PROJECT MANUAL

FOR

BALTZELL LIFT STATION ELIMINATION

ANNISTON WATER WORKS & SEWER BOARD

PROJECT NO. 6496

Clifton L. Osborne

ALABAMA LICENSED NO. 26336 PROFESSIONAL ENGINEER CLIFTON L. OSBORNE

7/21/2020

JULY 2020

ISSUED FOR CONSTRUCTION

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ADVERTISEMENT FOR BIDS

Sealed proposals will be received by Anniston Water Works and Sewer Board (OWNER), located at 931 Noble Street, Anniston, Alabama 36202-2268 until 10:00 AM, local time **Thursday, August 13, 2020** for the construction of

Baltzell Lift Station Elimination

at which time and place they will be publicly opened and read.

The project consists of approximately 630 linear feet of 12" D.I. gravity sewer, including a bored highway crossing and a bored creek crossing.

A cashier's check or bid bond payable to (OWNER) in an amount not less than five (5) percent of the amount of the bid, but in no event more than $10,000, must accompany the bidder's proposal. Performance and Payment Bonds and evidence of insurance required in the bid documents will be required at the signing of the Contract.

Bid Documents may be obtained from the Anniston Water Works and Sewer Board office located at 931 Noble Street, Suite 200, Anniston, AL 36202, or under the Opportunities section at awwsb.org.

For the duration of the advertisement period, a list of plan holders may be found at www.awwsb.org.

Bids must be submitted on proposal forms furnished by the Engineer or copies thereof. All bidders bidding in amounts exceeding that established by the State Licensing Board for General Contractors must be licensed under the provisions of Title 34, Chapter 8, Code of Alabama, 1975, and must show evidence of license before bidding or bid will not be received or considered by the Engineer; the bidder shall show such evidence by clearly displaying his or her current license number on the outside of the sealed envelope in which the proposal is delivered. The Owner reserves the right to reject any or all proposals and to waive technical errors if, in the Owner's judgment, the best interest of the Owner will thereby be promoted.

(OWNER/ENGINEER)
Anniston Water Works and Sewer Board
931 Noble Street, Suite 200
Anniston, AL 36202
(205) 241-5007

INSTRUCTIONS TO BIDDERS

RECEIPT OF BIDS

Sealed Proposals will be received by the Anniston Water Works and Sewer Board at 931 Noble Street, Suite 200, Anniston, AL. 36202, until 10:00 AM local time Thursday August 13, 2020, for furnishing all labor, tools, materials and equipment, according to the Contract Documents, as described in the Advertisement for Bids and in the Specifications. No bids will be received after the time set forth hereinabove; and the Proposals will be publicly opened and read.

CONTRACT DOCUMENTS

Bid Documents may be obtained from the Anniston Water Works and Sewer Board office located at 931 Noble Street, Suite 200, Anniston, AL 36202, or under the Opportunities section at awwsb.org.

DEFINITIONS

The following terms as used in these Contract Documents, are respectively defined as follows:

(a)	"Contractor" or "Contractors":	The person, firm or corporation signing the Contract with the Owner.
(b)	"Sub-Contractor":	One who contracts with the Contractor to perform all or any part of the Contract to be performed by the Contractor under the attached Documents.
(c)	"Work at Site of Project":	Work to be performed, including work normally done at the location of the project.
(d)	"Purchaser, Owner, Authority":	Anniston Waterworks & Sewer Board, Inc. (AWWSB)
(e)	"Engineer":	Anniston Water Works and Sewer Board or their duly authorized representative.
(f)	"Days":	Calendar days, unless otherwise specified.
(g)	"Proposal":	Wherever "Proposal" is used, it shall mean "Bid".

PROPOSAL FORM

AWWSB will furnish Bidders with a Proposal Form. No bid will be considered unless submitted on such form. The Bidders shall complete the Proposal Form in manner prescribed, using ink for writing figures, or figures may be typed. The Bidder must sign the Bid correctly and legibly; and shall state his interest, title, or office in the company submitting the Bid. If the Bid should be made by an individual, his full name and address shall be shown; if made by a firm or partnership, the full name and address of each member of the firm or each partner shall be shown; and if made by a corporation, the full names and addresses of the president, secretary and treasurer shall be shown. Should the Proposal Form not be fully completed in ink by the Contractor, the Bid will be deemed to be informal and may be rejected.

The Proposal Form shall be fully completed in accordance with the Instruction to Bidders, in accordance with any instructions to bidders given in the Specifications, and without any excisions, alterations, special conditions or alterations made by the Bidder. The Bidder shall be fully responsive to all instructions relating to the Proposal.

If omissions or math errors are made on the Proposal Form, the following rules shall govern the amounts bid:

Condition	Governing Rule
1. Amount is entered in Unit Price Column	Total Amount for Item = Unit Price x Approx Quantity
2. No Amount is entered in Unit Price Column	Unit Price = Total Amount for Item ÷ Approx Quantity
3. No Amount is entered in either the Unit Price Column or the Total Amount for Item Column	Total Amount for Item = Total Amount Bid - Sum of remaining figures in "Total Amount for Item" column, then apply Rule 2
4. Multiplication Error	Same as 1 above
5. Math Error in Total Amount Bid	Total Amount Bid = Sum of "Total Amount for Item" column

BIDS

Bids shall be enclosed in a sealed envelope, endorsed **Baltzell Lift Station Elimination, Project No. 6496** and addressed to Anniston Water Works and Sewer Board.

The Bidder shall show, on the outside of the envelope and on the last page of the Proposal Form, his Contractor's License Number for the State of Alabama, and shall also show, on the outside of the envelope, his name and address.

