pounds per 1,000 square feet.

2. Grassing: Grassing (by seeding) shall be completed as soon as practical after finish grading is completed in order to minimize erosion from rainfall and run-off. Any erosion occurring in grassed areas shall be immediately repaired.

3. Permanent Seeding: Permanent seeding shall be done only if it can be completed between March 1st and April 15th or August 15th and November 15th . Use domestic Italian rye during remaining periods. The Contractor shall provide for later permanent seeding by obtaining a signed proposal to the Owner from an approved local landscaper for the work specified. The Owner shall deduct the amount of the proposal from the final payment. The work of spreading and compacting top soil shall be performed by the Contractor, as specified, prior to planting rye grass. Replacing or repairing of eroded top soil shall be done, as necessary, by the local landscaper at time of later grassing, and this work shall be included in his proposal.

4. Seed, Fertilizer, Mulch: Seed, fertilizer, mulch and periodic watering shall be applied in adequate quantities to assure a satisfactory ground cover over the entire disturbed area of construction operations. A satisfactory stand of grass is defined as a full cover over the seeded area of live and growing grass with no bare spots larger than 2 square feet.

5. Hydroseeding: Grassing may be by hydroseeding or by the following described method:

    a. Seed and fertilizer mix shall be as described above. All planting and seeding shall be watered thoroughly as soon as completed and shall be watered at least twice daily, or more often if necessary to provide continuous growth without setback until all growth from seed is thoroughly established.

    b. Seeded areas shall be immediately mulched to aid in the establishment of vegetation. The mulching material will consist of dry straw or hay of good quality free of seeds of competing plants, and at the rate of 2-tons per acre.

    c. Straw or hay mulch will be applied uniformly over the area, leaving about 25% of the ground surface exposed. It must be spread within 24 hours after seeding is done. The spreading must be done by blower-type or other mulch-spreading equipment or by

hand and anchored by pressing the mulch into the soil. Anchoring must be done immediately after the mulch is spread. A disk harrow with the disk set straight or a special "packer disk" may be used. The disk may be smooth or aerated and should be 20" or more in diameter and 8" to 12" apart. The edges of the disk should be dull enough not to cut the mulch but sharp enough to press into the soil leaving much of it in an erect position.

B. Sedimentation Control: Sedimentation shall be controlled by the use of hay mulch on slopes 3:1 or less and by the use of 1" x 2" erosion net over hay mulch on slopes greater than 3:1.

1. Hay Mulch and Erosion-Net: Hay mulch and erosion net shall be placed over the area to be protected immediately after seeding operations have been completed.

   The netting shall be spread evenly and smoothly and shall be in contact with the soil at all points.

2. Staples: Staples for securing the net shall be made from not less that 12" lengths of 11 gauge, degradable carbon iron bent to form a "U" of 1-½" to 2" in width. Longer staples may be required for loose soil.

3. Securing: Each strip of the netting shall be held firmly in place by means of three rows of staples, one row along each edge and one row along the middle. The staples shall be spaced no more than 3' apart in each row with the staples in the middle row spaced alternately with those at the edges. All staples shall be driven flush with the ground.

C. Temporary Sedimentation Control Structures: Where the location of temporary sedimentation control structures are not indicated on the Drawings, the following guidelines shall be used: Install sedimentation structures at the toe of all disturbed earth slopes, around all drainage structure inlets, across constructed drainage ways at approximately 150' centers and at the tops of slopes and terraced slopes as indicated on the details. Siltation fences or hay bales only shall be used across constructed drainage ways. Hay bales only shall be used at drainage structure inlets. Perimeter barriers may be any of the types detailed.

Structures shall be constructed of wire bound hay or straw bales staked, wire together or retained against hog wire. Fences shall be as indicated on the Drawings.

6.24 Demolition:

A. Scope: The work covered by this Section of the Specifications consists of furnishing all materials and equipment and performing all labor necessary for demolition and removal of existing structures and utilities as designated on the Drawings to be removed.

B. Site Conditions: The Contractor's attention is directed to the Instructions to Bidders and the soils investigation paragraph of these Specifications relating to site examination.

C. Procedures: The Contractor shall submit proposed procedures for demolition work to the Engineer for review and approval. All demolition procedures shall be accomplished in strict compliance with all state and local laws and regulations as well as shall conform to NFPA Standard 241, *Safe Guarding Building Construction and Demolition Operations*. Submittals shall include a detailed description of the methods and equipment to be used for each operation and the sequence of operation, evidence of having successfully performed similar work on other projects; permits and notices authorizing demolition where required by local and/or state regulations, and permits for transport and disposal of debris where required by local and/or state regulations.

D. Site Work: The Contractor shall not use explosives without prior approval of the Owner and Engineer. The Contractor shall conduct operations to insure minimum interference with all roadways and adjacent businesses and facilities. The Contractor shall not obstruct roadways without obtaining permits and permission from governing authorities. The Contractor shall protect all existing underground and overhead utilities from damage or interruption of service from demolition activities.

E. Dust Control: Dust resulting from demolition shall be controlled to prevent the spread of dust to occupied portions of the site as well as avoid creation of nuisance to the surrounding area. Use of water will not be permitted when it results in or creates hazardous or objectionable conditions such as ice, flooding and pollution.

F. Disconnection of Utility Service: Utilities shall be disconnected at points indicated on Drawings or as necessary for demolition of structures. The Contractor shall arrange for, and verify, termination of utility service including removal of meters and capping of lines by representatives of utilities that are involved.

G. Preparation: The Contractor shall remove all items to be salvaged for the Owner and place in designated storage area. The Contractor shall construct barriers, fences, guard rails, enclosures, shoring, etc. to deny public access to the demolition site and to protect utilities and structures that are to remain.

H. Structures: Structures shall be completely removed where noted on the Drawings. Holes resulting from removal structures shall be backfilled and compacted in accordance with these Specifications.

I. Cleanup: The Contractor shall remove debris and rubbish from the site as soon as practicable. Debris and rubbish will not be allowed to accumulate. Remove and transport debris in a manner as to prevent spillage on streets, public rights of ways or adjacent areas. The Contractor shall obtain all permits for transport and disposal of debris as required by all local, state and federal agencies. All disturbed areas from demolition activities shall be grassed in accordance with these Specifications.

6.25 Vegetation Cleanup, Maintenance and Inspection:

A. Cleanup: Any soil, mulch or similar material which has been brought onto paved areas by hauling operations or otherwise shall be removed promptly, keeping these areas clean at all times. Upon completion of the planting, all excess soil, stones and debris which have not previously been cleaned up shall be removed from the site or disposed of as directed by the Engineer. All grassed areas shall be prepared for final inspection.

B. Maintenance: Maintenance shall begin immediately after installation and continue until final inspection and acceptance by the Engineer. Grassing shall be protected and maintained by watering and mowing. Replanting may be necessary to produce a uniform stand of grass. Weeding, fertilizing, liming, disease and insect pest control, aerating and all other procedures consistent with good horticultural practice may be necessary to insure normal, vigorous and healthy grass.

6.26 Inspection for Acceptance: Upon the complete installation of grassing, the Contractor shall request an inspection by the Engineer to determine that all required areas have been satisfactorily grassed according to the plans and specifications. Grassing shall be noted as to condition and coverage and shall be free from erosion and other damage prior to being accepted. Upon acceptance, the Owner shall assume the responsibility for maintenance.

6.27 Chain Link Fence and Gates: Contractor shall provide fence and gates meeting the following:

A. Chain Link Fence Fabric: Fabric shall meet the following:

1. Chain link fence shall be galvanized fabric in accordance with ASTM A392, Type II, Class 2, 2.0 ounces per square foot.
2. Fence height shall be 6'.
3. No. 9 Core Wire Gauge

B. Pattern: 2" diamond-mesh

C. Posts: Intermediate / line posts shall meet the following:

1. Schedule 40 galvanized steel pipe in accordance with ASTM F1083
2. Diameter: 2.375"
3. Weight: Minimum 3.65 pounds per foot
4. Zinc Coating: Minimum 1.8 ounces per square foot

D. Top and Brace Rails: Rails shall meet the following:

1. Schedule 40 galvanized steel pipe in accordance with ASTM F1083
2. Diameter: 1.66"
3. Weight: Minimum 2.27 pounds per foot
4. Zinc Coating: Minimum 1.8 ounces per square foot

E. Gate Frame Posts:

1. Schedule 40 galvanized steel pipe in accordance with ASTM F1083.
2. Diameter: 1 .90"
3. Weight: Minimum 2.72 pounds per foot
4. Zinc Coating: Minimum 1.8 ounces per square foot

F. Interior Bracing Posts for Gates:

1. Schedule 40 galvanized steel pipe in accordance with ASTM F1083.
2. Diameter: 1.66"
3. Weight: Minimum 2.27 pounds per foot
4. Zinc Coating: Minimum 1.8 ounces per square foot

G. Fence Fittings:

1. All fence fittings shall be in accordance with ASTM F626.
2. Barbed wire support arms shall have 45° angle and shall support 3 strands of barbed wire.

H. Tension Wire:

1. Zinc-coated steel marcelled tension wire in accordance with ASTM A824, Type II.
2. Diameter: 0.177" (7 gauge)

I. Zinc Coating: 1.20 ounces per square foot

J. Barbed Wire: Zinc-coated barbed wire in accordance with ASTM A121 meeting the following:

1. Line Wire:
   a. Three strands of twisted wire
   b. Diameter: 12½ gauge
   c. Zinc Coating: 0.80 ounces per square foot
2. Barbs:
   a. Number of Points: 4
   b. Length: Minimum ⅜"
   c. Diameter: 14 gauge
   d. Spacing: 5"

K. Gates: Gates shall be designed and fabricated in accordance with ASTM F900.

L. Gate Accessories:

1. Provide gate hinges that are structurally capable of supporting the gate leaf and allow the gate to open and close without binding. Hinges shall be designed to allow the gate to open 180°.

2. Single gates shall be provided with a gate latch that holds the gate in a closed position and has provisions for a gate lock.

3. Double gates shall be provided with a drop rod or plunger bar type gate latch arranged to engage the gate stop. Locking devices shall be constructed so that the center drop rod or plunger cannot be raised when the gate is locked. Gate latch shall have provisions for a gate lock.

4. Double gates shall be provided with gate stops.

5. Double-leaf gates greater than 5' must be provided with gate keepers.

M. Gate Operators: Replace existing electrical motorized gate operator. Gate operator shall be manufactured by HySecurity, Liftmaster or approved equal.

1. Gate operation shall be by means of a brushed DC electric motor driving a single reduction gear reducer with an output sprocket driving #40 plated roller chain. When the gate is stopped, the motor applies a brake to the drive assembly which inhibits any forced, manual operation of the gate. Gate position is constantly monitored allowing for automatic reposition if motion is detected without the operator receiving a run command. The opening and closing speeds are user adjustable 0.75, 1.0 or 1.25 fps. The gear reducer shall be filled with synthetic lubricant capable of allowing operation down to -13˚F without a heater. Operator shall be capable of handling gates up to 40' in length and weighing up to 1,500 pounds. Gate operator shall operate in the event of a power failure in an uninterruptible power supply mode to the extent the two 8Ah batteries can maintain adequate power.

2. Standard mechanical components shall include as a minimum:

   a. Two piece linear low density polyethylene cover with top locking latch. Cover protects bystanders from pinch hazards of roller chain traveling through idlers and drive sprocket.

   b. Frame to be constructed of 10 gauge or greater steel plate, welded.

   c. Frame to be zinc plated and other components zinc plated or non-corroding.

   d. Operator shall contain a position sensing device and a means of setting the limit position and maintaining this position in non-volatile memory. Operator must also contain a magnetic absolute position sensor to verify the gate position.

   e. Zinc or nickel plated #40 roller chain with chain mount brackets and connecting hardware.

3. Minimum standard electrical components shall be industrial grade and include as a minimum the following:

   a. ½ horsepower brushed DC motor with ball bearings

b. Electronic circuit boards to be conformal coated to resist moisture induced failures.

c. All components shall have overload protection.

d. Controls: Smart DC controller board with 512K memory containing:

1) Adaptive inherent entrapment sensor

2) Built in "warn before operate" system

3) Built in timer to close

4) 32 character LCD, 5 button user interface

5) 24 programmable output relay options

6) Anti-tailgate mode

7) Built-in multi-level power surge and lightning strike protection using gas discharge and optoisolation technology

8) Multi-stage intelligent battery charging under microprocessor control

9) Capable of viewing EEPROM stored event logs for troubleshooting diagnostics

10) RS232 and USB port for connection to laptop or other computer peripheral and RS485 connection of Master/Slave systems

11) Pulse width modulated control of brushed DC motor using 110 Amp rated solid state switching devices

4. Transformer: 250 VA Input Power: 115V, 230V, Field selectable

5. Accessory Power: 12VDC, 24VDC, 24VAC

6. Stop switch, accessible from outside

7. Back Drivable: During AC and DC power loss, the gate can be pushed open.

8. Required External Sensors: Photo eyes to be installed such that the gate is capable of reversing in either direction upon sensing an obstruction

9. Control Devices: Vehicle detector and keypad

10. Optional Alert Devices: Rotating beacon or flashing lights

11. Extended battery backup using two 50 Amp hour batteries with base riser.

6.28 Method of Payment: Payment for all excavation and fill work shown on the Drawings and herein specified and required to complete the clearing, grubbing, site excavation, trench excavation, borrow excavation, backfill, sheeting, shoring, topsoil, crushed stone or gravel, drainage, pumping, embankment fills and any other excavation and fills required to construct the project as shown on the Drawings shall be included in the lump

sum price bid in the Proposal, and no measurement of the quantities will be made. The contours and elevations of the present ground are believed to be reasonably correct but are not guaranteed. The Contractor shall satisfy himself by actual examination of the site work as to the existing elevations and contours and the amount of work required under this Section.

A. If the quantities of common excavation required are increased or decreased as a result of changes made in the Drawings or by direction of the Engineer in writing during construction, the Engineer will determine the quantities of such changes, and the lump sum price will be adjusted upward or downward as applicable to compensate for such changes at the applicable adjustment unit price bid for common excavation in the Proposal.

B. No adjustment payment for trench excavation in earth will be made. Adjustment payment for such excavation shall be included in the applicable adjustment unit prices bid per linear foot of various sizes of pipe laid as listed in the applicable adjustment unit prices bid in the Proposal.

C. Additional payment will be made for any additional undercutting if required due to unsuitable soils. Additional undercutting will be any undercutting below the **level** as shown on the Drawings, provided excavations have been made after the site has been properly dewatered. Additional payment shall include the cost of replacing and compacting unsuitable material. Undercutting due to improper dewatering and construction operations will be at no additional expense to the Owner.

D. The cost of all soils inspections and testing shall be paid by the Owner. If compaction tests do not meet required values, the cost of additional testing as required by the Engineer shall be paid by the Contractor.

E. Payment for signs shall be at the unit price bid. Posts will be paid at the unit price bid. Price shall include installation, hardware and all other items.

F. Rock excavation is unclassified. No separate payment will be made for rock excavation. The cost of such work and all costs incidentals thereto shall be included in the prices bid for the time to which the work pertains.

G. Disposal of buried debris from this site as shown on the bid drawings will be paid by the City of Social Circle. All tickets to be provided by Contractor.

H. All landscaping planting and erosion control structures shown on the Drawings will be included in the lump sum bid in the Proposal.

SECTION 7
PIPING, FITTINGS, VALVES AND DRAINS

7.01 Scope: The work described by this Section consists of furnishing all materials and equipment and performing all labor necessary to install all interior and exterior piping systems and valves, complete, as shown on the Drawings or specified, and as required for proper operation of all equipment installed under this Contract. All standard test designations refer to the revision of those standards in effect on the date of issue of the Contract Documents, except when a specific revision is specified.

7.02 Drawings: The Contractor shall furnish pipe fabrication details and dimensional layouts for all piping systems for checking and review by the Engineer in accordance with the General Requirements section of these Specifications. Each joint of pipe and fittings shall be marked and dimensioned to ensure installation shall commence until those drawings have reviewed and stamped by the Engineer.