No Bid will be received after the time specified in the Advertisement for Bids.

Any Bidder may withdraw his bid, either personally or by telegraphic or written request, at any time prior to the scheduled closing time for the receipt of bids.

No Bidder may withdraw his bid for a period of sixty (60) days after the scheduled closing time for receipt of bids, as set forth in the Advertisement for Bids.

The Owner reserves the right to reject any or all bids, to waive any informalities in any bid, and to accept any bid considered advantageous to the Owner.

AWARD OF CONTRACT

The Contract, if awarded, will be awarded to the low, responsive, responsible bidder as soon as practicable, provided a satisfactory bid has been received. In order to be considered for the award of the Contract, the Bidder shall demonstrate to the Owner that he possesses all of the above named qualifications.

GUARANTY

Each Bidder must enclose with his Proposal a Bid Bond or a Cashier's Check drawn on an Alabama bank in the amount of not less than five percent (5%) of the total bid, but not more than $10,000.00. The payee of such bond or cashier's check shall be Anniston Water Works and Sewer Board, Inc., Anniston, Alabama. The Bid Bond or Cashier's Check shall bear the same date as that set for the receipt of bids.

Bid Bonds shall be returned to all bidders, other than the low and two next low bidders, when the low bids have been determined. Those of the three low bidders will be returned after execution of the Contract.

If a bidder to whom a contract is awarded shall refuse or neglect to execute the contract and furnish security in the amount required within ten (10) days after the notice has been given him of such award, his bid bond shall be forfeited to the Owner as liquidated damages for such refusal or neglect.

The successful bidder will be required to furnish, through an authorized agent in the State of Alabama a Performance Bond, Labor and Material Payment Bond, Employer's Liability and Workmen Compensation Insurance, Public Liability and Property Damage Insurance, Comprehensive Automobile Liability, Special Hazards or Perils and shall furnish proof of carriage of all of the above insurance all as set out in detail under "General Conditions" of these Specifications. The Performance Bond and the Labor and Material Payment Bond must be countersigned by an agent whose office is located in the State of Alabama and who is authorized to do business in the State of Alabama; and a valid Power-of-Attorney shall be attached to each Bond.

INTERPRETATIONS

If any person contemplating submitting a bid for the proposed contract is in doubt as to the true meaning of any part of the Contract Documents, he may submit a written request

to the Engineer for interpretations thereof. The persons submitting the request will be responsible for its prompt delivery. Any interpretation of the proposed documents will be made by addendum duly issued, and delivered to each person receiving a set of such documents. The Owner will not be responsible for any other explanation or interpretation of the proposed documents.

COMMENCEMENT AND COMPLETION OF WORK

Following the execution of the Contract by the Owner and the Contractor, the Contractor will be authorized to commence work by written order from the Owner. The Contractor shall then commence work on the project within the time stated in the Proposal, unless such time stated is extended by mutual agreement between the Owner and the Contractor, and shall fully complete all work under the Contract within the number of consecutive calendar days specified in the Contract.

FAMILIARITY WITH LAWS

The Bidder is assumed to have familiarized himself with all state laws and with all local ordinances and regulations which, in any manner, may affect the conduct of the work or those engaged or employed on the work, and no pleas of misunderstanding will be considered.

The attention of bidders is called to the provisions of State Law Governing General Contractors, as set forth in Sections 34-8-1 to 34-8-24, inclusive, Code of Alabama of 1975, as amended; and bidders shall be governed by the provisions of said law insofar as it is applicable. The above mentioned provisions of the Code make it illegal for the Owner to consider a bid from anyone who is not properly licensed under such code provisions. The Owner, therefore, will not consider any bid unless the bidder produces evidence that he is so licensed. Neither will the Owner enter into a Contract with a foreign corporation which is not qualified under State Law to do business in the State of Alabama.

The attention of nonresident bidders is called to the provisions of Alabama Law, Act No. 84-227, requiring every nonresident contractor, as defined in Section 39-2-14, Code of Alabama 1975, as amended, to register with the Department of Revenue prior to engaging in the performance of a Contract in the State of Alabama, and to deposit with the Department of Revenue an amount, or approved corporate surety bond in lieu thereof, equal to five percent (5%) of the amount such contractor is to receive for performance of the contract, such amount or bond to be held pending completion of the contract and the payment of taxes due the State and the governmental bodies.

The attention of nonresident bidders is called to the provisions of Alabama Law, Section 39-3-5, Code of Alabama 1975, as amended, relating to preference to be given to resident contractors in Alabama over nonresident contractors in the award of contracts in the same manner and to the same extent as provided by the laws of the state of domicile of the nonresident contractor, and to the requirements that the bid documents tendered by any nonresident contractor must be accompanied by "a written opinion of an attorney-at-law licensed to practice law in such nonresident contractor's state of domicile as to the preference, if any or none, granted by the law of that state to its own business entities

whose principal places of business are in that state in the letting of any or all public contracts" (sic).

The bidder is advised that the above referenced act is subject to the opinion of the Attorney General of the State of Alabama.

ASSIGNMENT OF CONTRACT

The Contractor shall not assign his Contract, nor any part thereof, nor any monies due, or to become due thereunder, without prior written consent of the Owner. In case the Contractor, with the consent of the Owner assigns all or any part of any monies 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 or to any monies due or to become due to the Contractor shall be subject to prior valid claims of all persons, firms, and corporation for services rendered or materials supplied for the performance of work under his Contract.

SUB-CONTRACTING

No part of the Contract shall be sublet without the prior written consent of the Owner. The Contractor shall, following execution of the Contract, immediately submit to the Owner the names of sub-contractors whom he proposes to employ on the project.

EXECUTION OF CONTRACT

The Contract documents shall be executed in triplicate, each counterpart of which shall be considered as an original without accounting for the absence of any of the other counterparts or copies.

QUALIFICATIONS OF BIDDERS

The Contract award, if made, will be made to the low, responsive, responsible Bidder.

The Bidder shall maintain a permanent place of business. This requirement applies to the Bidder where the Bidder is a division of a corporation, or where the Bidder is 50 percent or more owned by a person, corporation or firm.

The Bidder shall have experience as a prime/general contractor on projects of similar size and scope and all subcontractors shall have similar experience in their respective fields. The Bidder shall submit written documentation of experience (e.g. list of projects, resumes of key personnel, financial data, present commitments, etc.) with the Proposal Form. Bidders are reminded that the Owner reserves the right to reject any Bid if the evidence submitted by, or investigation of, such Bidder fails to satisfy the Owner that such Bidder is properly qualified to carry out the obligations of the Contract and to complete the Project contemplated therein, or any bid which the Owner deems to be non-responsive to the requirements stated herein. 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 reasonably request.

A responsive bid shall be evidenced by: (1), a Proposal Form complete in accordance with the Instructions to Bidders and with instructions and/or requests contained in any other sections of the Contract Documents; (2), a Proposal Form not evidencing any apparent unbalanced pricing for performance of the items of work; (3), a Proposal Form without excisions, alterations, special conditions or qualifications made by the Bidder; and, (4), a Proposal Form containing no alternative bids or offerings (by inclusion, attachment, or otherwise) for any items unless such alternative bids or offers are requested in the Technical Specifications.

Acceptance of the Bidder's documentation and substantiation or Contract Award by the Owner does not relieve the Bidder of liability for non performance as covered in the Contract Documents, nor will the Bidder be exempted from any other legal recourse the Owner may elect to pursue.

END OF SECTION

PROPOSAL FORM

MADE BY _____

ADDRESS _____

TO: Anniston Water Works and Sewer Board

The undersigned, as Bidder, proposes and agrees, if this Bid is accepted, to enter into a Contract with **Anniston Water Works and Sewer Board**, in the form of Contract specified and shown in the attached Contract Documents, to furnish all necessary materials, equipment, machinery, tools, apparatus, means of transportation, and labor necessary to complete the construction of **Baltzell Lift Station Elimination, Project No. 6496**, as described in the Advertisement for Bids, and in the Contract Documents, which are hereby referred to and made a part of the same extent as if fully set out herein, and in full and complete accordance with the shown, noted, described and reasonably intended requirements of the Contract Documents, to the full and entire satisfaction of the Owner, with a definite understanding that no money will be allowed for extra work except as set forth in the attached Instructions to Bidders, General Conditions, and other Contract Documents, for the following lump sum price:

ADDENDA: The Bidder acknowledges receipt of Addenda Nos. _____ , _____ , _____ , _____,_____, _____, _____ .

UNIT PRICES: The following unit price quotations include all labor, materials and equipment required to perform the work involved, and will be used to determine the amount added or deducted from the Contract Price. See Section 01 22 00 – Unit Prices for complete requirements.

BASE BID				
Item No.	**Approximate Quantities**	**Description of Item**	**Unit Price**	**Total Price for Item**
1.	95 LF	12" D.I. Pipe, Cl. 350, P-O Joint, Gravity Sewer, 0-10 ft depth, Furnished and Installed Per Linear Foot		
2.	195 LF	12" D.I. Pipe, Cl. 350, P-O Joint, Gravity Sewer, 10-20 ft depth, Furnished and Installed Per Linear Foot		

BASE BID				
Item No.	**Approximate Quantities**	**Description of Item**	**Unit Price**	**Total Price for Item**
3.	245 LF	Highway 21 Bored Road Crossing, Sewer STA. 0+32 to STA. 2+77, Furnished and Installed Per Linear Foot		
4.	93 LF	Bored Creek Crossing, Sta. 4+39 to Sta. 5+32, Furnished and Installed Per Linear Foot		
5.	37 VF	48" Diameter Precast Concrete Manhole, Furnished and Installed Per Vertical Foot		
6.	13 VF	48" Diameter Precast Concrete Drop Manhole, Furnished and Installed Per Vertical Foot		
7.	4 EA	Manhole Ring and Cover, Furnished and Installed Per Each		
8.	7 VF	48" Diameter Manhole Interior Rehabilitation, Furnished and Installed, Per Vertical Foot		
9.	2 EA	Connection to Existing System (Gravity Sewer), Furnished and Installed, Per Each		
10.	205 LBS	Ductile Iron Fittings, Furnished and Installed Per Pound		
11.	1 EA	Cut, Cap and Brace Existing Sewer Lines, Furnished and Installed, Per Each		
12.	1500 LF	Mulching, Seeding, and Grass Stabilization, Furnished and Installed, Per Linear Foot		
13.	65 LF	Chain Link Fence, Furnished and Installed Per Linear Foot		

BASE BID				
Item No.	**Approximate Quantities**	**Description of Item**	**Unit Price**	**Total Price for Item**
14.	1000 LF	Silt Fence, Furnished and Installed, Per Linear Foot		
15.	10 CY	Undercut Unsuitable Soils, Haul, and Dispose Off-Site, as directed by the Engineer, Per Cubic Yard		
16.	10 CY	Backfill Undercut Areas with Crushed Stone (Including hauling and compaction), as directed by the Engineer, Per Cubic Yard		

BASE BID TOTAL: _____

The Bidder declares that he has examined the site of the work, that he has fully informed himself of conditions that would affect the proposed work, that, prior to the tender of his bid, he has examined the Contract Documents for the work and has read all special instructions and provisions contained in the Documents, and that he has satisfied himself with respect to the quality and extent of work to be performed.