7.03 Iron Pipe and Fittings: Ductile iron pipe shall be where shown or indicated on the Drawings. (Piping systems not specifically scheduled or otherwise specified shall be provided as ductile iron.) All ductile iron pipe shall be designed for a minimum 150-psi working pressure, 100-psi surge allowance, a 2 to 1 factor of safety on the sum of working pressure plus surge pressure, single AASHO H-20 truck loading, laying condition 2, and cover required. Each pipe shall be subjected to a hydrostatic pressure test of at least 500-psi at the point of manufacture. Ductile iron pipe shall conform to ANSI A21.51. The class or nominal thickness, net weight without lining, and casting period shall be clearly marked on each length of pipe. Additionally, the manufacturer's mark, year in which the pipe was produced, and the letters "D.I." or "Ductile Iron" shall be cast or stamped on the pipe.

A. Pipe:

1. Buried Pipe: Unless noted otherwise, buried pipe shall be push-on type joints meeting requirements of AWWA C111/A21.11, minimum pressure class 150. (Bury depth and laying condition/ trench type may require higher pressure class.)

2. Exposed Pipe: Unless note otherwise, exposed pipe shall be flanged joint meeting requirements of AWWA C115/A21.15, Minimum Thickness Class 53.

B. Fittings: All fittings to meet requirements of AWWA C 110 (ANSI A 21.10), or ANSI/AWWA C153/A21.53.

1. Buried Fittings: Mechanical Joint with standard retainer gland unless noted otherwise. (See below for restrained joint systems)

2. Exposed Fittings: Flanged Joint unless noted otherwise.

C. Exterior Coatings:

1. Underground Pipe and Fittings: Asphaltic coating in accordance with AWWA C151

2. Exposed Pipe and Fittings: Factory applied primer compatible with painting systems specified in "Painting" section

D. Interior Lining: Pipe and fittings shall be lined with a bituminous asphalt coating in accordance with ANSI A21.4 and AWWA C104, NSF 61 for water applications, except as noted below:

1. Gravity sewer pipe shall be cement lined in accordance with ANSI A21.4 and AWWA C104

2. Air pipe shall be unlined.

E. Gaskets:

1. Sewers: Styrene Butadiene Rubber (SBR) conforming to ANSI A21.11

2. Water: Styrene Butadiene Rubber (SBR) or EPDM in accordance with ANSI A21.11

3. Air: FKM (Viton or equal)

F. Hardware (Bolts & Nuts):

1. Mechanical Joint: High-strength, low-alloy steel T-bolts and nuts complying with AWWA C111.

2. Flange Joint: Bolts to ASTM A307 Grade A carbon steel with chamfered or rounded ends projecting ¼ to ½ inch beyond the outer face of nut. Nuts to be ASTM A563, hexagonal, ANSI/ASME B18.2.2.

a. Hardware located in sewer wet wells, or where indicated on the drawings, shall be 316 stainless steel.

G. Restrained Joint Pipe and Fittings: Where indicated on the Drawings, all restrained joint pipe shall be ductile iron, pressure class as indicated, with push on joints and restrained gaskets according to the following:

American Pipe	ACIPCO "Fast-Grip"
U.S. Pipe (up to 24")	U.S. Pipe "Field-Lok"
Griffin Pipe (up to 24")	U.S. Pipe "Field-Lok"
McWane Pipe (up to 24")	U.S. Pipe "Field-Lok"

U.S. Pipe TR Flex, American Flex Ring, or similar joints may be used at the Contractor's option. Valves and fittings shall be restrained by mechanical joints with wedge acting restraining gland, EBAA Mega-lug, Sigma One-Lok, or approved equal.

Restrained joint pipe and fittings shall not be substituted for concrete blocking, where indicated on the drawings, without prior approval from the Engineer.

7.04 Copper and Brass Pipe: Copper pipe shall be as specified in Article 7.11 and shall be used for small water pipe and fittings. Brass used for air lines shall be of commercial iron pipe sizes conforming to ASTM B43 "Standard Red Brass Pipe, Standard Sizes".

7.05 Steel Casing Pipe: Casing shall be Grade B steel pipe minimum yield strength 35,000 psi and shall conform to ASTM A252 Grade 2. The diameter and wall thickness shall be as shown on the Drawings. Joints where required shall be electric fusion (arc) proper installation. No fabrication, manufacture, and welding by operators qualified in accordance with American Welding Society Standard Procedure.

7.06 Polyvinyl Chloride Pipe:

A. Water Lines: Except where noted on the drawings, the Contractor can provide in the Proposal a price for installing polyvinyl chloride pipe outside of structures. PVC pipe for water lines shall meet the requirements of AWWA C-900, "Standard for Polyvinyl Chloride (PVC) Pressure Pipe 4" through 12" for Water". PVC pipe shall be class 200 (DR 14) and shall have iron outside diameters and must be Underwriters Laboratories, Inc. listed. Pipe less than 4" shall be SDR21 (PR200) conforming to ASTM D-2241. All pipe shall be jointed with integral thickened bell and elastomeric gaskets. Lubricant used with PVC pipe must be non-toxic and supplied or approved for use by the pipe manufacturer.

1. Testing and Inspection: All pipe shall be tested and inspected at the place of manufacture for all requirements of the AWWA C-900 standards. Certified copies of the test reports covering each shipment shall be submitted to the Engineer prior to laying.

2. Detectable Tape: Where PVC pipe is installed, the Contractor shall place in the pipe trench 1' above the top of pipe a metallic detectable tape. The tape shall have a 2" minimum width, imprinted with "Caution Buried Water Line", and shall be made of polyethylene film laminated to aluminum film with a total thickness of not less than 4 mils.

B. Chemical Feed Lines: Polyvinyl chloride pipe shown on the Drawings to be installed inside of structures, or for gaseous chlorine, acid, or other chemicals shall have solvent weld joints except as noted. Sufficient unions shall be provided to facilitate maintenance of all lines. PVC yard pipe shall be SDR21 (PR200) conforming to ASTM D-2241. PVC pipe shall be Schedule 80, Type 1, Grade 1, National Sanitation Foundation approved and shall conform to Commercial Standard, CS 207, latest revision, ASTM D-1734 and ASTM D-1785, latest revision, as applicable to Type 1, Grade I polyvinyl chloride plastic pipe, Schedule 80 water pressure ratings. Fittings shall comply with ASTM D-2467.

1. Valves: Valve material shall meet requirements of Type 1, Grade I polyvinyl chloride as outlined in ASTM D-1784, with seats and seals as required by usage. Ball valves shall carry a pressure rating of 150 psi, W.O.G. at 75° F. All wetted surfaces shall be of a material not affected by chemicals to be transported.

2. Testing and Inspection: Pipe shall be all tested and inspected at the place of manufacture for all requirements of the latest ASTM and Commercial Standard tests and certified copies of the test reports covering each shipment shall be submitted to the Engineer prior to laying.

All pipe used for liquid or gaseous chlorine shall be tested with ammonia solution as recommended by the manufacturer of the chlorination equipment.

7.07 Unloading, Hauling, Distributing and Storing Pipe and Related Materials: The Contractor shall unload, haul, distribute, and store pipe and related materials as follows.

A. Unloading: Equipment and facilities for unloading, hauling, distributing and storing materials shall be furnished by the Contractor and shall at all times be available for use in unloading materials. Delays in unloading railroad cars, unloading trucks, or hauling from freight terminal, which incur demurrage, truck waiting charges or terminal charges shall be at the expense of the Contractor.

B. Handling: Pipe, fittings, and other material shall be carefully handled so as to prevent breaking and/or damage. Pipe may be unloaded individually by hand but shall not be unloaded by rolling or dropping off of trucks or cars. Preferred unloading is in units using mechanical equipment, such as forklifts, cherry pickers or front-end loaders with forks. If forklift equipment is not available, units may be unloaded with use of spreader bar on top and nylon strips or cables (cushioned with rubber hose sleeve) looped under the unit.

C. Distributing: Materials shall be distributed and placed so as to least interfere with traffic. No street or roadway may be closed without first obtaining permission of the proper authorities. The Contractor shall furnish and maintain proper warning signs and obstruction lights for the protection of traffic along highways, street and roadways upon which material is distributed. No distributed materials shall be placed in drainage ditches.

D. Storage: All pipe, fittings, and other materials, which cannot be distributed along the route of the work, shall be stored for subsequent use when needed. The Contractor shall make his own arrangements for the use of storage areas; except that, with permission, he may make reasonable use of the Owner's storage yards.

1. Ductile Iron Pipe: Ductile iron pipe must be stockpiled on level ground. Timbers must be placed under the pipe for a base and to prevent dirt and debris from washing into the pipe.

2. PVC Pipe: PVC pipe must be stockpiled on level ground. If pipe is unloaded individually by hand, timbers must be used under the pipe for a base, spaced the same as factory load, with stop blocks nailed at either end. Stockpile must be built up the same manner as it was stocked for shipment, transferring dunnage and chock-blocks from load to stockpile. Individual lengths of pipe shall not be stacked in piles any higher than 5'.

   If pipe is unloaded in units, the units must be placed on level ground and shall not be stacked more than 2 units high. Units must be protected by dunnage in the same way they were protected while loaded on the truck or car. The dunnage must support the weight of all units so that pipe lengths do not carry the weight of the unit loaded above.

   If pipe is to be stored outside and exposed to sunlight for a number of months, the pipe must be protected by covering with canvas or other

opaque material. The cover shall be loose enough to allow for air circulation around the pipe. The use of clear plastic sheets will not be permitted.

7.08 General Provisions for Laying Exterior Metal Pipe Lines: The Contractor shall lay all pipe and fittings to accurately conform to the lines and grades established by the Engineer as follows:

A. Handling: Proper and suitable tools and equipment, for the safe and convenient handling and laying of pipe, shall be used; great care shall be taken to prevent the pipe and coatings from being damaged. All pipe shall be carefully examined for cracks and other defects, and no pipe and other castings shall be laid which are known to be defective. If pipe and other castings are discovered to be cracked, broken and defective after being laid, it shall be removed and replaced with sound material, at no additional expense to the Owner. All pipe and fittings shall be thoroughly cleaned before being laid, and shall be kept clean until accepted in the complete work.

B. Alignment and Gradient: Pipe line alignment and gradient shall be straight, or shall follow true curves as near as is practicable. Curvature in pipe lines, where required, shall be well within the allowable horizontal or vertical laying radius.

C. Schedule of Work: Excavation, cleaning, laying, jointing, and backfilling shall be kept up as closely as is possible so as to progress the work in a uniform workmanlike manner. In no case shall pipe be left in the trench overnight without completing the jointing.

The completed pipe line shall not be left exposed in the trench unnecessarily; the Contractor shall backfill and compact the trench as soon as is possible after laying and jointing is completed. Each day at the close of work, and at all times when laying is not in progress, the exposed end of the pipe line in the trench shall be closed with an approved head or barrier of wood or metal. If at any time it becomes necessary to cover the end of an incomplete pipe line with backfill, the end of that pipe shall be closed with a mechanical joint plug.

D. Cleaning: The Contractor shall clean each joint of pipe while it is suspended before it is lowered into the trench. The Contractor shall keep exposed ends of the pipe properly plugged during laying to prevent dirt and other materials from entering the line, and shall, before the system is accepted, thoroughly clean all lines.

E. Laying Pipe in Trenches: When laying pipe in trenches, care shall be taken to give the pipe solid bearing throughout its entire length. The earth used in refilling trenches, from the bottom of the trench, under and up to 2' over the top of the pipe line, shall be of selected material, carefully packed, and tamped and rammed with proper tools for the purpose. Pipe in rock trenches shall be carefully bedded in 4" minimum fine selected material. Extreme care should be exercised to prevent contact with the rock. All tees and bends in pipe lines shall be firmly blocked with Class "B" concrete to the dimensions shown on the Drawings or as directed by the Engineer, placed between fittings and the vertical face of the trench; all

exposed pipes, valves, hydrants, etc., shall be securely strapped, and all ends and bends shall be properly blocked.

F. Mechanical Jointing: Mechanical joints shall be made only by experienced mechanics. Sockets and spigots shall be washed with soapy water before slipping gland and gasket over spigot. The spigot shall be inserted in the socket full depth. The gasket shall be brushed with soapy water and shall be pushed into position, making sure the gasket is evenly seated in the socket. The gland shall be laid into position for compressing gasket. All bolts and nuts shall be tightened "fingertight", after which bolts shall be tightened to a uniform permanent tightness using a torque wrench for tightening. Bolts shall be tightened alternately 180° apart. Sockets, spigots, gaskets, glands, and bolts shall be kept clean and wet with soapy water until each joint is completed. Suitable bell holes shall be cut in the bottom of the trench at the location of joints in order to secure a uniform bearing of the pipe in the trench. Gaskets of high quality EPDM meeting the requirements of ASTM D200 shall be used for air piping.

G. Flanged Connections: Flanges shall have 125# AN91 drillings. Gaskets of rainbow rubber, or equal, with cloth inserts shall be used. Flanges shall be firmly bolted with machine bolts of the proper size and threaded. The bolts and nuts shall be of the best quality refined bar iron, with good, true threads, and shall be tightened in a manner which will evenly distribute the stress in the bolts and bring the pipe into uniform alignment.

H. Jointing Bell-Spigot Connections: All bell-spigot connections shall be jointed with a molded rubber gasket. The inside of the bell, and the outside of the pipe, shall be thoroughly cleaned. Only joint runners in good condition shall be used in the work.

1. Gasket: All joints shall be made with best quality molded rubber gasket, properly installed in accord with manufacturer's printed recommendations.

2. Defective Joints: All defective joints shall be replaced to the satisfaction of the Engineer.

I. Push-On Joints: Joints shall be made in accord with the manufacturer's printed instructions.

J. Cutting: Whenever pipe and special castings are required to be cut, the cutting shall be done by skilled workmen; cutting torches shall not be used.

7.09 General Provisions for Laying Exterior PVC Pipe Lines: Installation of PVC pipe shall meet the provisions of the installation section of these Specifications and shall be in accordance with UNI-BELL STANDARD UNI-B-3, "Installation of Polyvinyl Chloride PVC Pressure Pipe." The provision of for laying the pipe in trenches section of these Specifications shall be followed. The select material used in filling the ditch around the pipe must be free of rocks, clods, and frozen material larger than 1½" in the largest dimension. Extreme care must be taken not to damage the PVC pipe with mechanical compactors.

7.10 Heavy Interior Piping Systems: The Contractor shall furnish and install all heavy interior piping systems, complete, as indicated on the Drawings, as specified, and as required for

proper operation of equipment. Those piping systems shall be jointed as specified in these Specifications and shall be properly supported by a system of hangers, pipe stanchions, brackets, concrete piers, and saddles as required. Inserts, bolts, and anchors, required for proper support, shall be set into form work or concrete work by the Contractor before concrete is placed. Pressure lines shall be secured with struts or reaction blocking to prevent slippage.

7.11 Operating Piping Systems: The Contractor shall furnish and install all small operating and control piping systems, and other small piping systems indicated on the Drawings and as required for operation of all equipment.

A. Materials: Piping for all operations and control piping systems shall be PVC, except as otherwise specified. Pipe, fittings, and valves shall be as follows:

1. Pipe and Fittings:

a. Above ground/exposed piping shall be PVC Schedule 80 pipe and be manufactured from a Type I, Grade I PVC compound with a Cell Classification of 12454 per ASTM D1784. The pipe shall be manufactured in strict compliance to ASTM D1785.

b. Hot water piping shall be CPVC schedule 80 pipe and be manufactured from a Type IV, Grade I Chlorinated Polyvinyl Chloride (CPVC) compound with a minimum Cell Classification of 23447 per ASTM D1784. The pipe shall be manufactured in strict compliance to ASTM F441. The pipe shall have a Flame Spread rating < 25 and a Smoke Development rating < 50 when tested and listed for Surface Burning Characteristics in accordance with CAN/ULC-S102-2-M88 or equivalent.

c. All small yard pipes shall be PVC SDR 21 PR 200 (½" shall be SDR 13.5 PR315) and shall be manufactured from a Type I, Grade I PVC compound with a Cell Classification of 12454 per ASTM D1784. The pipe shall be manufactured in strict compliance to ASTM D2241.

d. All piping shall be stored indoors after production at the manufacturing site until shipped from factory. This pipe shall carry the National Sanitation Foundation (NSF) seal of approval for potable water applications.

2. Valves: Valves shall be check, gate or globe pattern as indicated on the Drawings or specified, and shall have soler ends. Air, globe and check valves shall have composition disc for tight shut-off. All valves shall be designed for 125 psi working pressure. Valves for gauges shall be union gauge cocks having pipe thread-to-copper adapters. Valves shall be located inside at all water supply entrances to buildings.