The Bidder declares that he understands that, when quantities of work for which unit price bids are requested in the Proposal, such quantities are approximate only and are subject to either increase or decrease, that, should the quantities of any of the work items be increased, the Bidder proposes to perform the additional work at the unit prices bid by him, that, should the quantities of any of the work items be decreased, payment will be made only for the actual quantities of work performed and such payment will be based upon the unit prices bid by him, and that he shall make no claim for profits anticipated on the decrease in quantities of work. Actual quantities will be paid for as the work progresses, in accordance with the provisions of the Contract Agreement, and such quantities shall be subject to final measurements and determinations made upon completion of the work.

The Bidder understands that the Owner reserves the right, in the Owner's discretion, to reject any or all bids, to waive any informality in any bid, and to accept any bid considered to be advantageous to the Owner.

The Bidder agrees that his bid shall be valid for a period of sixty (60) calendar days after the date set for receipt of bids, and shall not be withdrawn for a period of sixty (60) calendar days after the date set for receipt of bids.

The Bidder has attached hereto a Bid Bond executed by a Surety Company authorized to do business in the State of Alabama (with valid Power-of-Attorney attached), or a cashier's check drawn on an Alabama bank, in favor of (made payable to) Anniston Water Works and Sewer Board, in the amount of 5% of the bid amount (total), but in no event more than $10,000.

The Bidder agrees that, should he be notified that his Bid on the work has been accepted, he will, within ten (10) days from receipt of such notice, execute the formal Contract Agreement bound herein, and will furnish with the Contract evidence of Insurance Coverage of his construction operations and all of his operations associated with the project, all in accordance with the requirements of the General Conditions.

The Bidder further agrees that, in case of failure on his part to execute said Contract Agreement, and to furnish all Bonds required by the Contract Documents, within ten (10) consecutive calendar days after receipt of notice of award of Contract to him, the monies payable to the Obligee of his Bid Bond, in accordance with the terms and conditions of the Bond, shall be paid to the Owner as liquidated damages for the delay and additional expense to the Owner caused by such failure on the part of the Bidder.

The Bidder hereby agrees that, should the work under the Contract be awarded to him, he will commence work under this Contract on or before a date to be specified in written "Notice to Proceed" given by the Owner, and that he will fully complete the Contract within **Ninety (90)** consecutive calendar days thereafter. Refer to Section 01 10 00 Summary for additional completion requirements. The Bidder further agrees to pay, as liquidated damages, the sum of $1,000.00 for each consecutive calendar day after the date set for completion of the work, as provided in the General Conditions. The Bidder further agrees that he will not make any claim for extra compensation should completion of work under the Contract be effected in advance of the time specified hereinabove.

The undersigned Bidder states that he fully understands the meaning of "low, responsive, responsible Bidder", as defined in these Documents, and that these criteria will be applied in the evaluation of this Bid.

The undersigned, as Bidder, hereby declares that the name (or names) of the only person (or persons) interested in this Proposal, as principal (or principals), is (or are) as herein below set out and that no person other than that (or those) herein below stated 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, firm or corporation making a proposal; and that it is in all respect fair and in good faith, without collusion or fraud.

Following are the names and addresses of all persons, firms, and corporation interested in the foregoing bid:

_____ _____

_____ _____

Address: Respectfully submitted,

_____ _____

_____ By _____

_____
Title

Date _____

Contractor's License No. _____
(SEAL - if Bid is made by a Corporation)

BID BOND

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

_____

_____

as Principal _____ and

as Surety, are hereby held and firmly bound unto _____

_____

as owner in the penal sum of _____

_____

for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

Signed this _____ day of _____ , 20 _____

The condition of the above obligation is such that whereas the Principal submitted to _____ a certain Bid, attached hereto and hereby made a part hereof to enter into a contract in writing, for the _____

_____

_____

NOW, THEREFORE,

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

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

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

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

_____ (L.S.)
Principal

_____
Surety

By _____

SEAL

CONTRACT AGREEMENT

THIS AGREEMENT, made and entered into as of the _____ day of _____ in the year of _____, by and between Anniston Water Works and Sewer Board (hereinafter called the Owner), and_____ (hereinafter called the Contractor)

WITNESSETH: That the Owner and the Contractor, in consideration of the mutual covenants hereinafter set forth, agree as follows:

Article I. **CONTRACT DOCUMENTS.** The Contract Documents shall consist of: this Agreement; Contractor's Proposal; Contractor's Bid Bond; Notice to Contractors (Advertisement for Bids); Instructions to Bidders; General Conditions; Supplemental Conditions; Performance Bond; Labor and Material Payment Bond; all Addenda issued prior to the submittal of the Proposal; all Modifications issued and agreed upon by the Owner and the Contractor prior to and subsequent to the execution of this Agreement; and the Plans (Contract Drawings) and Specifications as prepared by the Anniston Water Works and Sewer Board, 931 Noble Street, Anniston, Alabama 36202-2268. The documents enumerated hereinabove form the Contract and all are as fully a part of the Contract as if attached to this Agreement and/or fully set forth herein.

Article II. **SCOPE OF WORK.** The work to be done under this Contract by the Contractor, at his own cost, shall consist of furnishing all labor, materials, supplies, tools and equipment, and of performing all work necessary to construct and fully complete the project entitled **Baltzell Lift Station Elimination, Project No. 6496** all in accordance with the Contract Drawings and Specifications and with the requirements and provisions of the Contract Documents, all of which form this Contract.