PVC ball valves shall be full port, true union type designed for easy service with reversible PRFE seats, fine pitch seal retainer threads and

double O-ring stem seals. Ball valves shall be manufactured by Heyward, Parker or equal.

B. Installation and Arrangement: All pipe runs shall be parallel with, or at right angles to, walls, ceilings equipment etc. 45° fittings and angle runs shall be avoided as far as possible. Piping shall be arranged and installed neatly, and so that it satisfies the service requirements and leaves the machine and equipment it is service accessible. Insofar as possible, all valves shall be accessible for operation by a person standing on the floor.

1. Pipe Drainage: All piping, whose service requires drainage of moisture, shall be installed with the required slope in the proper direction for gravity drainage and in such a manner to least interfere with foot traffic.

2. Parallel Runs: All parallel runs of piping shall be installed with equi-distant spaces between the piping and shall be neatly grouped. Grouping shall be such that crossovers, except as branches, are avoided.

C. Hangers and Supports:

1. The maximum distance between hangers and supports shall be:

¼" and ⅜" diameter -	4' - 0"
½" diameter -	6' - 0"
¾" and 1" diameter -	8' - 0"
1-¼" to 2" diameter -	10' - 0"
2-½" diameter and larger -	12' -0"

2. Maximum distance between hangers and supports for plumbing piping shall be:

Cast Iron -	5' - 0"
Screwed Pipe -	12' - 0"
Copper, 1-½"and smaller -	6' - 0"
Copper, 2 "and larger -	10' - 0"

3. Piping 1" and smaller, shall not be hung from rod hangers. Rod hangers, where used for pipe 1-¼" and larger, shall be split pattern. No pipe shall be clamped directly to a masonry surface. Steel brackets shall be used so that there will be a space not less than ¾" between the pipe and the masonry. Piping 1" and smaller and, preferably, piping 1-¼" and larger, shall be clamped to brackets and other steel members with clamps which will allow no axial movement. Clamps and clamping arrangements shall be of the "Unistrut" type, properly supported for the required arrangement.

7.12 Gate Valves: Valves shall be manufactured and tested to meet the requirements of ANSI/AWWA C515. Valves shall meet or exceed the requirements of Underwriters Laboratories Standard UL262 and Factory Mutual Standard 1130. Valves shall be certified to NSF/ANSI 61 and 372. The rated working pressure of the valve shall be 250

psi. The body, bonnet, wedge and seal plate shall be made of ductile iron in accordance with ASTM A536. The wedge shall be totally encapsulated in rubber. This rubber coating shall be permanently bonded to the ductile iron wedge casting and shall meet ASTM D429 tests for rubber to metal bonding. No paint shall be allowed in the wedge and the wedge must not be hollow. Containment of the stem nut must only be on two sides to facilitate easy removal. There shall be three stem seal O-rings: two in the seal plate which shall be replaceable with the valve in the full open position at rated working pressure and one under the stem thrust collar. All gaskets shall be O-ring seals. O-rings set in a cartridge shall not be allowed. A grit seal must be present above the seal plate to prevent dirt intrusion. Valves are to be open left (OL) or open right (OR). Operating nuts are to be painted black (OL) or painted red (OR). The NRS valves shall be provided with a 2" square operating nut (2"-24"). Valves 2" to 16" must have two polymer thrust washers, one above and one below the thrust collar. Stainless steel thrust washers are not acceptable. All fasteners are to be 304 stainless steel. Socket head bolts shall not be allowed. If only two bolts are used to secure the seal plate, the bolts must be fastened to the bonnet with a drilled and tapped hole in the bonnet. The body, bonnet and seal plate shall be epoxy coated in accordance with ANSI/AWWA C550 certified to NSF 61. This coating shall be on the interior and the exterior of the valve. The manufacturer's name, valve size, year of manufacture, pressure rating ("250W"), C515 and "DI" shall be cast on the valve. Each valve shall be tested in accordance with ANSI/AWWA C515, UL262 and FM1130 and shall include hydrostatic pressure testing at 500 psi. A certification of manufacture and testing shall be provided at the municipality's request. All parts of valves to be considered must be manufactured, assembled and tested in the contiguous USA, and letters of certification must accompany any and all products at the request of municipality. Valves with a bury depth greater than 4' shall be supplied with valve nut extension stem. Valves shall be Crispin, Dezurik or equal.

7.13 Eccentric Plug Valves: Plug valves shall be used on all sewage, sludge, and gas lines, and as indicated, and shall be furnished complete with operators and accessories shown on the drawings or specified, or both. Valves shall be of the eccentric, non- lubricated resilient seat type, designed for sewage at 125 psi working pressure and shall have mechanical joint or flanged ends. Drilling for flanged ends shall be in accordance with ANSI B 16.1, Class 125. The valve body shall be semi-steel conforming to ASTM A 126, Class B. Seats shall have a welded-in or cast overlay of not less than 90% pure nickel on all surfaces which will contact the rubber seating area. Upper and lower plug stem bushings shall be of stainless steel and permanently lubricated. Valves shall be manufactured by DeZurik, Crispin, or equal.

A. Valve Operators and Accessories: Valves shall be furnished with operators and accessories as shown and/or required for the intended service and shall include the following.

1. All valves 6" and larger, and all 4" and larger underground valves and valves submerged in sewage shall be gear operated.

2. Below floor/grating valves operated from floor above shall have bushed extension stem with valve stand or floor box. Valves which are more than 6' above operating levels shall be geared for chainwheel operation. Chains shall be cadmium plated.

3. One operating wrench shall be furnished for each wrench-operable valve. Valve stands shall be furnished as shown on the Drawings.

4. Gear actuators shall be submersible, and have a seal provided on all shafts which will prevent entry of water into the actuator. The enclosed gearing, with heavy duty corrosion resistant bearings, shall run in oil or grease. Packing shall be adjustable without disassembling the actuator. Actuator shall clearly indicate valve position; closing torque shall be set by an adjustable stop.

5. Valve operators shall be manual or electric operated as shown. Valve shall be designed for open LEFT operation. Valves operators shall be pretested at rated operating pressure using the specified valve operator to perform the opening and closing cycle.

6. Valves with bury depth greater than 4' shall be supplied with valve nut extension stem.

7.14 Check Valves: Check valves shall be constructed of heavy cast iron with bronze and stainless steel fittings. It shall prevent reverse flow back through the valve when the inlet pressure decreases below the delivery pressure. The valve must be tight seating, and must operate without hammer or shock. The seat ring must be renewable and shall be securely held in place by a threaded joint. The valve disc shall be of cast iron and shall be hinged above its seat so that perfect closure is always attained. Check valves for all pump discharge lines shall have outside spring and lever. The high point of the valve shall be tapped and provided with a stopcock for bleeding of air.

7.15 Vacuum and Air Relief Valves: Vacuum and air relief valves shall be of the sizes shown in the Drawings and shall be a type that will release air and prevent the formation of a vacuum. The valves shall automatically release air from the lines when the lines are being filled with water, and shall admit air into the lines when water is being withdrawn in excess of the inflow. It shall also allow accumulating air to escape while the line is in operation and under pressure. Valves shall be cast iron body, stainless steel float and stainless steel for all other interior metal parts. Valves shall be equipped with an inlet valve and drain valve. Valve shall be Model UL10 as manufactured by Crispin, Dezurik GA Industries or equal.

7.16 Solenoid Valves: Solenoid valves shall be normally closed and shall open wide to permit full pipe opening when the solenoid is energized and closed tight when the solenoid is de-energized. All parts in contact with the fluid being handled shall be of corrosion resistant construction. Coils shall be rated for continuous duty and shall be completely encapsulated in epoxy resin.

7.17 Solenoid Control Valve: The solenoid control valve is a self-contained unit consisting of a diaphragm-operated, packless main valve, and a packless 3-way solenoid pilot valve. The valve shall either open wide or close drip tight. The 3-way solenoid pilot alternately applies pressure to or exhausts pressure from the diaphragm chamber of the main valve which in turn causes the main valve to open or close. The valve shall be hydraulically operated, single diaphragm-actuated, globe or angle pattern. The valve shall consist of 3 major components: the body with seat installed, the cover with bearing installed, and the

diaphragm assembly. The diaphragm assembly shall be the only moving part and shall form a sealed chamber in the upper portion of the valve, separating operating pressure from line pressure. Valves shall be Cla-Val 136-01, Aquamatic 420 series or equal.

A. Valve Body: Valve body and cover shall be of cast material. Ductile iron is standard and other materials shall be available. The valve shall contain a resilient, synthetic rubber disc, with a rectangular cross-section contained on 3½ sides by a disc retainer and forming a tight seal against a single removable seat insert. The disc guide shall be of the contoured type to permit smooth transition of flow and shall hold the disc firmly in place. The disc retainer shall be of a sturdy one-piece design capable of withstanding opening and closing shocks. It must have straight edge sides and a radius at the top edge to prevent excessive diaphragm wear as the diaphragm flexes across this surface. The diaphragm assembly containing a non-magnetic 303 stainless steel stem of sufficient diameter to withstand high hydraulic pressures shall be fully guided at both ends by a bearing in the valve cover and an integral bearing in the valve seat. The seat shall be a solid, one-piece design and shall have a minimum of a 5° taper on the seating surface for a positive, drip-tight shut off. The stem shall be drilled and tapped in the cover end to receive and affix such accessories as may be deemed necessary. The diaphragm assembly shall be the only moving part and shall form a sealed chamber in the upper portion of the valve, separating operating pressure from line pressure. The flexible, non-wicking, FDA approved diaphragm shall consist of nylon fabric bonded with synthetic rubber compatible with the operating fluid. The diaphragm must withstand a Mullins Burst Test of a minimum of 600 psi per layer of nylon fabric and shall be cycle tested 100,000 times to insure longevity. The valve manufacturer shall warrant the valve to be free of defects in material and workmanship for a period of 3 years from date of shipment, provided the valve is installed and used in accordance with all applicable instructions. Electrical components shall have a one-year warranty.

B. Pilot Control System: The pilot control shall be a 3-way solenoid valve controlled by an external electrical power source. The pilot system shall include strainers, shut-off cocks and manual operator. Opening and closing speed control needle valves shall be utilized so as to prevent surging of the system on start-up and shut-down. Solenoid shall have a NEMA IV enclosure.

7.18 Butterfly Valves: All butterfly valves shall be of the tight closing rubber seat type with rubber seats that are securely fastened to the valve disc or valve body. No metal-to-metal seating surfaces shall be permitted. Valves shall be bubble-tight as rated pressures with flow in either direction, and shall be satisfactory for applications involving throttling service and/or frequent operation and for applications involving valve operation after long period of inactivity. Valve discs shall rotate 90° from the full open position to the tight shut position. Valves 20" and smaller shall meet the full requirements of AWWA Standard C-504.

A. Valve Bodies and Flanges: Valve bodies shall be constructed of cast iron ASTM A-126, Class B. Flange drilling shall be in accordance with ANSI B16.1 standard for cast iron flanges. Two trunnions for shaft bearings shall be integral with each

valve body. Body thickness shall be in strict accordance with AWWR Standard C-504.

B. Valve Discs: Valve discs shall be constructed of ductile iron or alloy cast iron ASTM A-436, Type I (Ni-Resist).

C. Valve -Shafts: Shafts of all valves shall be turned, ground and polished. Valve shafts shall be constructed of 18-8 Type 304 or Type 316 stainless steel. Shaft diameters must meet minimum requirements established by AWWA Standard C-504. Shafts shall extend into gear reducers with diameters not less than the AWWA minimums.

D. Valve Seats: Valve seats shall be of a synthetic compound. Valves shall have seats that are mechanically retained on the valve disc or simultaneously molded in, vulcanized and bonded to the body. Seat bond must withstand 75 pounds peel strength under test procedure ASTM D-429, Method B.

E. Valve Bearings: Valves shall be fitted with sleeve type bearings. Bearings shall be corrosion resistant and self-lubricating. Bearing load shall not exceed1/5 of the compressive strength of the bearings or shaft material.

F. Valve Packing: Packing shall be self-adjusting Chevron type.

G. Valve Operators: Valve operators shall conform to AWWA C-504. Manual operators shall be of the traveling nut, self-locking type and shall be designed to hold the valve in any intermediate position between fully open and fully closed without creeping or fluttering. Operators shall be equipped with field adjustable mechanical stop-limiting devices independent of the operator case to prevent over-travel of the disc in the open and closed positions. Valves shall close with a clockwise rotation. Operators shall be fully enclosed and designed to produce the specified torque with a maximum pull of 60 pounds on the handwheel or chainwheel. Operator components shall withstand an input of 450 ft. lbs. at extreme operator position without damage.

H. Painting: All surfaces of the valve shall be clean, dry and free from grease before painting. The valve surfaces except for disc, seating and finished portions shall be evenly coated with a suitable primer to inhibit rust or with asphalt varnish in accordance with Federal Specification TT-V-51c and AWWA Standard C-504.

I. Testing: Hydrostatic and seat leakage tests shall be conducted in strict accordance with AWWA Standard C-504, Section 12.

7.19 Electric Valve Actuators:

A. General: The actuators shall incorporate motor, integral reversing starter, local control facilities and terminals for remote control and indication connections housed within a self-contained, sealed enclosure. Setting of the torque levels, position limits and configuration of the indication contacts etc. shall be performed by Infra-red or Bluetooth® wireless interface without the removal of any actuator covers and without the need of supply power. The actuator shall include a device to ensure that the motor runs with the correct rotation for the required direction of valve travel regardless of the connection sequence of the power supply. Motors

will be capable of operating on 460 volt, 3-phase, 60 hertz power except quarter-turn valves 16" and smaller which shall operate on 120 volt, single phase, 60 hertz power. All gate valve and sluice gate actuators will operate on 460 volt, 3-phase power.

B. Enclosure: Actuators shall be double O-ring sealed, watertight to IP66 / IP68 at a minimum of 20m for 10 days, NEMA 4, 6. Breathers, drains, heaters and external conduit connections from motor to actuator controller are not permitted. Enclosure must allow for site storage without the need for electrical supply connection. Actuators shall operate within an ambient temperature ranging from 22°F to 158°F, up to 100% relative humidity.

C. Motor and Protection: The electric motor for open / close and positioning service shall be rated for 60 starts per hour. The motor shall be rated for 104°F at an average load of at least 33% of the maximum valve torque. Electric motors for modulating service shall be rated at 30 minutes at an average load of at least 50% of maximum valve torque and rated for 1,200 starts per hour. For small butterfly or plug valves, actuators shall incorporate a motor speed controller to allow for non-intrusive field adjustable speed control. Motor protection shall be done via two thermostats embedded in the motor end windings. In addition, the motor shall be de-energized within 8 seconds in the event of a stall when attempting to unseat a jammed valve or gate. Lost phase protection shall be incorporated into the design. The motor can be reversed without the necessity of stopping the actuator. Removal of the motor should be possible without draining the oil from the actuator.

D. Gearing: The actuator gearing shall be totally enclosed in an oil-filled gear case suitable for operation at any orientation. Grease lubrication is not permissible. A removable thrust base shall be at the base of the actuator to eliminate gear case stress and permit the removal of the actuator from the valve or gate. Thrust bearings shall be sealed for life and the base shall be capable of withstanding five times the rated thrust of the actuator.

E. Hand Operation: A handwheel shall be provided for emergency operation. Motor drive shall be restored automatically by starting the motor. The clockwise rotation of the handwheel shall provide a clockwise rotation of the drive output. It should be possible to select hand operation while the actuator is running without damage to the drive train. For linear valve types the actuator handwheel drive must be mechanically independent of the motor drive.

F. Local Controls and Position Indication: The actuator shall incorporate local controls. It shall be possible to select maintained or non-maintained local control. The local controls and display shall be rotatable through increments of 90° to suit valve and actuator orientation. The actuator must provide a LCD display of the position of the valve, even when the power supply is not present The actuator shall include a digital LCD position indicator with a numeric display from fully open to fully closed in 1% increments. Red, green and yellow lights corresponding to Open, Closed and Intermediate positions shall be included on the actuator. The digital display of valve position shall be readable and updated

during handwheel operation without supply power for up to 30 continuous days. Datalogger graphical displays should as a minimum be able to display log and trend graphs on the local LCD for torque versus position, number of starts versus position, and number of starts per hour.

G. Torque and Position Limits: A setting tool shall be included for set-up, calibration and interrogation of the actuator. Using a setting tool, torque and position limits shall be adjustable as follows:

1. Position limits between 0 and 100% open
2. Torque limits from 40% to 100% rated torque
3. Torque sensing must be affected directly electrically or electronically. Extrapolating torque from mechanically measured motor speed is not acceptable due to response time.

H. Remote Valve Position and Status Indication: Four separate contacts shall be provided which can be selected to indicate any position of the valve. Contacts shall operate when all external power to the actuator is isolated. The contacts shall be rated for 5mA to 5A, 120V AC, 30V DC. A monitor relay shall be provided as standard which can be used to indicate actuator available for remote operation.

I. Monitoring Facilities: An integral timestamped datalogger shall be provided to record and store at least including but not limited to:

1. Opening last /average torque against position
2. Closing last /average torque against position
3. Opening motor starts against position
4. Closing motor starts against position
5. Total open/closed operations
6. Maximum recorded opening and closing torque values
7. Event recorder logging operational conditions (valve, control and actuator)

Datalogger data shall be accessed via setting tool and data displayed on the local LCD. The actuator manufacturer shall supply PC software to enable datalogger files to be viewed and analyzed.

J. Wiring and Termination: All wiring supplied as part of the actuator to be contained within the main enclosure for physical and environmental protection. External conduit connections between components are not acceptable. A card showing a plan of terminals shall be provided attached to the inside of the terminal box cover indicating serial number, external voltage values, wiring diagram number, and terminal layout.

K. Commissioning / Testing: Each actuator shall be supplied with a start-up kit comprising installation instruction manual, electrical wiring diagram and cover seals. Each actuator must be performance tested and individual test certificates

shall be supplied free of charge. The test equipment should simulate a typical valve load, and the following parameters should be recorded.

1. Current at maximum torque setting
2. Torque at max. torque setting
3. Flash test voltage
4. Actuator output speed or operating time

In addition, the test certificate should record details of specification such as gear ratios for both manual and automatic, second stage gearing, if provided, drive closing direction, and wiring diagram number.

L. Warranty: Each actuator shall be warranted for a minimum of 24 months from date of shipment.

M. Acceptable Manufacturers: Rotork IQ/IQT series or Limitorque MX/QX series, Amua SA/AC 01.2

7.20 Aluminum Stop Gates: The fabricated 6061-T6 aluminum hand lift stop gates and frames shall be manufactured by Rodney Hunt, WACO Products, Waterman or equal. Stop gates and frames shall be furnished with all necessary accessories and parts for a complete installation and shall be the latest standard product of a manufacturer regularly engaged in the production of equipment of this type. All stop gates and frames shall be furnished by the same manufacturer. Except as otherwise indicated by this specification, all stop gates and frames will be designed and manufactured to meet or exceed all design criteria of AWWA Standard C513, most current edition, defining head and loading calculations, structural strength, deflection requirements, and material specifications including minimum dimensions. Structural components shall have a minimum design safety factor of 4 with regard to ultimate tensile, compressive, and shear strength and a minimum safety factor of 2 with regard to tensile, compressive, and shear yield strength.

A. Stop Gate Plates: The stop plates are to be fabricated from minimum ¼" thickness 6061-T6 aluminum plate and shapes, reinforced as required to meet the Engineer's specified design head. Deflection under full design head will be no more than 1/360 of the span width of the gate. Stop gates will be fabricated so that gate plates will be interchangeable for all channels of equal width with the same frame type. Stop gates equal to or under 3' in width shall have single hand slots or handles as specified for lifting purposes. Gate plates wider than 3' in width shall incorporate dual slots or handles. Where Drawings do not indicate otherwise, slots shall be provided. All slots shall have welded pipe handholds on the upper side of the slot for ease of lifting unless otherwise indicated.

B. Stop Gate Guide Frames: The guide frame is to be fabricated from minimum ¼" thickness 6061-T6 aluminum extrusions designed to resist loads imposed by the design head upon the stop plate and into the frame. Guide frames built out of plate or structural shapes shall not be acceptable. The frame shall have factory welded mitered corners where the side and invert frames meet. Embedded and end-of-wall mount frames shall be designed to allow for a flush bottom installation. Flush bottom frames will incorporate a countersunk invert seat or

flush neoprene invert seal as indicated. Formed concrete inverts and stop plate mounted seals shall not be acceptable. Embedded frames shall be grouted in place within a blockout or embedded at the time of the channel concrete pour. Embedded frame extrusions shall have a minimum weight of 1 ½ pounds per foot. Frames shall have a factory applied coating of bituminous paint on all surfaces to be in contact with concrete or grout.

1. Wall mounted frame anchors are to be 300 series stainless steel and supplied by the gate manufacturer at a size, quantity and spacing sufficient for design loads. Wall mounted frames shall have bolt holes factory drilled at the recommended locations for use as a template to locate anchors in the field. Wall mounted frames shall be gasketed installation as indicated. Gasket-type frames require that Contractor field verify channel dimension, wall alignment and wall surface conditions for suitability with gasket use prior to start of submittal drawings. End-of-wall mount and intra-channel surface mount frames shall have a minimum extrusion weight of two pounds per foot. Frames shall have a factory applied coating of bituminous paint on all surfaces to be in contact with concrete or grout.

2. All guide frames shall incorporate ultrahigh molecular weight polyethylene (UHMW) bearing bars on both sides of the stop plate to reduce friction and wear between the plate and frame. Bearing bars shall be extruded from UHMW ultraviolet resistant polymer and shall be held within the guide frame by integral dovetail retaining slots in the guide extension. Bearing bars glued or mechanically fastened to the frame or plate shall not be acceptable.

7.21 Floor Stands and Extensions Stems: Floor stands, unless otherwise specified or directed, shall be of the non-rising stem type equipped with a suitable indicator to show at all times the position of the valve and shall be fitted with handwheels of proper size for easy operation. In no case shall more than a 40-pound pull on the crank of the handwheel be required for valve operation. Extension stems shall be designed for non-rising stem valves and shall be equipped with stem guides and handwheel. Suitable anchor bolts shall be furnished with all stem guides. All floor stands shall be set plumb with the operating stem and shall bear evenly on the base plate and masonry. The floor stand or base plate shall be grouted in place as required for a proper installation.

7.22 Wall Sleeves: Where piping connects with, or passes through, concrete walls, furnish and install wall sleeves of cast iron, as specified in these Specifications. Pipe shall run continuous through walls. Formed openings in concrete walls for inserting cast iron piping will not be allowed. Wall sleeves shall be accurately located and securely fastened in place before concrete is placed. In a similar manner, wall sleeves shall be used in locations where small piping and electric wiring connects to, and passes through, concrete walls. Wall sleeves shall be furnished with water stops.

7.23 Pipe Couplings: Pipe couplings for cast iron pipe shall be of gasketed, sleeve type, with diameter to properly fit the pipe. Each coupling shall consist of one steel middle ring, two steel followers, two rubber-compounded wedge section gaskets, and sufficient track-

head steel bolts to properly compress the gaskets. Couplings shall be Dresser Style 38, Rockwell Series 411 or equal.

A. The middle ring and followers of the coupling shall be true circular sections free from irregularities, flat spots, or surface defects. They shall be formed from mill sections with the follower-ring section of such design as to provide confinement of the gasket.

B. Coupling bolts shall be of the elliptic-neck track-head design with rolled threads. All bolt holes in the followers shall be oval for greater strength.

C. Baskets shall be composed of crude or synthetic rubber base compounded with other products to produce a material which will not deteriorate with age, from heat, or exposure to air under normal storage conditions. It shall also possess the quality of resilience and ability to resist cold flow of the material so that the joint will remain sealed and tight indefinitely when subjected to shock, vibration pulsation, and temperature or other adjustments of the pipe line.

7.24 Flanged Adaptor: Contractor shall furnish and install cast iron flange adapters to joint plain-end pipe to flanged pipe where shown on the Drawings. Adapters shall be manufactured to meet ASTM A-126, Class B, cast-iron. Flange end of adapter shall mate with ASA 16.1 and B16.5 flanges of the same nominal size. Adapters shall be locking type with special high-strength steel pins. Adapters shall be Sigma SigmaFlange, Mega Flange Series 2100 or equal.

7.25 Hose Bibs: Hose bibs shall be furnished and installed where shown on the Drawings and shall be ¾", non-freeze type with brass casings and T-handle. Furnish one quick female coupling hose fitting for each hose bib.

7.26 Post Hydrant: Provide and install 2' post hydrant with depth of bury as shown on Drawings with horizontal FIP inlet and 1.5" NST nozzle outlet. Hydrant shall be non-freezing and self-draining. Hydrant shall be operated by turning a top mounted 9/16" square operating nut counterclockwise to open, clockwise to close. Hydrant must seal the drain outlet in all positions from ¼-open to fully-open. All internal working parts, the inlet, and the outlet shall be brass or aluminum. All working parts shall be serviceable from above ground no digging required. All wear parts (O-rings and valve seal) shall be of commonly-available dimensions and materials. Hydrant shall be Model TF200 as manufactured by the Kupferle Foundary Company or equal.

7.27 Wall Hydrants: Wall hydrants-shall be cast brass, non-freeze with 1" HPT outlet, T-handle, polished face, brass wall casing, renewable nylon seat, and brass operating parts. Wall hydrants shall be Josam Model 71000-8, Wade Model W8600L6+2 or equal.

7.28 Yard Hydrants: Yard hydrants shall be 1" post hydrant with galvanized casings ¾" inlet and discharge hose connections, non-freeze with vacuum breaker and sanitary siphon drain system. Yard hydrants shall be Josam Model 71400, Wade Model 8610 or equal.

7.29 Clearing: The Contractor shall perform all clearing work required for the installation of the complete work. Clearing shall consist of the removal and disposal of all trees, stumps, roots, brush or debris in the way of the work.

Any private or public facilities, including fences, removed for construction purposes shall be promptly replaced. Trees or shrubbery along highways, roadways, and streets shall not be disturbed unless absolutely necessary, subject to the review of the Engineer. Any such trees or shrubbery which may be necessary to be removed shall be heeled in and replanted. Heeling in and replanting shall be done under the direction of an experienced nurseryman.

7.30 Excavation for Trenches: Excavation of pipe trenches shall include all excavation of every description and whatever substance encountered and shall include disposal of all rock excavation and shall include disposal of excess earth excavation not required for backfilling of trenches.

A. Depth of Trenches: The minimum cover over the top of the pipe shall be 4' unless otherwise directed by the Engineer. Where obstructions are encountered, minimum depth may be changed to avoid interference.

B. Width of Trenches: Trenches shall be excavated sufficiently wide to allow proper installation of pipe, fittings and other materials, and to not less than 6" clear of the outside barrel of the pipe on any side at any point.

C. Bell Holes: Bell holes of ample depth and width shall be excavated in pipe trenches at the location of each joint to permit the joint to be properly made.

D. Earth Excavation: Earth excavation shall include all excavation of whatever substance encountered, except rock excavation, as further provided for in these Specifications. In locations where pipe is to be bedded in earth excavated trenches, the bottom of such trenches shall be fine graded to allow firm bearing for the bottom of the pipe on undisturbed earth. Where any part of the trench has been excavated below the grade of the trench, the part excavated below such grade shall be filled in with bank sand and compacted at the Contractor's expense.

E. Rock Excavation: Rock excavation shall comprise solid rock in the original bed, or in well defined ledges, the removal of which in the opinion of the Engineer requires drilling, blasting, or the use of jack hammers or bottle points, and shall also include boulders or detached pieces of rock 8 cubic feet or more in content.

1. Blasting operations shall be conducted in strict accordance with all blasting ordinances and regulations and all blasting shall be done as directed by the Engineer. All exposed structures shall be carefully protected from the effects of blast and all blasts shall be covered with heavy timbers, mats or suitable protection. The blasting shall be done only by experienced men. Very light charges must be used to prevent damages to adjacent structures.

2. No blasting operations shall be started without the Engineer’s review of method and quantity of explosive to be used. Any damage done shall be promptly repaired by the Contractor at his own expense. Where there are no local ordinances governing blasting and the storage of explosives, all blasting supplies shall be stored in a manner discussed with the Engineer and a watchman shall be stationed at all times at the place of storage. In

no case shall caps or other explosives be kept at the place where dynamite or other explosives are stored.

7.31 Existing Pipe Lines: Where new pipe line parallels or crosses existing pipe lines, the Contractor shall take precautions as necessary to ensure that such existing pipe lines are not disturbed. Any damage to existing pipe lines shall be promptly repaired at the Contractor's expense.

7.32 Connections to Existing Pipe Lines: Connections to existing pipe lines shall be made with the necessary fittings and valves as indicated on the drawings.

A. Location: The Contractor shall, before opening pipe line trenches, locate the various points of connections to be made into existing pipe lines and shall uncover as necessary for the Engineer to prescribe the type of connections and fittings to be installed.

B. Interruption of Service: Connections to existing pipe lines shall be made only at such times and in such manner as will meet operating requirements. No cut shall be made in existing lines until the permission of the Owner's Superintendent of Utilities has been obtained as to time and manner of making the cuts and connections. All existing vales shall be operated only by authorized representatives of the Owner.

7.33 Existing Underground Utilities and Obstructions: Certain existing water lines, culverts and cross drains are shown on the Drawings, according to the best information available to the Engineer. The Drawings indicate the pipe lines to be laid over, under or around underground utilities or obstructions where such utilities or obstructions are known to exist. Where these or unforeseen underground utilities or obstructions are encountered, minimum depth of cover or the location and alignment may be changed upon written concurrence by the Engineer to avoid interference. The location of the existing utilities are approximate only. The Contractor is responsible for determining the exact location of all utilities before beginning construction.

The Contractor shall furnish and have available at all times an Electronic Pipe and Cable Finder in working order, for the purpose of locating existing pipe lines or other obstructions in the way or are along the route of the new work.

7.34 Removing Pavement: The Contractor shall remove pavement as necessary for installing the new pipe lines and appurtenances and for making connections to existing pipe lines.

A. Marking: Before removing any pavement, the pavement shall be marked for cuts nearly paralleling pipe lines and existing street lines. Pavement shall be cut back from the top edges of trenches for a distance of at last 12" on each side of the trench to provide solid bearing for the edges of pavement to be replaced. Tunneling will be permitted under existing sidewalks, curbs and gutters, but not under pavement.

Power saws shall be used to cut all types of pavement along marked lines. The pavement shall be sawed to a depth of at least 2" or deeper if the Engineer so directs. "Sawing" is not a separate pay item and the cost thereof shall be included in the overall bid submitted.

B. Machine Pulling: No pavement shall be machine pulled until completely separated along the marked cuts.

C. Damage to Adjacent Pavement: The pavement adjacent to pipe line trenches must not be disturbed or damaged. If the adjacent pavement is disturbed or damaged due to any cause, such as caving ditch banks, indiscriminate use of construction machinery, etc., the Contractor shall remove the damaged pavement and shall replace at his own expense.

D. Stone or Pre-Cast Concrete Curb: The Contractor shall remove and replace or tunnel under any stone or pre-cast concrete curb encountered. No additional payment will be made for removing, replacing or tunneling under said curb.

7.35 Concrete Blocking: The Contractor shall furnish all materials and perform all labor as necessary for installing concrete blocking for fittings, including elbows, tees, and other fittings as shown on the drawings and/or as specified herein.

Concrete blocking shall be formed and poured at the backs of fittings, including elbows, tees, and other fittings as shown on the Drawings and as directed by the Engineer. Concrete mix shall be 1:2-1/2:3-1/3, and have a compressive strength of not less than 2500 psi after 28 days. Blocking shall be poured against undisturbed earth.

7.36 Backfilling: The Contractor shall furnish all equipment and labor, and when necessary, the material required for backfilling the pipe line trenches as follows:

A. Backfill shall be placed in two stages. First, sidefill to the level 1' over the top of pipe; and second, overfill to former surface grade. Sidefill should consist of granular material laid in 6" layers, each consolidated by mechanical tamping and controlled addition of moisture, to a density of 95% as determined by AASHO Method T-99 or GHD-7. Overfill should be layered and consolidated to match the entrenches material in cohesion and compaction. The top 12" shall be compacted to 100% of specified density. Consolidation by saturation or ponding will not be permitted. For backfill of entrenched pavement, materials and methods of compaction should be adapted to achieve prompt restoration of traffic service. There shall be additional cutback of base and surfacing and transitioning of trench shoulders to minimize later development of sag in the grade of pavement of the trench.