Article III. **TIME OF COMPLETION.** The work shall be fully completed within Ninety (90) calendar days after the date on which the Notice to Proceed is issued, subject, however, to such extensions of time as may be authorized in accordance with the provisions of the Contract Documents.

Should the work under this Contract not be fully completed within the time specified, it is understood and agreed that there will be deducted from the periodic and final estimates of work performed by the Contractor a sum computed at the rate of $1000.00 per day for each additional day required to fully complete the work, beginning from the specified date of completion and extending to the date of final acceptance of the work. It is understood and agreed that the sum thus deducted is not a penalty, but money due to reimburse the Owner for the extra cost and expense caused by the delay in the completion of the work. It is also understood and agreed that, in the event the work should be completed in advance of the completion date specified, the Contractor will make no claim for extra payment therefor.

Article IV. **CONTRACT PRICE.** The Owner shall pay the Contractor in full payment for performance of work under this Contract, in accordance with the price or prices set forth in the Proposal submitted by the Contractor, which proposal is bound herewith

and made a part hereof to the same extent as if fully set out herein, but subject to such additions and deductions as provided for in the Contract Documents, the sum of _____ _____($_____).

The Contract Price shall be equitably adjusted to compensate for any changes in the work as may be ordered by the Owner.

Article V. **CHANGES IN WORK AND EXTRA WORK**. The Owner shall have the right to increase or decrease quantities of work, to make changes in the work, and to require the Contractor to perform extra work necessary for the satisfactory completion of the project.

Where new and/or additional items of work are found to be necessary for the satisfactory completion of the project, and where the character of the work is such that a reasonable price for the performance of the work cannot be established by use of contract prices or combinations thereof, such new and/or additional items of work shall be classed as Extra Work.

Where the satisfactory completion of the project requires that changes in work be effected or extra work be ordered, the procedure to be followed in such cases shall be in accordance with the provisions of the Articles of the General Conditions relating to CHANGES IN WORK, EXTRA WORK, and PAYMENT FOR EXTRA WORK.

Article VI. **PROGRESS PAYMENTS.** The Owner shall make progress payments to the Contractor in amounts equal to values of work performed on the project through the closing dates of the preceding estimate periods, but less five percent (5%) of the combined values and less previous payments made. The five percent (5%) retained percentage may be held by the Owner until the value of work completed at the end of any estimate period equals or exceeds fifty percent (50%) of the total amount of the Contract, after which time, if the Owner and the Engineer deem that satisfactory progress is being made, no further retainage will be withheld. The retainage as set forth above shall be held until final completion and acceptance of the Contract. When the work has been substantially completed, reviewed by the Owner and the Engineer, and found to be in accordance with the provisions of the Contract Documents, the retainage may be reduced to such an amount as would reasonably cover the cost of correction of minor items of work heretofore found to be faulty and the cost of work remaining to be done in order to effect the completion of all of the work in full accordance with the provisions of the Contract Documents. Progress payments will be made in accordance with the provisions of the General Conditions.

Article VII. **FINAL PAYMENT.** Final payment, constituting the entire balance of the Contract Price, shall be paid by the Owner to the Contractor within thirty days after the acceptance of the work. The work will not be accepted until the Contractor has certified that he has completed all of the work in full accordance with the provisions of the Contract Documents, the Owner and the Engineer have completed the final review of the work and found that it has been fully completed in accordance with the provisions of the Contract Documents, the Contractor has advertised completion of the work in accordance with the

General Conditions, and the Contractor has presented to the Owner satisfactory evidence that all indebtedness connected with the work has been fully paid and satisfied, all as set forth in the General Conditions.

Article VIII. **MISCELLANEOUS PROVISIONS.** Terms used in this Agreement which are defined in the General Conditions and in the Instructions to Bidders shall have the same meanings as designated in those component parts of the Contract Documents.

The Contract Documents, which constitute the entire agreement between the Owner and the Contractor are listed in Article I of this Agreement and, except for Modifications issued after the execution of this Agreement, are enumerated hereinbelow. The signatures which appear hereunder shall have the same force and effect as if appearing on all of the Contract Documents.

IN WITNESS HEREOF, the said Contractor has hereunder executed this Agreement by his signature shown hereon, and said Owner has hereunder executed this Agreement by affixing hereto his corporate seal and by signature of his corporate officer(s) as shown, on the date first written above, in 3 counterparts, each of which shall, without proof or accounting for the other counterparts, be deemed an original.

By signing this contract, the contracting parties affirm, for the duration of the agreement, that they will not violate federal immigration law or knowingly employ, hire for employment, or continue to employ an unauthorized alien within the state of Alabama. Furthermore, a contracting party found to be in violation of this provision shall be deemed in breach of the agreement and shall be responsible for all damages resulting therefrom.