B. When testing for leaks in open trenches, backfilling shall not be done until after all testing has been completed and all leaks eliminated.

7.37 Testing and Cleaning Sewer and Drain Lines: Before acceptance of any sewer or systems of sewers, lines shall be cleaned and tested in accordance with these Specifications. Where any obstruction is met, the Contractor will be required to clean the sewers by means of rods, swabs, or other instruments. Lines and manholes shall be clean before final inspection. Pipe lines shall be straight and shown a uniform grade between manholes. The Contractor shall be required to correct any variations therefrom which may be disclosed during the inspection.

No extra payment will be made for testing and cleaning.

7.38 Leakage Tests: All sewer lines, including house service lines, shall be tested for leakage, in the presence of the Engineer or his representative, before being placed into service. Tests shall be conducted by the low pressure air test method:

A. Low-Pressure Air Test: Low pressure air testing shall be performed in accordance with ASTM F1417 or UNI-B-6-90, as amended to date. Prior to air testing, the section of sewer between manholes shall be thoroughly cleaned and wetted. Immediately after cleaning or while the pipe is water soaked, the sewer shall be tested with low-pressure air. At the Contractor's option, sewers may be tested in lengths between manholes or in short sections (25' or less) using air-lock balls pulled through the line from manhole to manhole. Air shall be slowly supplies to the plugged sewer section until internal air pressure reaches approximately 4.0-psi. After this pressure is reached and the pressure allowed to stabilize (approximately 2 to 5 minutes), the pressure may be reduced to 3.5-psi before starting the tests. If a 1.0 psi drop does not occur within the test time, then the line has passed the test. If the pressure drops more than 1.0 psi during the test time, the line is presumed to have failed the test, and the contractor will be required to locate the failure, make necessary repairs and retest the line. Minimum test time for various pipe sizes, in accordance with Uni-Bell PVC Pipe Assoc. UNI-B-6-90, as amended to date, is as follows:

1. Specification Time required for a 1.0 PSIG Pressure Drop for Size and Length of Pipe Indicated for Q = 0.0015

Pipe Diameter	Minimum Time (minutes:second)	Length for Minimum Time	Time for Longer Length (second)
4"	3:46	597'	0.380
6"	5:40	398'	0.854
8"	7:34	298'	1.520
10"	9:26	239'	2.374
12"	11:20	199'	3.418
15"	14:10	159'	5.342
18"	17:00	133'	7.692
21"	19:50	114'	10.470
24"	22:40	99'	13.674

Required test equipment includes air-lock balls, braces, air hose, air source, timer, rotometer as applicable, cut-off valves, pressure reducing valve, 0-15 pressure gauge, 0-5 pressure gauge with gradations in 0.1 psi and accuracy of ± 2%.

The Contractor shall keep records of all test made. Copy of such records will be given to the Engineer or the Owner. Such records shall show date, line number and stations, operator and such other pertinent information as required by the Engineer.

The Contractor is cautioned to observe proper safety precautions in performance of the air testing. It is imperative that plugs be properly secured and that care be exercised in their removal. Every precaution shall be taken to avoid the possibility of over-pressurizing the sewer line.

B. Repairs: All visible leaks shall be repaired regardless of whether the air test is within allowable limits. No sewer will be accepted until leakage tests demonstrate compliance with the leakage test method.

C. Payment: The Contractor shall furnish all materials, labor and equipment and necessary for testing and retesting as required and shall make all necessary repairs. No extra payment will be made for testing and repairs, the cost thereof to be included in the unit prices bid for sewers.

7.39 Testing Force Main: When a section of force main of a length deemed adequate by the Engineer is ready for testing, the line shall be filled with water, air completely exhausted and a leakage test made. The Contractor shall furnish all labor, materials and equipment for carrying out these tests. Wherever conditions will permit, in the opinion of the Engineer, pipe lines shall be tested before the trench is backfilled. All joints then shall be examined during open trench test and all leaks entirely stopped. The Contractor shall furnish a test pump, and means for accurate measurement of water introduced into a line during testing, and shall furnish and install corporation stops in the line as required for blowing lines free from air and at the test pump location.

A. The Contractor shall furnish, install and remove all temporary bulkheads, flanges or plugs, to permit the required pressure tests, and shall furnish all equipment and labor to properly carry out such tests and to replace defective material.

B. Force main shall be tested in accordance to AWWA C600 for ductile iron mains and AWWA C605 for PVC mains, except as specified otherwise herein. Test pressures shall be 100 pounds per square inch. Allowable leakage in gallons per hour per 1,000' of pipe line shall not exceed 0.045 D (D is the nominal pipe diameter in inches). Minimum test period shall be 2 hours; however, if in the opinion of the Engineer, additional testing is required, such additional testing shall be performed by the Contractor at no additional expense to the Owner.

C. Any cracked or broken material shall be removed and replaced with sound pieces, at the expense of the Contractor. Joints which leak shall be carefully remade. Remade joints and replace material shall be carefully re- tested under the same conditions of operation. If joints or materials are then found to be defective, they shall be remade and replace until the line passes the required test.

D. Payment: No separate payment will be made for the above work.

7.40 Testing Potable Water Lines and Chemical Lines: When a section of pipe of a length deemed adequate by the Engineer is ready for testing, the line shall be thoroughly blown free from air and a leakage test made, and the Contractor shall furnish all labor, materials and equipment for carrying out these tests. Wherever conditions will permit, in the opinion of the Engineer pipe lines shall be tested before the trench is backfilled. All joints then shall be examined during open trench test and all leaks entirely stopped. The Contractor shall furnish a test pump and means for accurate measurement of water

introduced into a line during testing, and shall furnish and install corporation stops at all high points in the line as required for blowing lines free from air and at the test pump location.

A. Temporary Bulkheads: The Contractor shall furnish, install and remove all temporary bulkheads, flanges or plugs, to permit the required pressure tests, and shall furnish all equipment and labor to properly carry out such tests and to replace defective material.

B. Test Pressure and Leakage: Test pressures shall be 200 pounds per square inch. Leakage allowed during the test per 1,000' of pipe shall be:

- 4" - .43 gallons / hour
- 6" - .64 gallons / hour
- 8" - .85 gallons / hour
- 10" - 1.06 gallons / hour

C. Minimum test period shall be 2 hours. However, if, in the opinion of the Engineer, additional testing is required, such additional testing shall be performed by the Contractor at no additional expense to the Owner.

7.41 Sterilizing Potable Water Lines: All pipe lines and all appurtenances which have been exposed to contamination by reason of this construction shall be sterilized by the Contractor before being placed in service.

A. Sterilization: Pipe lines shall remain filled for a 24-hour period with a solution of water and chlorine in amounts to provide a free chlorine residual of not less than 25 mg/l. Disinfection of the new main and the disposal of the heavily chlorinated water following disinfection shall be accomplished in accordance with the latest edition of AWWA Standard C651. The quality of the water used during the disinfection procedures shall meet the required drinking water standards. The heavily chlorinated water shall be retained in the main for at least 24 hours during which time all valves and hydrants shall be operated to ensure disinfection of the appurtenances. At the end of the 24-hour period the treated water in all portions of the main shall have a residual of not less than 10 mg/l free chlorine.

The Contractor shall obtain bacteriological analysis of samples of water taken from the distribution system which are satisfactory to the Engineer before the line will be accepted by the Owner. The Contractor shall furnish all liquid chlorine required for sterilization and shall furnish all equipment and labor required for the work and shall provide for the bacteriological test which will be paid for by the Owner.

B. Flushing: Upon completion of the sterilization, all mains and piping shall be thoroughly flushed before placing in service. All chlorinated water shall be disposed of in a procedure acceptable to the Georgia Environmental Protection Division. The heavily chlorinated water must not be disposed in a manner that will harm the environment. Neutralizing chemicals such as sulfur dioxide, sodium bisulfite, sodium sulfite or sodium thiosulfate can be used to neutralize

the chlorine residual remaining in the water to be wasted. Flush all lines until residual is equal to existing system. After final flushing and before the water main is placed into service, water samples shall be collected from the main and tested for microbiological quality in accordance with Georgia Rules for Safe Drinking Water, Chapter 391-3-5. The laboratory results must show the absence of coliform organisms in the water. Reflux and redisinfect the lines as necessary until satisfactory bacteriological results are obtained.

7.42 Connections to Structures: At all structures, including manholes, provide a flexible joint no more than 24" from the face of the structure. It shall be the responsibility of the Contractor to submit details of the proposed connection to the Engineer for review in accordance with the General Requirements section of these Specifications. Connections not accepted will be subject to removal and replacement by an accepted flexible joint.

7.43 Pipe Insulation and Heat Tracing: Exterior pipe and fittings, where indicated on the Drawings, shall be insulated and heat traced as follows:

A. Pipe insulation shall be 1" thick formed cellular glass insulation weighing 8 to 10 pounds per cubic foot. The insulation shall be specifically shaped for use with pipes, shall be formed true to shape and roundness, shall exhibit negligible water absorption and shall have a "k" value of not less than 0.3813 tu/hr/sf at 50° F. The insulation shall be installed and jacketed with dry aluminum foil 4 mils thick in accordance with directions of the manufacturer.

B. Heating cable shall be rated at a constant 4 watts per foot at 120 V and shall be P.V.C. sheathed. Cable shall be U.L. listed and shall be installed with thermostat in complete accordance with manufacturer's instructions. Heating cable shall be Emerson Model NC4 or Chromolox Model CWM 4-1CT or equal.

7.44 Cleaning Up: Before the work shall be considered complete, all material not used, and rubbish of every character, must be removed from the streets and placed at some point to be designated by the Owner; and all streets, sidewalks, curbs, fences and other private or public facilities and structures disturbed must be essentially in as good condition as existed before the work was done. Any subsequent settlement of backfill or pavement over trenches -shall be replaced by the Contractor and the surfaces brought to grade.

7.45 Payment: No separate payment will be made for the work of this Section. The cost of the work and all cost incidental thereto shall be included in the bid in the Proposal. Rock excavation is unclassified for all work. Payment for the complete work shall be made upon the basis of measured or completed quantities actually installed at the unit prices bid in the Proposal.

A. Fittings for extra work shall be paid for on the basis of the published weights of the fittings itself exclusive of followers rings and gaskets.

B. Lump sum items will be paid at the price bid in the Proposal or as specified.

SECTION 8
ELECTRICAL – BASIC MATERIALS AND METHODS

8.01 Scope of Work: Work covered by this Specification consists of furnishing all labor, equipment, supplies and materials, and performing all operations including cutting, trenching and backfilling, etc., necessary for the installation of complete wiring systems as shown on Drawings and as hereinafter specified.

Work shall include power distribution and controls, lighting systems, instrumentation and metering, wiring and telephone service (where required).

8.02 Quality Assurance: Installation shall comply with all laws applicable to electrical installations which are enforced by local authorities, with the regulations of National Electrical Code where such regulations do not conflict with local laws, and with regulations of the utility company that serves the facility. Contractor shall obtain all permits required by local authorities and, after completion of work, and shall furnish Engineer and Owner a certificate of final inspection and approval from inspection bureau having jurisdiction. Contractor shall notify Engineer and Owner that certificate has been furnished to utility company so that application for service can be filed.

All materials shall be new and shall bear a U.L. label or be listed by Underwriter's Laboratories as conforming to its standards where such a standard has been established for the particular type of material in question.

Catalog numbers of devices, fixtures, equipment, etc., are used for ease in describing standard of quality desired. Devices, fixtures, equipment, etc., by other manufacturers performing the same functions and considered equal in quality by the Engineer will be acceptable.

8.03 Reference: All work shall conform to applicable standards of ANSI, ICEA, IEEE, ISA, NEMA, UL and NEC.

8.04 Submittals:

A. Contractor's submittal shall include a list of manufacturers of principal items of equipment and material including wire, raceways, devices, boxes, panelboards, connectors, etc. Full information shall be furnished on products of manufacturers not named in the Contract Documents.

B. Shop drawings shall be submitted giving performance data, physical size, wiring diagrams, materials, etc., for control centers, lighting fixtures, motor controllers, panelboards, conduit and duct, and cable and wire.

C. The requirements of each electrical system shall be identified by the Contractor before submission of shop drawings, and all necessary accessory parts required between items of electrical equipment shall be identified in sufficient detail to prove that the total equipment furnished and installed will operate as specified and shown on the Drawings.

D. Shop drawings and samples shall be thoroughly checked and coordinated by the Contractor for details and fulfillment of Contract requirements prior to submittal.

The Engineer's review stamp does not relieve Contractor of responsibility for coordinating dimensions and work required by other trades.

E. Refer to the General Requirements section of these Specifications for submittal requirements and quantities.

8.05 Delivery, Storage and Handling: All materials shall be unloaded and stored in a manner to avoid physical damage or detrimental effects of exposure to weather.

8.06 Grounding: All equipment, building steel and main service must be effectively and permanently grounded with a cross section as required by the NEC and of capacity sufficient to ensure effectiveness of the ground connections for fault current. Ground conductors must be as short and straight as possible and protected from mechanical injury, if practical, without splice or joint.

A. Grounding Conductors:

1. All ground conductors shall be at least 12 AWG soft drawn copper cable or bar, bare or green-insulated in accordance with the National Electrical Code.

2. Main service conduits, entering switchgear, panels, control center, switches, etc., shall be provided with insulating bushings with ground lug and connected to building ground system.

3. Bonding jumpers shall be copper tape, braided conductors, terminated with copper ferrules sized in accordance with the National Electrical Code table on sizes of equipment grounding electrode conductors.

4. All flexible conduits making final connections to motors, lights, vibrating equipment, etc., shall contain a green copper bonding conductor which shall extend from outlet box where flexible conduit originates or from nearest box in line to the equipment served.

B. Devices: Each receptacle and switch device shall be furnished with a grounding screw connected to the metallic device frame. Bond equipment grounding conductor to each outlet box. For isolated ground receptacles, bond equipment grounding conductor to box, and bond isolated ground conductor to device grounding screw.

C. Ground Rods: Ground rods shall be a minimum of ⅝" in diameter by 10' long, with a copper jacket bonded to a steel core.

D. Ground cable splices and joints, ground rod connections, and equipment bonding connections shall meet the requirements of IEEE 837, and shall be exothermic weld connections or irreversible high-compression connections. Models shall be Cadweld "Exothermic" or Burndy "Hyground". Mechanical connectors will not be acceptable. Cable connections to bus bars shall be made with high-compression two-hole lugs.

E. Raceways, boxes, outlets, cabinets, etc., shall be bonded together to form a continuous metallic grounding circuit in accordance with NEC.

F. All powered equipment, including lighting fixtures and receptacles, shall be grounded by a copper ground conductor in addition to the conduit connection.

G. Test wells and covers for non-traffic areas shall be molded high density polyethylene. Test wells for traffic areas shall be precast concrete construction rated for traffic duty with concrete or cast iron covers.

8.07 Equipment Identification:

A. Engraved Plastic Nameplates: Nameplates shall be engraving stock, melamine plastic laminate, minimum 1/16" thick plates with engraved white letters on black face legend. Painted, stenciled or indented tape identification is not acceptable.

B. Item Identification: Install identification on each unit of equipment, including central or master unit of each system. Power, lighting, communication, signal and alarm systems shall be furnished with identification unless units are specified with their own self-explanatory identification.

1. Unless otherwise indicated, provide a single line of text with ½" high lettering on 1½" high label; where 2 lines of text are required, use labels 2" high. Use white lettering on black field. Apply labels for each unit of the following categories of equipment using mechanical fasteners:

2. All electrical apparatus such as wiring troughs, panelboards, switchgear, switchboards, motor control centers, enclosed circuit breakers, electrical cabinets and enclosures, motor starters, push-button stations, contactors, transformers and disconnect switches shall have laminated plastic identification plates. Identification shall match labeling shown on Drawings.

3. Circuit breakers and disconnects shall identify the equipment served and circuit and panel from which it is served.

8.08 Cables and Conductors:

A. All conductors shall be type THHN-THWN #12 AWG minimum, insulated, color coded, and in accordance with ASTM B3, B8 and B787, UL 83, 758,1063 and 1581.

B. Instrument Cable: Cable for electronic circuits to instrumentation, metering and other signaling and control equipment shall be 2 or 3 conductor instrument cable twisted for magnetic noise rejection and protected from electrostatic noise by a total coverage shield.

C. Installation:

1. Conceal cables in finished walls, ceilings and floors unless otherwise indicated.

2. Conductor splices and connections shall be made with accepted solderless lugs and mechanical connections to ensure positive electrically and mechanically strong joints. Use of connectors without internal spiral spring (wire nuts) is not acceptable.

3. Where bolted connectors are used for makeup of cables or for termination, they must be exact size to suit cable being used. Trimming, shimming or cutting of conductor strands are not permitted. Where branch circuit conduits are jointed or spliced using crimp-on or twist-on connectors, wires must first be twisted together full length and then connector installed.

4. Conductors within switchboards, panelboards, terminal cabinets, starters, control centers, etc., shall be neatly formed and trained to run parallel to or at right angles to the device. Conductors shall be bundled together and laced using nylon tie straps.

5. Use pulling means, including fish tape, cable, rope and basket-weave wire/cable grips, that will not damage cables or raceway.

6. Control cable shall be minimum #14 AWG single or multiple conductor, 600V insulation.

7. Control raceway and wiring shall be installed and fully connected to make system operational.

8.09 Junction and Pull Boxes: Pull boxes no less than the minimum size required by the National Electrical Code Article 370 shall be constructed of cast aluminum with gasketed covers. Boxes shall be furnished with screw fastened covers. Boxes located on the exterior of the structures shall be watertight. Covers shall be secured with tamper proof screws. Boxes and outlets shall be cast alloy type and securely attached to building structure using expansion bolts for masonry or concrete construction.

A. Cabinets: Galvanized steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel may be provided with concurrence by Engineer. Cabinets shall include the following:

1. Hinged door in front cover with flush latch and concealed hinge

2. Key latch to match panelboards

3. Include metal barriers to separate wiring of different systems and voltage and includes accessory feet where required for freestanding equipment.

B. Polymer-Concrete Handholes and Boxes with Polymer-Concrete Cover: Handholes and boxes shall be molded sand and aggregate, bound together with polymer resin, and reinforced with steel or fiberglass or a combination of the two.

C. Precast Concrete Electric Manhole: Precast concrete electrical manholes shall include thin-wall knockout, pull irons, sump box with grate, ground rod sleeve, fiberglass ladder, neck extension, where required, and a cast or ductile iron ring and cover marked "ELECTRIC".

D. All outlet or junction boxes of pressed or sheet steel type shall be galvanized, sheradized, bonderized or treated with a similar corrosion inhibitor.

E. Installation:

1. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.

2. Concealed conduit systems shall have flush-mounted switches and convenience outlets. Exposed conduit systems shall have surface-mounted switches and convenience outlets. Conduits shall be concealed where practicable.

3. Covers and collars for manholes shall be level with the finished grade. Build up masonry wall between manhole top and manhole cover collar as required for leveling with finished grade.

8.10 Raceways: All raceways shall conform to Underwriter's Laboratories and NEMA standards and be fully UL labeled. Contractor shall be responsible for routing all conduits, including all conduits indicated on the one-lines, riser diagrams, and home-runs shown on the plan Drawings. Conduits shall be routed as defined in these Specifications. Where conduit routing is shown on Drawings, it shall be considered a general guideline and shall be field verified to avoid interferences.

A. Submittals: Submit manufacturer's literature for each type of conduit or tubing and fittings used in the project in accordance with the General Requirements of these Specifications.

B. Manufacturers:

1. Acceptable manufacturers of rigid aluminum conduit are: Allied Tube and Conduit Co., Wheatland Tube Co., Triangle, L.T.V., American Brass, E.T.P., Robroy or equal.

2. Acceptable manufacturers of polyvinyl chloride (PVC) conduit are: Allied Tube and Conduit Co., Certainteed, Georgia Pipe, Carlon, Cantex, Queen City or equal.

3. Acceptable manufacturers of PVC coated rigid galvanized conduit and fittings are: Plasti-bond Red H_2OT, Calbond or equal.

4. Acceptable manufacturers of liquid tight flexible metal conduit and fittings are: Electric-Flex Company, Hubbell, Ideal Industries, Southwire or equal.

5. Acceptable manufacturers of conduit fittings, bushings, and locknuts are: O-Z/Gedney, Thomas and Belts, Raco or equal.

C. Wiring: All wiring shall be in a raceway or conduit, and the following shall govern type used throughout the project except as otherwise specified:

1. Rigid Aluminum Conduit: Use for all exposed indoor raceways except as otherwise noted. Exposed conduit shall be rigidly supported by aluminum hardware and framing materials. Conduit shall be listed UL 6A and be manufactured in accordance with ANSI C80.1 (C80.5).

2. Electrical Metallic Tubing (EMT): Use for all concealed raceways in ceilings and walls. EMT galvanized raceways shall have a sheradized, bonderized, galvanized or similar coating. Conduit shall be listed UL 797 and be manufactured in accordance with ANSI C80.3.

3. Liquid-Tight Flexible Steel Conduit: Use for final connections, maximum 72", to all dry-type transformers, motors, vibrating equipment and in wet or damp installations. Outer covering shall be polyvinyl chloride, and inner core shall be galvanized steel. Provide UL listed watertight connectors installed without sharp bends.

4. Rigid Non-Metallic PVC Plastic Conduit: Use for outside underground for feeders and branch circuits except as otherwise noted and where specifically indicated on Drawings. A grounding conductor shall be installed in each non-metallic conduit to maintain grounding continuity. Follow manufacturer's recommendations for heat bends and cement application. Install plastic to rigid adapter before emerging from ground or running under building. Install expansion fittings for each 100' of unbroken PVC run. Rigid non-metallic PVC plastic raceways shall be listed UL 651 and be manufactured in accordance with NEMA TC2.

5. Rigid, PVC Coated Galvanized Conduit: Use for all exposed outdoor raceways and corrosive environments (RAS pump station, chemical feed and storage rooms, sludge dewatering building). PVC coated galvanized steel conduit shall be listed in accordance to UL6 & ANSI C80.1. The conduit shall be hot dipped galvanized inside and out with hot galvanized threads. The exterior PVC coating shall have a series of longitudinal ribs 40 mils thick to protect from damage during installations. All threaded connections shall be urethane coated. Interior and threaded connection urethane coating shall be a nominal 2 mil thickness. Mounting hardware, which includes nuts, bolts, and anchors, shall be PVC coated or stainless steel. All damaged coatings shall be repaired according to the manufacturer's instructions.

D. Accessories:

1. Sleeves: Sleeves shall be cast or fabricated wall pipe, equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

2. Sleeve Seals: Sleeve seals shall be a modular sealing device and designed for field assembly to fill annular space between sleeve and cable.

3. Stainless Steel Pressure Plate: Include 2 for each sealing element and include stainless steel bolts and nuts of length required to secure pressure plates to the sealing elements.

4. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold down straps, end caps, and other fittings to match and mate with wire ways required for complete system. All couplings and

connections in locations where water or other liquid or vapor might contact the conduit shall be watertight.

5. Conduit Boxes: Exposed conduit boxes and pulling elbows shall be of die-cast aluminum with threaded body and removable gasketed cover.

6. Duct Sealant: Duct sealant shall be Polywater FST™ Foam Sealant. Duct sealant shall be a 2-part, 98% closed-cell urethane foam. It shall react and set in 5 to 10 minutes at 70°F. It shall be capable of sealing ¾" to 10" conduits with multiple cable configurations. Duct sealant shall be re-enterable. It shall be capable of withstanding temperatures from -40°F to 200°F and be chemically resistant to gasoline, oils, dilute acids and bases. Duct sealant shall not affect the physical or electrical properties of wire and cable.

   Duct sealant shall provide good adhesion to duct and cable jacket surfaces with good structural strength. It shall have 120 pound compressive strength (ASTM D1621). Duct sealant shall be capable of holding 22' waterhead pressure continuous or 90' waterhead pressure short-term. It shall block up to 5 psi gas or vapor continuous. It shall meet NEC codes for raceway seals, meet UL 94 fire rating HBF and be UL recognized.

E. Installation:

1. Keep raceways at least 12" away from parallel runs of flues and steam or hot water pipes. Install horizontal raceway runs above water and steam piping.

2. Complete raceway installation before starting conductor installation.

3. All raceway stubs shall be sufficiently plugged or capped during construction to prevent entry of water, debris, mortar, etc.

4. Where non-metallic PVC plastic conduit is installed underground in groups of 3 or more, it shall be installed in duct banks as indicated on the Drawings. Duct banks shall be encased in 3,000 psi concrete with red dye added.

5. All conduits entering boxes, cabinets, panels of similar equipment shall have double locknuts and insulating bushing.

6. In all liquid-tight flexible steel conduit, provide a green grounding conductor sized per NEC. Bond at fixture, motor, etc., and also bond at box where flexible conduit originates or the next box in line.

7. A code sized grounding conductor shall be installed in all raceways.

8. All raceways shall be rigidly supported from building structure by rods or hangers attached to building structure. Raceways shall not be attached to any rods or hangers required by other trades. Raceways shall be supported from building construction at intervals as required by the NEC not to exceed 8' with straps and expansion bolts for masonry or concrete construction.

9. All raceways entering cabinets, panels, switchboxes, switchgear, junction boxes, etc. shall be fitted with double bonding locknuts and bushings. One

locknut inside and one outside box shall be used. Where conduits terminate in steel or cast NEMA enclosures with no factory installed threaded hubs, a threaded hub shall be installed.

10. Feeder cable conductors shall be pulled into raceways using an acceptable soapstone product lubricant. Pull conductors with a pulling eye attached to conductor so not to stretch or injure insulation.

    a. Contractor shall be responsible for coordinating proper connection at each item of equipment requiring service and connect accordingly. The term “stub-up and connect” or “connect” used on Drawings implies a full connection as required for each piece of equipment to place it in satisfactory operation. If equipment is equipped with cord and plug, install proper matching receptacle.

    b. All aluminum conduit installed in contact with concrete or earth shall be protected with aluminum bitumastic paint or tape wraps specific for the purpose.

    c. Conceal conduit within finished walls, ceilings and floors unless otherwise indicated. Install concealed raceways with a minimum of bends in the shortest practical distance considering type of building construction and obstructions, unless otherwise indicated.

    d. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200 pound tensile strength. Leave at least 12" of slack at each end of pull wire.

8.11 Wiring Devices: Metallic and nonmetallic conduit boxes and fittings shall be installed in the following locations:

A. Switches: Switches shall be specification grade, totally enclosed, brown composition, back and side wired, 20 amp, 227V and comply with UL 20.

1. Manufacturer:

    a. Hubbell: CS1221 (single pole), CS1222 (two pole), CS1223 (three way), CS1224(four way)

    b. Leviton: 1221-2 (single pole), 1222-2 (two pole), 1223-2 (three way), 1224-2 (four way)

    c. Pass & Seymour: 20AC1 (single pole), 20AC2 (two pole), 20AC3 (three way), 20AC4 (four way)

    d. or equal

2. Switches shall be installed 4' above floor to top of boxes except as otherwise noted.

3. After circuits are energized, all wall switches shall be tested for proper operation.

B. Receptacles: All receptacles shall conform to current NEMA configurations and be UL listed.

1. Duplex Wall Receptacle: Duplex wall receptacles shall be of grounding pole type, 125 V., 20 amperes, brown composition, back and side-wired and comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498. Acceptable manufacturers are: Hubbell: HBL5351 (single), CR5352 (duplex), Leviton: 5891 (single), 5352 (duplex), Pass & Seymour: 5381 (single), 5352 (duplex), or equal.

2. GFCI Receptacles: Receptacles shall be straight blade, non-feed-through type, shall include device trip indicator light, and comply with NEMA WD 1, NEMA WD 6, UL 498, and UL 943, Class A. Acceptable manufacturers are: Hubble: GF20, Leviton: AGTR2, Pass & Seymour: 2084, or equal.

3. Receptacles shall be installed vertically 1'-4" above the floor except as noted otherwise.

4. Outlets outdoors and in garages, basements, shops, storerooms, and rooms where equipment may be hosed down; shall be 4' above floor or grade.

5. Conduit and wire for receptacle installation not shown on the Drawings shall be, sized, furnished and installed by Contractor. Conductors shall be minimum 12 AWG, and conduit shall be minimum ¾" for convenience outlet installation.

C. Cover Plates: Provide and install single and combination types to match corresponding wiring devices. Oversized plates shall be installed where standard-sized plates do not fully cover the wall opening.

1. Plate-Securing Screws: Metal with head color to match plate finish

2. Material for Finished Spaces: 0.05" thick anodized aluminum

3. Material for Unfinished Spaces: Galvanized steel

4. Material for Wet Locations: Weatherproof covers for duplex receptacles shall be NEMA 3R weather resistant die-cast aluminum with spring loaded lift and lockable cover.

D. Installation:

1. Install devices and assemblies level, plumb and square with building lines.

2. Unless otherwise indicated, mount flush, with long dimension vertical, and with grounding terminal of receptacles on top. Group adjacent switches under single, multi-gang wall plates.

3. Remove wall plates and protect devices and assemblies during painting.

4. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

E. Testing: After installing wiring devices and after electrical circuitry has been energized, test for proper polarity, ground continuity, and compliance with requirements. Test GFCI operation with both local and remote fault simulations according to manufacturer's instructions.

8.12 Safety Switches: The Contractor shall furnish and install heavy duty rated low-voltage fused and non-fused switches as specified herein and as shown on the Drawings. The switches and all components shall be designed, manufactured and tested in accordance with the latest applicable version of NEMA and UL standards. Provide switches rated for the voltage, current and NEMA enclosure rated for the environment as shown on the Drawings. Switches shall be manufactured by ABB, Eaton, GE, Square D, or equal.

8.13 Execution:

A. Inspection: Inspect preceding work to ensure satisfactory completion prior to electrical work.

B. Preparation: Coordinate work with power company and Owner to minimize delays in operation of new facilities.

C. Wiring layouts or schematics are not intended to show exact location of raceways, outlets, etc. Contractor shall refer to building plans and details for dimensions and shall fit his work to conform to details of building construction. The right is reserved to shift any switch, receptacle, ceiling or other outlet a maximum of 10' from its location as shown on Drawings before it is permanently installed without incurring additional expense.

8.14 Installation: Contractor shall furnish all labor and furnish, install, connect, test and adjust all equipment and materials to form a complete operating installation, including wiring hangers, supports for equipment, cables, conduits, cable tray, cable trench, pull boxes anchors and inserts, identification plates, signs, and tags for equipment, conduits, wiring and wiring labels.

A. The electrical work shall be installed in such a manner and at such times as will require a minimum of cutting and patching of the building structure.

B. Provide all wiring for testing and trials, for all required corrections, changes, additions, completions and adjustments until final acceptance of the work.

C. Coordinate numbers and label all field wiring between equipment of the various electrical equipment suppliers.

D. Any damage to work already in place as a result of electrical work shall be repaired and made good at no expense to the Owner.

8.15 Testing and Acceptance: Prior to acceptance by the Owner, all control systems shall function as required, and all motors shall be connected to protective devices and control devices associated with a machine or a group of machines to produce the correct operating, timing and sequencing necessary for the proper functioning of the mechanical equipment.

8.16 As-Built Drawings: Submit one blueline print of the Drawings marked to show as-built locations and description of all electrical work.

8.17 Payment: No separate payment will be made for the work of this Section. The cost of the work, and all costs incidental thereto, shall be included in the price bid for the item to which the work pertains.

SECTION 9
GENERATOR SETS AND EQUIPMENT

9.01 Work Included:

A. Diesel Engine Driven Standby Generator Sets

B. Fuel System

C. Exhaust System

D. Weatherproof Enclosure

E. Base Mounted Fuel Tank

F. Installation and Start-Up

9.02 Quality Assurance:

A. The performance of the engine-generator unit shall be tested as a unit, and the factory performance characteristics shall be supplied to the Engineer indicating the results as to the sets full load ratings, voltage and frequency regulation.

B. Shall comply with all applicable codes

C. The units offered under these specifications shall be covered by the manufacturer's standard warranty or guarantee on new machines. But in no event shall it be for a period of less than two years from date of initial start-up of the system.

D. Acceptable manufacturer's shall have in operation at time of bid, engine generator sets of similar size and design at least three years previous to bid opening, operating in a weather exposed, exterior environment.

9.03 Submittals:

A. General: All requirements concerning supervisory services, equipment bids, equipment obtained from manufacturer, equipment review , mechanical testing, piping for equipment, shop painting, operation and maintenance manuals, guarantees, and motors specified in Section 12.02 through Section 12.12 shall apply to this Section of the Specification unless otherwise specified.