ATTEST: _____

_____ By_____

Title _____

ATTEST: Anniston Water Works and Sewer Board

_____ By_____

Title General Manager

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: that we _____

_____

_____

hereinafter called the Principal, and _____

_____

hereinafter called the Surety, do acknowledge ourselves to be held and firmly bound unto

Anniston Water Works and Sewer Board

hereinafter called the Owner, in the penal sum of _____

_____

for payment of which sum well and truly to be made in lawful money of the United States, we bind ourselves, our successors, heirs, executors, administrators, assigns and personal representatives, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION OR BOND IS THIS:

Whereas, the Principal has entered into a certain written contract with the Owner, bearing the

date of _____ , 20 _____ for the performance of the

Baltzell Lift Station Elimination, Project No. 6496

_____

(the "Contract"), which is fully incorporated herein by reference, and made a part hereof to the same extent as if set out herein in full, and the Principal and Surety are and shall remain bound under this Bond for the full and faithful performance and satisfaction of all of the Principal's duties, undertakings, work, and obligations under the Contract,

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform and satisfy all of his duties, undertakings, work, and obligations, all in accordance with the covenants, terms, conditions, agreements and provisions of the Contract, and if the Principal shall satisfy all claims and demands made or incurred under the Contract, shall fully correct all faulty work or defective work and make good any work that does not comply with the Principal's warranty and guaranty, shall fully indemnify and save harmless the Owner from all costs and damages whatsoever which the Owner may suffer by reason of any failure on the part of the Principal to do so, and shall fully reimburse and repay the Owner for any and all outlay, damage, and expense (including all additional engineering

costs, all legal costs and attorney's fees) which the Owner may incur in making good any default or by reason of any failure by the Principal to fully perform and satisfy all of the Principal's duties, undertakings, work, and obligations under the Contract, then this obligation shall be void; otherwise, it shall remain in full force and effect.

Be it also understood that should the Principal be in default on or non-compliance with any of its obligations under the Contract, the Owner having performed the Owner's obligations thereunder, then upon written notice by the Owner to the Surety of such default or non-compliance, the Surety shall promptly:

(1) Remedy the default or non-compliance of the Principal, or

(2) Perform and satisfy all of the Principal's remaining work and obligations under the Contract in full accordance with the terms and conditions of the Contract, using for performance of such work a contractor chosen by the Surety and approved by the Owner, or

"Promptly", as used herein, shall be defined as within thirty (30) days from the date on which the Owner has notified the Surety in writing of the Principal's default on or non-compliance with the Contract.

Whichever method may be used by the Surety to remedy the Principal's default on or non-compliance with the Contract or to complete the work under the Contract and satisfy the Principal's obligations, the Surety shall also pay to the Owner all additional costs and damages incurred by the Owner by reason of the Principal's default on or non-compliance with the Contract and the subsequent completion of the work under the Contract by the Surety.

PROVIDED FURTHER, that the said Surety, for value received, hereby stipulates and agrees that no change, modification, extension of time, alteration, or addition to or of the terms of the Contract or to the work to be performed thereunder shall in any wise affect the obligation of the Surety under this Bond and the Surety does hereby waive notice of any such change, modification, extension of time, alteration, or addition to or of the terms of the Contract or to the work to be performed thereunder.

PROVIDED FURTHER, that final payment by the Owner to the Principal shall not abridge the rights of the Owner hereunder.

IN WITNESS WHEREOF, this instrument is executed in ___3___ counterparts, each one of which shall, without proof of or accounting for the other counterparts, be deemed an original, on this day the _____ day of _____, 20 ____.

ATTEST:

By _____
(Principal Secretary)

_____
Witness as to Principal

_____
Address

_____
Principal

By _____

Title _____

_____

_____
Address

_____
Surety

ATTEST:

By _____
(Surety Secretary)

_____
Witness to Surety

_____

_____
Address

By _____
Attorney-in-Fact

_____

_____
Address

Countersigned

_____
Resident Agent of Surety

_____

_____
Resident Agent Address

_____
Phone No.

LABOR AND MATERIAL PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: that we _____

_____

_____

hereinafter called the Principal, and _____

_____

hereinafter called the Surety, do acknowledge ourselves to be held and firmly bound unto

Annitson Water Works & Sewer Board

hereinafter called the Owner, in the penal sum of _____

($)

for payment of which sum well and truly to be made in lawful money of the United States, we bind ourselves, our successors, heirs, executors, administrators, assigns and personal representatives, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION OR BOND IS THIS:

Whereas, the Principal has entered into a certain written contract with the Owner, bearing the

date of _____ , 20 _____ for the construction of the

Baltzell Lift Station Elimination, Project No. 6496

_____

a copy of which contract is attached hereto, incorporated herein by reference, and made a part of to the same extent as if set out herein in full, and the Principal and Surety are bound under this Bond which shall remain in full force and effect until all claims and demands with respect to labor and materials connected with the work under the contract have been satisfied, subject however to statutory limitations and to such other conditions as hereinafter stated.

NOW, THEREFORE, if the Principal and all Subcontractors to whom any portion of the work provided for in the contract is sublet, and all assignees of said Principal and said sub- contractors, shall promptly make payment to all persons, firms, subcontractors and corporations for furnishing said Principal and said Subcontractors with labor, materials, equipment, machinery, parts, fuel, foodstuffs, supplies, or repairs on machinery or equipment used in or incorporated in the work, for performing any work in connection with the prosecution of the work under the Contract, and under any

modifications or extensions thereof, for all insurance premiums in connection with the work, for all labor performed in connection with the work whether by subcontractor or otherwise, or for reasonable attorney's fees incurred by any claimant or claimants in suits under this Bond, then this obligation shall be void; otherwise it shall remain in full force and effect.

PROVIDED FURTHER, that the said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder or to the Specifications accompanying the same, shall in any wise affect the obligation of the Surety under this Bond, and the Surety does hereby waive notice of any such change, extension of time, or alteration or addition to the terms of the Contract or to the Specifications.

PROVIDED FURTHER, that this Bond is subject to the following limitations and conditions:

(a) Any person, firm or corporation who has furnished labor, materials, equipment, machinery, fuel, parts, foodstuffs, supplies, or repairs for machinery or equipment used or incorporated in the prosecution of the work under the Contract, or amendment or extension thereof, and who has not received due payment for furnishing such items, shall have a direct right of action in his or their name or names against the Principal and Surety on this Bond, which right of action shall be asserted in a proceeding instituted in a Court of competent jurisdiction in the area in which the work under the contract has been performed. Such right of action shall be asserted in a proceeding brought in the name of the claimant for his or their use and benefit against said Principal or Surety, or either of them not later than one year after the final settlement of the contract, in which action such claim or claims shall be adjudicated and judgement thereon.