B. Complete shop drawings shall be submitted for review and shall include detailed specification data and information on the specific engine-generator proposed in accordance with the General Requirements section of these Specifications. General manufacturer's product bulletins alone shall not be considered sufficient for review. Options and accessories to be furnished shall be clearly noted and drawings and/or literature provided. The Contractor shall also include as a portion of the submittal the following job drawings:

1. Generator plan layout showing the engine generator set

2. Accessories and pertinent conditions

3. Plan shall be ¼ " scale minimum.

9.04 General Requirements:

A. Furnish and install a diesel engine driven emergency generator, complete with all accessories as required for a complete emergency generator system. The generator shall be rated as specified.

B. All materials and parts comprising the units herein specified shall be new and unused, of current manufacture, and of the highest grade, free from all defects or imperfections affecting performance. Workmanship shall be of the highest grade, in accordance with modern practice. All major components shall be manufactured in the United States.

9.05 Testing: The performance of the generator sets shall be tested, as to the sets full power rating, voltage and frequency regulation. A copy of the above performance chart shall be supplied to Engineer.

9.06 Job Conditions:

A. Generator:

a. 150 KW standby, 187.5 kVA-Minimum. See Drawings for load requirements.

b. 277Y / 480V, 3-phase., 4 W

B. Accessories:

1. Water jacket heater, complete with thermostat

2. Muffler, critical silencing type

3. Weatherproof enclosure

4. Base mounted

9.07 Acceptable Manufacturers: Caterpillar, Cummins, or equal

9.08 Generator:

A. The diesel electric generator set shall be the product of a firm regularly engaged in the manufacture of this product. The components of the plant other than the diesel electric generator set shall be the products of a firm regularly engaged in the manufacture of the products of this type.

B. Electric set rating shall be based on operation at 1,800 rpm when equipped with all necessary operating accessories. Electric set shall be capable of producing the required KW at 0.8 PF for continuous standby electric set applications. All ratings shall be readily accessible in public literature; no factory special ratings are acceptable. Ratings shall be based on SAE standard ambient conditions of 29.38" of mercury and 85° F. Engine shall be rated with jacket cooling water pump radiator fan and other required appurtenances; no two core radiators or separate after cooler water circuits shall be allowed.

C. Generator shall be 3-phase, 4 wire, 60 cycle, 1,800 RPM, rated as shown. It shall be single bearing of heavy-duty ball bearing construction connected to engine

flywheel through a suitable flexible coupling. Regulator shall have adjustments for gain, level and droop.

D. Exciter shall have sufficient capacity to produce ample excitation under all normal load conditions. Exciter shall be brushless type.

E. The generator mounted control panel shall be vibration isolated 14 gauge with the following equipment:

1. Voltmeter, 2% accuracy
2. Ammeter, 2% accuracy
3. Frequency meter, Dial type
4. Voltmeter-ammeter transfer switch
5. Voltage adjustment level rheostat
6. 4 fault indicator lights (low oil pressure, high coolant temperature, overspeed, overcrank)
7. Panel illumination lights

F. A main line molded case circuit breaker rated at 600 volts, shall be provided as a load circuit interrupting and protection device and be mounted on the generator. It shall operate both manually for normal switching functions and automatically during overload and short circuit conditions. Generator/Exciter field circuit breakers do not meet the above electrical standards and are unacceptable for line protection. The circuit breaker shall meet standards established by Underwriters Laboratories, NEMA, and the National Electrical Code.

9.09 Engine:

A. The engine shall be a full compression ignition four-cycle, single-acting, solid-injection unit.

B. Engine output capacity shall not be less than the required horsepower to drive the specified generator 1,800 RPM under the rating conditions specified.

C. Engine speed shall not exceed 1,800 RPM at normal full load operation.

D. Governor shall be of the hydro-mechanical type and shall maintain frequency regulation within 3% from no load rated load.

E. Satisfactory performance on No. 2 domestic burner oil is a requirement. Diesel engines requiring premium fuel will not be considered.

F. Injection pumps and injection valves shall not require adjustment in service. The engine shall have an individual mechanical injection valve for each cylinder, any one of which may be removed and replaced from parts stock.

G. A gear-type lubricating oil pump with lube oil cooler will supply oil under pressure to main bearings, crank pin bearings, camshaft bearings, and valve mechanism. Pistons shall be spray cooled. Effective full flow lubricating oil filters of the replaceable resin impregnated cellulose type shall be provided and so located that lubricating oil is continuously filtered. Filter system shall be equipped with a

spring-loaded bypass valve as an insurance against stoppage of lubricating oil circulation in event the filters become clogged. All lubricating oil piping and lube oil temperature controls shall be factory fabricated. Generator manufacturer shall pipe a valved oil drain pipe to the edge of the skid with flexible hose to facilitate oil removal. Engine shall be filled with SAE 10W oil.

H. One or more engine mounted dry-type air cleaners of sufficient capacity to protect engine working parts from dust and grit shall be provided.

I. Provide suitable engine-mounted instrument panel including the following instruments:

1. Lubricating Oil Pressure Gauge
2. Water Temperature Gauge
3. Engine Hour Meter

J. Shutdown devices shall be provided which automatically shut down the engine in the event of low oil pressure, high coolant temperature, overcrank or overspeed.

K. The engine shall be equipped with a steel sheathed immersion type electric jacket water heater for maintaining the engine jacket water at approximately 100° F. The heater shall be equipped with an adjustable thermostat and mounted on the engine, circulating the water by means of natural convection. Heater shall operate from the 120 volt, 1-phase electric system.

L. A 12 or 24 volt battery charging alternator with D.C. ammeter shall be provided to provide a quick charge of battery during operation of engine-generator set.

M. A battery charger with at least 10A fast charge rate and trickle charge rate with ammeter and voltmeter and low/high rate indicator lamps shall be furnished for remote mounting for maintaining the battery charge while the engine is idle.

9.10 Fuel System:

A. The fuel system shall be in accordance with the engine manufacturer's recommendations and shall include all piping, pumps, filters, storage tanks, etc. All fuel lines shall be sized and type as recommended by the manufacturer. A flexible section of tubing shall be used between the engine and the fuel supply line. A replaceable element fuel filter shall be conveniently located for servicing. The engine shall be equipped with a built-in fuel transfer pump.

B. All main fuel lines shall be copper or black iron pipe as recommended by the manufacturer. Do not use galvanized pipe, fittings, or tank in system. Fuel system shall be complete with return lines.

C. A base mounted, double walled fuel storage tank with a capacity of at least 336 gallons shall be furnished and installed. The fuel storage tank shall be sized to provide a minimum of 24 hours run time at 100% load. The tank shall be equipped with all openings required, including fill, drain and vent. Contractor shall fill the 336 gallon fuel tank prior to testing.

9.11 Cooling System:

A. The engine shall be equipped with an engine mounted radiator, fan, fan drive, and water pump for circulation of coolant through the water jackets of the cylinder block, cylinder head, exhaust manifold and lube oil cooler. The water pump shall be engine mounted and gear driven. Water temperature shall be thermostatically controlled.

B. Radiator shall be equipped with a capped filler opening, overflow line and drain cock. The radiator fan shall blow cooling air through the radiator. All engine cooling water piping shall be factory fabricated requiring only main supply and return connection to radiator. Cooling system shall be designed to operate in 125°F ambient rated output and shall be filled with a 50% emylene glycol solution.

9.12 Starting System:

A. System shall include 12 or 24 volt automatic starting motor, sufficient Amp/H capacity batter set with rack and cables, and other wiring, controls, and equipment as required for heavy duty, long life operation.

B. Batteries shall be mounted in suitable battery rack 2" off floor. Rack shall be made of non-corrosive materials (but not wood). However, a wood base plate shall be provided to isolate battery from floor. Coat terminals with grease. Batteries shall be of size recommended in manufacturer's published literature. Batteries shall be Delco, Willard, Exide, or equal.

9.13 Mounting System: The engine generator shall be mounted on corfund vibration isolators, the complete engine-generator and all auxiliary devices shall be housed within a weatherproof enclosure with hinged side doors and hinged door over the instrument panel.

9.14 Installation:

A. All equipment shall be properly supported and additional support provided where necessary.

B. Installation shall be according to the manufacturer's recommendations, shall be done in a neat workmanlike manner and shall be installed under the supervision of a manufacturer's representative.

C. The manufacturer's representative shall be present during start-up and testing and shall provide certification of the system.

9.15 Wiring:

A. Two 20A, 120V, single phase circuits with plug and cord shall be provided and wired to a receptacle on the engine generator for the crankcase heater and battery charger.

B. All wiring shall conform to manufacturer's wiring diagrams and shall be installed in a neat manner and in accordance with all other sections of the specification. Wiring shall be stranded and terminated in the box type terminals.

9.16 Exhaust System:

A. Avoid sharp bends, use sweeping long radius elbows, and use a section of seamless stainless steel flexible exhaust pipe between the engine manifold and the rigid piping.

B. Exhaust piping shall be sized according to the engine manufacturer's recommendations. Exhaust piping shall be wrought iron with adequate support to stand severe service and allow for expansion as required by operating temperatures. No weight shall be supported by the engine manifold.

C. A rain cap shall be provided at the end of the exhaust line.

9.17 Generator Enclosure:

A. A weatherproof enclosure shall be provided to house the engine/generator and accessories. The enclosure is to be in compliance with the National Electrical Code (NEC) and the National Fire Protection Association (NPPA) with regard to clearance around electrical equipment as specified.

B. Housing shall consist of a weatherproof enclosure to completely enclose the engine generator and accessories. Housing shall protect the engine generator from the environment yet be conductive to easy maintenance. Housing shall have removable swing out doors on each side and lockable rear door for access to meters and controls. Side doors shall have a means to pad lock. Construction of housing shall be a minimum 14-gauge sheet steel and painted manufacturer's standard color.

9.18 Automatic Transfer Switch:

A. Automatic transfer switch shall be furnished and installed as shown on the plans. Automatic transfer switch shall be provided with contacts and logic to allow start/stop of the generator. Terminal strips shall be provided in the automatic transfer switch, clearly marked for each control or status point.

B. The rating shall be as shown on the plans for use on 277Y/480V, 3-phase, 3 wire system.

C. The automatic transfer switch shall be UL 1008 as listed and be ASCO Series 300SE, GE Zenith ZTG Series, or equal, as described in the Drawings. Accessories to be included are time delay on start (0 to 6 seconds) to ignore momentary outages, adjustable time delay transfer to emergency (0 minutes to 60 minutes), transfer to normal (0 to 9 hours), cool down timer, test switch to simulate outages and to load the plant, pilot contacts to initiate starting of the engine, insulated neutral pad, 3 sets of auxiliary contacts for remote indication of switch position on normal and emergency, weekly exercise timer, charger, described previously may be housed in the switch enclosure. The transfer switch shall be housed in a NEMA 3R type enclosure with strip heater. For allowing motor and transformer voltage decay prior to transfer, the transfer switch shall have either a timed programmed neutral or timed contacts that may be wired into the motor starter circuits that will drop out selected motor starters then re-energize them after the transfer is made. The time shall be adjustable up to 10 seconds.

9.19 Information Furnished to the Owner:

A. A factory authorized technician shall instruct the Owner's representative in the proper operation and maintenance of the equipment installed and shall furnish at least 2 copies of operating and maintenance instruction manual covering the engine-generator and such auxiliary equipment as may require published instructions or periodic maintenance.

B. The nearest and most convenient source of replacement parts and service shall also be furnished.

9.20 Payment: No separate payment will be made for the work of this Section. The cost of the work, and all cost incidental thereto, shall be included in the price bid for the item to which the work pertains.

SECTION 10
FUEL PUMP STATION

10.01 Scope: The Contractor shall furnish all materials, labor and equipment necessary for complete installation of mechanical equipment as shown on the Drawings and/or specified and the furnishing of the services of a competent factory representative to supervise and/or inspect the installation and initial operation of the equipment. The duration of the service to be furnished during the periods of installation and initial operation is estimated as specified below:

Article Number	Equipment
12.13	Fuel Pump Station

A. The Contractor shall furnish, install, test, adjust and paint in accurate, satisfactory, workmanlike manner, all machinery, equipment, apparatus, accessories and fittings required for the completion of the work in accordance with the Drawings, Specifications and equipment manufacturer.

B. The Contractor shall furnish and install all materials including electric wiring, conduits and controls not furnished by the equipment manufacturers. The Contractor's attention is directed to the General Requirements section of these Specifications with reference to requirements for furnishing working drawings.

C. The Contractor shall refer to electrical drawings for all voltage requirements for mechanical equipment.

10.02 Supervisory Services: The periods of installation and initial operation shall be assumed to occur on successive days, unless otherwise stated herein. If the Contractor fails to arrange his work so that all services may be performed on successive days, he will be required to furnish such services at a later date at no additional expense to the Owner. Periods of service on more than one item furnished by the same manufacturer may run concurrently if permitted by the Engineer. Manufacturers, who are required to furnish supervisory and/or inspection services, shall extend those services to include all equipment furnished by them for the Project, whether listed or not.

10.03 Equipment Bids:

A. Manufacturer: Any reference to an item of equipment or material by a specific manufacturer's trade name in these Specifications is intended merely as a standard. Even though named in the Specifications, equipment offered with smaller or lightweight mechanism or devices compared to that specified will not be permitted for the project. Each bidder is required to state in his bid the name of at least one manufacturer or supplier named in these Specifications for each major item of equipment and his bid price for that item as required in the Proposal. This requirement is to prevent rejection of the bid should a piece of substitute equipment be rejected. Other equipment shall be considered as specified in the "General Conditions," if offered by the bidder under "Substitute

Equipment," in the Proposal; provided, it is equal in functional design, mechanical and structural details, to the one specified.

If no named manufacturers are specified, the Contractor shall include the name of the manufacturer to be used in the Proposal.

B. Substitute Equipment: Equipment offered under "Substitute Equipment" of the Proposal shall comply with requirements of these Specifications. It shall be the responsibility of the Bidder to determine that equipment offered in the Proposal is in accordance with the Specifications. Substitute equipment offered at a lower price by reason of smaller or lightweight members, inferior to or inefficient mechanism or devices will not be considered.

C. Substitute Equipment Bid: The price for substitute equipment shall include the cost of all changes in the structure, mechanical, electrical work and in other appurtenances for the accommodation of such equipment as determined by the Engineer, at the expense of the Contractor.

1. Information Required: It shall be the responsibility of the Bidder to ascertain that each manufacturer has submitted to the Engineer at least two weeks in advance of the letting date complete information in regard to the equipment offered. For makes of equipment named in the Specifications, this information may be a statement that the equipment offered is in strict accordance with the Engineer's Specifications, listing any and all exceptions. To all substitute items of equipment, complete drawings, specifications, thickness and weights of principle parts shall be furnished to the Engineer two weeks prior to the letting date. A list of all equipment which has sbeen submitted in accordance with the above will be provided to all bidders one week prior to the receipt of bids.

   For makes of equipment with no named manufacturers, the manufacturer must either submit a statement that equipment is in strict accordance with the Specifications or list any exceptions.

2. Experience and Manufacturer: It is desired that only equipment which has undergone thorough development as provided by successful service in similar installations for at least two years shall be accepted for installation unless specified elsewhere in these Specifications. Manufacturers and/or equipment which do not meet the two year experience period will be considered if the manufacturer or supplier provides a bond or cash deposit which will guarantee replacement of the equipment or process in the event of failure or unsatisfactory service. The amount of bond or cash deposit shall be sufficient to cover all labor and equipment costs for replacement in addition to any costs incurred by the Owner because of failure or unsatisfactory service. The period of time for which the bond or cash deposit is required shall be two years.

D. Standardization: To avoid a division of responsibility among several manufacturers for items of equipment having functions related to each other or to the same portion of the treatment process, and to avoid unnecessary duplication of

replacement parts and service calls by the Owner, the equipment supplied under any numbered paragraph shall be the product of or furnished and guaranteed by one manufacturer unless otherwise permitted herein.

10.04 Equipment Obtained from Equipment Manufacturer: The Contractor shall obtain all equipment specified and required for the safe operation and use of that equipment from the manufacturer or the equipment unless excluded by provisions in this paragraph or specifications for the item.

Unless otherwise stated in the Specifications, the following type of materials shall not be considered to be a part of the equipment: connecting piping and valves, railing set in the tank or structure, motor starters and wiring, steps and manholes installed separately from equipment, finish painting, etc.