(b) In addition to any other legal mode of service, service of summons and other process in suits brought on this Bond may be had on the Principal or Surety by leaving a copy of the summons and complaint, or other pleading or process, with the

General Manager

and the principal and the Surety agree to be bound by such mode of service above described, and consent that such service shall be the same as personal service on the Principal or Surety.

(c) The Surety shall not be liable hereunder for any damage or compensation recoverable under any workmen's compensation or employer's liability statute.

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

(e) No final settlement between the Owner and the Principal shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in ___3___ counterparts, each one of which shall, without proof of or accounting for the other counterparts, be deemed an original, on this day the _____ day of _____, 20 ____.

ATTEST:

By _____
(Principal Secretary)

_____
Witness as to Principal

_____
Address

_____
Principal

By _____

Title _____

_____

_____
Address

_____
Surety

ATTEST:

By _____
(Surety Secretary)

_____
Witness to Surety

_____

_____
Address

By _____
Attorney-in-Fact

_____

_____
Address

Countersigned _____
Resident Agent of Surety

_____

_____
Resident Agent Address

_____
Phone No.

GENERAL CONDITIONS

1. WORK TO BE PERFORMED

1.1 The work to be performed under this Contract shall include, but without limitation, the furnishing of all materials, labor, tools, appliances, equipment, supplies, transportation and services necessary to accomplish the work, and the construction complete of all facilities and improvements as described and/or shown by the Contract Documents.

1.2 The Contractor shall pay all sales, consumer, use and similar taxes for the work to be performed by the Contractor which are legally enacted when bids are received, or negotiations concluded.

2. CONTRACT/BID DOCUMENTS

2.1 The Bid Documents form the Contractor's formal response to the invitation to bid. The Contract Documents form the Contract for Construction between the Owner and Contractor. These documents supersede prior negotiations or agreements, either written or oral, and shall not be interpreted to create a contractual relationship between the Engineer and Contractor, or between any persons or entities other then the Owner and Contractor. The Contract/Bid Documents are comprised of the following documents:

Bid Documents

A. Advertisement for Bids (Notice to Contractors), listing date and time for receipt of bids, principal items of work, and requirements for bidding.

B. Instructions to Bidders containing information for use of Contractors preparing a Proposal.

C. Proposal shall be tendered on Proposal Forms provided in the Specifications. The Proposal shall be properly executed and guaranteed as specified in the Instructions to Bidders.

D. Bid Bond shall accompany the Proposal, and shall guarantee that the Bidder will enter into an agreement with the Owner for construction of the work should the Contract be awarded to him.

Contract Documents

E. Contract Agreement Between the Owner and Contractor covers the performance of the work described in the Contract Documents including all supplemental addenda thereto and all general and special provisions pertaining to the work or materials therefor. Execution of the Contract by the Contractor represents that the Contractor has visited the site to become familiar with the conditions under which the work is to be performed.

F. General Conditions outline certain responsibilities of the Owner and the Contractor (who are the parties to the Contract Agreement) and also those responsibilities delegated by the Owner to the Engineer who acts as the agent of the Owner. Supplemental General Conditions or Special Provisions, when required, are bound in the Contract Documents following the General Conditions and are a part of the Contract.

G. Drawings (Plans) and Specifications show and describe the work to be performed, and it is the intent of the Drawings and Specifications that the Contractor shall furnish all labor, tools, materials, equipment, transportation and services necessary for the proper execution of the work so shown and/or described, unless specifically noted otherwise. The Contractor shall execute all work so described in full conformance with the Plans, Specifications and all Contract Documents; shall perform all incidental work necessary to complete the project in an acceptable manner; and shall fully and satisfactorily complete all work, facilities, and improvements, ready for use, occupancy and operation by the Owner.

The Engineer shall be deemed the author of the Drawings and Specifications, including those in electronic format, and shall retain all reserved rights, including the copyright. The Contract Documents are for use solely with respect to this project, and shall not be used by the Contractor for any other purpose.

Responsibilities for adequacy of the design and for sufficiency of the Contract Documents shall be borne by the Owner. The complete requirements of the work to be performed under the Contract shall be set forth in the Contract Documents supplied by the Owner through the Engineer or by the Engineer as representative of the Owner. The Contract Documents shall be considered to be inseparable documents, and in considering them, the Contractor shall use them in performing the work in accordance with their combined intent.

The Drawings and Specifications are intended to be complementary; and where work is called for in one but not in the other, it shall be performed as though it were specified and/or indicated in both. Any seeming conflict between the Drawings, Specifications, and other Contract Documents, shall be submitted to the Engineer, and the Engineer's decision shall be final.

All discrepancies found between the Contract Documents and site conditions or any inconsistencies or ambiguities in the Contract Documents shall be immediately reported by the Contractor to the Engineer, who shall promptly correct such inconsistencies or ambiguities in writing. After discovery of such inconsistencies or ambiguities by the Contractor, any work done by the Contractor on any part of the project affected by such inconsistencies or ambiguities before receipt of written corrections from the Engineer shall be at the Contractor's risk.

The figured dimensions and/or elevations shown on the Drawings shall be used by the Contractor for the layout of the work. Where the work of the Contractor is affected by finish dimensions, such dimensions shall be determined by the Contractor at the site of the work, and he shall assume the responsibility therefor.