10.05 Equipment Acceptance: Each manufacturer furnishing equipment shall submit the following information to the Engineer in accordance with the General Requirements section of these Specifications.

A. Shop drawings, working drawings, certified drawings, guaranteed performance curves, wiring diagrams, specifications, and lists of electrical controls, including manufacturer's name and catalog number, horsepower, and normal full load maximum load ampere rating of each motor

B. Estimated weight of each unit

C. Sets of certified test curves for each pump with capacity of greater than 100 gpm prior to shipment in accordance with the General Requirements section of these Specifications

D. List spare parts and tools furnished with equipment. Unless otherwise specified herein, tools shall be only such special tools required by the particular equipment.

10.06 Mechanical Testing: After each unit has been installed and is ready for operation, it shall be operated continuously for a period of 24 hours. During that period, the equipment will be inspected for defects and weakness. Parts of the unit which show a defect and/or a weakness shall at once be removed and be replaced with new parts or be made good in a satisfactory manner at no additional expense to the Owner.

A. Continuous 24-hour test shall be made after all defects have been remedied at no additional expense to the Owner.

B. After installation and final testing, each equipment manufacturer furnishing supervision and/or inspection services shall make written certification to the Engineer and the Owner that the equipment and controls have been properly installed in accord with the Drawings, Specifications and manufacturer's requirements and that the required operating and maintenance instructions have been furnished to the Engineer.

10.07 Piping for Equipment: The Contractor shall furnish completely dimensioned layouts for all piping, fittings, valves, specialties and other equipment. Deviations from the dimensions shown on the Drawings, caused by equipment dimensions, shall be taken into consideration by the Contractor, and changes in piping, electrical conduit and other similar items shall be done at no additional expense to the Owner.

A. All piping and appurtenances shall be properly supported by a system of hangers, pipe stands, saddles, base ells and concrete piers as required. Concrete insets, bolts, anchors, etc., shall be placed in the forms before placing concrete.

B. Drip piping, ¾" in size, shall be provided for all pumps with crosses and plugs at all changes of direction. Piping shall be run to nearest drain in a manner not to constitute a hazard to floor traffic. Contractor shall furnish plug valve or stop cock bleeds for high points in piping for all pumping units.

10.08 Shop Painting: All shop painting of equipment shall be as specified in "Painting" section of these Specifications unless otherwise specified.

10.09 Operation and Maintenance Manuals: Before the equipment is placed in service, operation and maintenance manuals for the equipment, clean and unused, shall be delivered to the Engineer by the Contractor in accordance with the General Requirements section of these Specifications.

10.10 Guarantees: The Contractor shall guarantee the equipment to be free from defects in workmanship, design and material for a period of 1 year after initial operation begins. The Contractor shall replace at no additional expense to the Owner, every defective part and every part showing undue wear during that guarantee period. The date of initial operation shall be shall be furnished in writing to the Contractor by the Engineer.

10.11 Spare Parts and Allowance: The Contractor shall allow $10,000.00 in his bid for spare parts in addition to those specified for individual pieces of equipment. The Contractor shall submit a list of spare parts recommended by the manufacturers along with a price list to the Engineer for review.

10.12 Motors: Motors for operating mechanical equipment shall satisfy the latest requirements of the Institute of Electrical and Electronic Engineers, American National Standards Institute, and the National Electrical Manufacturer's Association. Motors shall be manufactured by Weg, Baldor, NIDEC, or equal. All single and 3-phase motors (except fan motors which may be a manufacturer standard) shall be ball bearing, and have either sealed-in lubricant or be designed for external oil or grease lubrication. The equipment manufacturer shall supply motors having sufficient torque to start equipment under load and to accelerate the equipment smoothly and quickly to full speed without exceeding the motor nameplate ratings, including service factor. Motors, except totally enclosed motors, shall have 1.15 service factor, unless otherwise specified.

Motors 25 horsepower and larger shall be equipped with embedded stator thermostats (normally closed) connected internally in series and brought out through motor junction box for connection to starter pilot relay 115V control circuit. Large motor protection will be covered under the paragraph applying to the individual motor.

A. Motors ½ horsepower and larger shall be 3-phase, 60 hertz, induction type and be designed for full voltage starting. Motors shall have either 40°C rise Class insulation or 60°C rise Class B insulation, be open drip-proof for indoor installation, be vertical splash-proof and drip-proof for outdoor installation or have 70°C Class B rating rise for totally enclosed, non-ventilated, outdoor, horizontal installation.

B. Motors smaller than ½ horsepower shall be single phase, induction, capacitor-run type, unless otherwise specified. Very small motors and those for special purposes may be shaded pole type subject to review by the Engineer.

10.13 Fuel Pump Station: The Contractor shall furnish all labor, materials, tools and equipment necessary to install a complete fueling station as shown on the Drawings and in accordance with these.

Item No.	Product Description	Quantity
1.	5,000 Gallon Fireguard Tank Split 50/50 Mounted on Saddles (Diesel/Gasoline Use)	1
2.	8" 8 Oz Emergency Vent Male with O-ring	3
3.	Monitoring Well with 2" Cap	2
4.	3" Stack Vent (12' above grade) with 3" Updraft Vent	1
5.	3" Stack Vent (12' above grade) with 3" Pressure Vacuum Vent	1
6.	Morrison Bros. High Level Shut-off Valve with test mechanism & 3" Ground Level Fill (Vertical Check Valve, Ball Valve, Fill Pipe w/ Diffuser, Fill Adapter, & Dust Cap)	2
7.	3" Vapor Recovery System (Stage 1)	1
8.	2" 918 Clock Gauge with Alarm & Standard Float for Accurate Fuel Level Reading	2
9.	Ladder with Safety Shield	1
10.	Total Control 682-15 Piston Meter with 10:1 Pulser	2
11.	UL Listed Lockable Dispensing Box Welded on Tank 3'6"x4'2"x6'6", Cross Broken for Easy Drainage, 2" Vent, 2" Mushroom Cap, & 1/2" Ball Valve	1
12.	FE Petro 3/4 Hp. Pump Assy with Anti-Syphon Valve & Ball Valve	2
13.	1" Hannay Hose Reel with 25' 1" Hose, Ball Stop, 1" Nozzle, Breakaway and Swivel	1
14.	3/4" Hannay Hose Reel with 25' 3/4" Hose, Ball Stop, 3/4" Nozzle, Breakaway and Swivel	1
15.	Electric Packages for Pumps and Switches	2
16.	Envirolastic 940 DTM Polyaspartic Urethane for High Performance Finish	1
17.	Tank Decal Kit	1
18.	Interstitial Leak Gauge	1

19.	ROM Door (Roll Up) 3'x6'	1
20.	Moisture Hand Pump	1
21.	Cim-Tek 1.5" Filter Adapter and 1" Filter	2
22.	18" Manway for easy inner tank accessibility	2
23.	Dual Bulkhead (Split System)	1
24.	UL 2085 Labeled & Listed	1
25.	Steel Thickness 1/4" Shells & 5/16" Heads	1
26.	Touch-up Paint	1
27.	Owner's Manual	1

SECTION 11
SUBSURFACE INVESTIGATIONS

11.01 Subsurface Investigations: Refer to the Additional Test Pit Observation Report.

GEOSYSTEMS
ENGINEERING, INC.

May 24, 2025

City of Social Circle
c/o Mr. William Martin
WDM & Associates, LLC
298 Asa Lindsey Road
Kite, Georgia, 31049

Re: Additional Test Pit Observation Report
Social Circle Public Works
Proposed Maintenance Facility
Social Circle, Walton County, Georgia
GeoSystems Project No. 25-2975

Dear Mr. Martin:

Andy Christian, Staff Engineer, observed additional test pit excavations at the proposed maintenance facility site on May 15, 2025. Eight additional test pits (#7 through #14) were excavated to termination or refusal depths varying approximately from 3 to 8 feet below the ground surface (bgs). The following briefly describes the observed subsurface conditions at the test pit locations.

As before, the test pit locations were staked in the field by others and excavations were completed by Social Circle Public Works. Only two excavations (#10 and #12) encountered fill materials. Clean soil fill to a depth of 2 feet was found in #10 and debris fill was encountered in #12 to a depth of 7 feet bgs. The remaining test pits encountered undisturbed residual soils below a 2 to 12-inch thick layer of topsoil. Test pit #10 encountered refusal material (apparent rock) at a depth of 4 feet. No groundwater was observed in any of the test pits at the time excavated. The attached test pit logs provide more detailed descriptions of the conditions encountered. A photo of the debris encountered at the location test pit #12 is also attached.

The conditions described in this report were based solely on our observations of the test pit excavations. Our services were performed, and this report was prepared consistent with the professional skill and care ordinarily provided by geotechnical engineers practicing in the same locality under the same or similar circumstances for projects of this type. We make no warranties or guarantees, either expressed or implied. GeoSystems is not responsible for the conclusions; opinions or recommendations of others based on the data in this report.

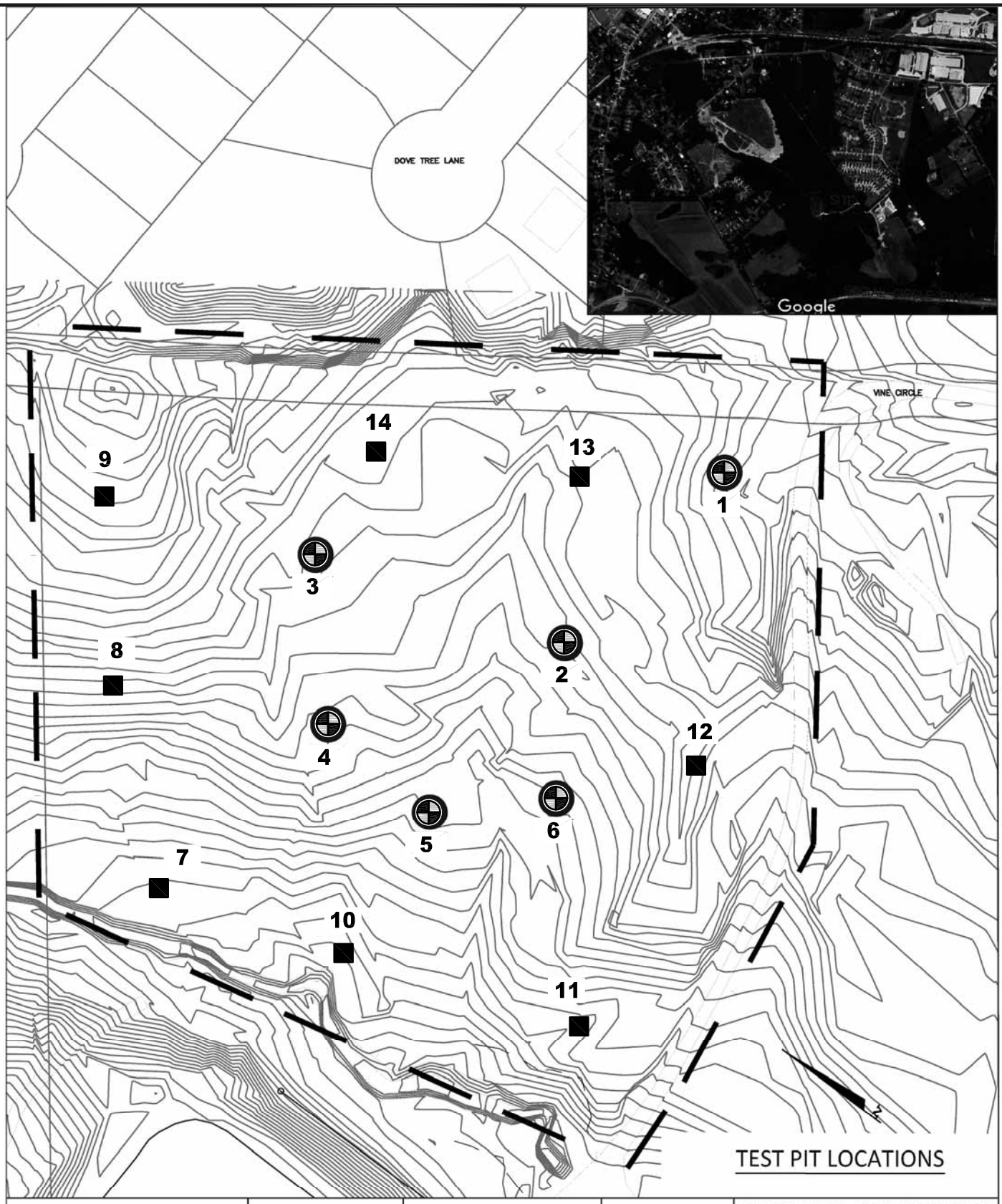
Please call me or Andy if you have any questions concerning this report or require additional information.

Sincerely,

GeoSystems Engineering, Inc.

Larry D. Mullins, P.E.
Senior Registered Engineer

Attachments: Test Pit Location Plan
Test Pit Logs
Test Pit #12 Photograph



WDM & ASSOCIATES, LLC

PROJECT: SOCIAL CIRCLE PUBLIC WORKS
PROJECT NUMBER: 0006
DATE: 03/19/2025
SHEET TITLE: TEST PIT LOCATIONS
NOT TO SCALE

LEGEND

– TEST PITS COMPLETED 4/1/2025

– TEST PITS COMPLETED 5/15/2025

PREPARED BY: ARC	DATE: 5/22/2025
REVIEWED BY: LDM	DATE: 5/22/2025

GEOSYSTEMS ENGINEERING, INC.

REFERENCE: Social Circle TP.dwg

TEST PIT LOCATION PLAN

PROJECT: CITY OF SOCIAL CIRCLE, GEORGIA
SOCIAL CIRCLE MAINTENANCE FACILITY
Walton County, Georgia
GeoSystems Project Number: 25–2975

FIGURE: 1

TEST PIT LOGS
CITY OF SOCIAL CIRCLE
PROPOSED MAINTENANCE FACILITY SITE
GeoSystems Project No. 25-2975

TEST PIT NUMBER	DEPTH From - To (ft)	SUBSURFACE CONDITIONS
7	0 - 0.67	TOPSOIL – 8”
	0.67 - 2	RESIDUUM – Reddish brown sandy **CLAY** (CH), moist
	2 - 3	Gray tan and brown clayey **SAND** (SC), wet
	3	Test Pit Terminated
8	0 - 0.75	TOPSOIL - 9”
	0.75 - 5	RESIDUUM – Reddish orange and brown sandy **CLAY** (CH), moist
	5	Test Pit Terminated
9	0 - 0.75	TOPSOIL - 9”
	0.75 - 5	RESIDUUM – Reddish orange and brown sandy **CLAY** (CH), moist
	5	Test Pit Terminated
10	0 - 2	FILL – Dark gray and brown medium sandy **CLAY** (CL)
	2 - 4	Dark brown silty fine to medium **SAND** (SM), trace clay, moist
	4	Test Pit Refusal (rock)
11	0 - 1	TOPSOIL - 12”
	1 - 5	RESIDUUM – Yellowish red to brown silty fine to medium **SAND** (SM), trace clay, moist
	5	Test Pit Terminated
12	0 - 0.33	TOPSOIL – 4”
	0.33 - 7	FILL – Brown silty fine to medium **SAND** (SM) and debris fill (plastic, plastic chips, cloth, rubber tubes, metal, wood, sawdust, etc.)
	7 - 8	RESIDUUM – Reddish brown fine sandy **CLAY** (CH), moist
	8	Test Pit Terminated

Notes:

TEST PIT LOGS
CITY OF SOCIAL CIRCLE
PROPOSED MAINTENANCE FACILITY SITE
GeoSystems Project No. 25-2975

TEST PIT NUMBER	DEPTH From - To (ft)	SUBSURFACE CONDITIONS
13	0 - 0.12	TOPSOIL - 2”
	0.12 – 1.5	RESIDUUM – Brown silty fine to medium **SAND** (SM), trace clay
	1.5 - 5	Reddish orange and brown fine to medium sandy **CLAY** (CH), moist
	5	Test Pit Terminated
14	0 - 1	TOPSOIL - 12”
	1 - 5	RESIDUUM – Reddish orange and brown sandy **CLAY** (CH), moist
	5	Test Pit Terminated

Notes:

Test Pit #12 - debris fill encountered to a depth of 7 feet bgs

SECTION 12
NEW FLEET FACILITY

12.01 New Fleet Facility: Refer to the Millard, Inc. Architects & Engineers plans and specifications.