The Owner reserves the right to amend or revise the Drawings and/or Specifications, and to furnish such other detail drawings as, in the opinion of the Engineer, may be necessary for the proper prosecution of the work. All such additional drawings and/or specifications shall have equal force and effect as the original drawings.

Except as provided for otherwise, or specified to the contrary, all copies of Contract Documents required for and necessary for the execution of the work will be furnished to the Contractor (on the Contract) without charge.

H. Addenda to Contract Documents issued during the time of bidding (before receipt of bids) or forming a part of the Contract Documents issued to the Contractor for the preparation of the Proposal, shall be covered in the Proposal, and shall be made a part of the Contract. Receipt of each Addendum shall be acknowledged in the Proposal.

I. Bonds shall be furnished by the Contractor at the time of execution of the Contract Agreement, shall be in the form prescribed by the Owner, shall be with a Surety Company authorized to do business in the State in which the work is located, and shall be countersigned by a resident agent of the Surety Company in that State. Bonds shall be as follows:

1. Performance Bond in an amount equal to 100% of the Contract Amount as a guaranty of good faith on the part of the Contractor to execute the work in accordance with the terms of the Contract.
2. Labor and Material Payment Bond in an amount equal to 100% of the Contract Amount as a guaranty of good faith on the part of the Contractor to make all payments for labor, material, supplies, and equipment in connection with the Contract.

The Bonds shall remain in full force and effect for the period of the full year following the date of Substantial Completion.

J. Modifications Issued After Execution of the Contract including, but not limited to, written amendments to the Contract, Change Orders, Construction Change Directives and minor changes in the work issued by the Engineer.

3. INSURANCE

3.1 The Contractor shall not commence any work on the project until he obtains, at his own expense, all required insurance; and the Contractor shall not, at any time, conduct any operations on the project or associated with the project unless such operations are covered by the specified insurance. Such insurance must have the

approval of the Owner as to limit, form, and amount. The Contractor shall not permit any subcontractor to commence work on the project until the same insurance requirements have been complied with by such subcontractor (or sub-contractors). The insurance coverage shall be maintained throughout the full period of the contract. Any insurance bearing on adequacy of performance shall be maintained after completion of the project for the full guaranty period.

3.2 As evidence of specified insurance coverage the Owner may in lieu of receipt of actual policies, accept certificates issued by the insurance carrier showing such policies to be in force for the specified period.

3.3 Nothing contained in these insurance requirements is to be construed as limiting the extent of the Contractor's responsibility for payment of damages resulting from his operations under this Contract. The Contractor shall have responsibility to enforce Subcontractor compliance with these insurance requirements.

3.4 The types of insurance that the Contractor shall be required to obtain and maintain for the full period of the Contract are listed hereinbelow:

A. Workmen's Compensation and Employer's Liability Insurance shall be in strict accordance with the requirements of the current and applicable Workmen's Compensation Laws of the State. The insurance shall cover all of the Contractor's employees employed or associated with the project; and where any part of the work is subcontracted, the Contractor shall require the subcontractor to provide similar Workmen's Compensation and Employer's Liability Insurance for all employees of the subcontractor unless such employees are covered by the protection afforded by the Contractor. In case any class of employees engaged in hazardous work under this Contract is not protected under the Workmen's Compensation Statute the Contractor shall provide, and shall cause such subcontractor to provide, adequate coverage for the protection of all employees on the project not otherwise protected under applicable provisions of the Statutes relating to Workmen's Compensation and Employer's Liability Insurance.

B. Comprehensive General Liability Insurance shall protect the Contractor and any subcontractors performing work under this Contract from any claims for bodily injury, for sickness or disease, for death, for personal injury, and for property damages which may arise either directly or indirectly out of, or in connection with, the performance of work under this Contract. The minimum limits of coverage shall be as follows:

Bodily Injury $1,000,000 each occurrence, $1,000,000 aggregate
Property Damage $500,000 each occurrence, $500,000 aggregate
Personal Injury $250,000 each occurrence, $250,000 aggregate

The naming of minimum limits of coverage shall not be construed as limiting the Contractor's responsibility to provide contractual coverage sufficiently broad to ensure the provisions of the Article of these General Conditions relating to Indemnity, or limiting the responsibilities of the Contractor as outlined under the aforesaid Article.

C. Comprehensive Automobile Liability Insurance shall protect the Contractor and any subcontractor performing work under this Contract from any claims for bodily injury, for death, and for property damages which may arise either directly or indirectly out of, or in connection with, the performance of work under this Contract. The minimum limits of coverage shall be as follows:

Bodily Injury - $500,000 per person, $1,000,000 each occurrence
Property Damage - $250,000 each occurrence

The naming of minimum limits of coverage shall not be construed as limiting the Contractor's responsibility to provide contractual coverage sufficiently broad to ensure the provisions of the Article of these General Conditions relating to Indemnity, or limiting the responsibilities of the Contractor as outlined under the aforesaid Article.

D. Property Insurance shall afford protection against physical damage to the insured property during the entire construction period. Insurable portions of the project shall be covered on a completed value basis; and at any given time the dollar coverage provided shall be actual value of completed work, value of work in progress, and value of stored materials. The policy by its own terms or by endorsement shall specifically permit partial or beneficial occupancy or use prior to completion or acceptance of the entire work.

Perils named in the policy shall be Fire and Lightning, Extended Coverage, Vandalism and Malicious Mischief, and other perils associated with the particular nature and character of the work.

E. Special Hazards or Perils. The Liability and Property Damage Insurance Coverage of the Contractor's operations shall provide adequate protection against any death, any bodily injury or any property damage resulting from the blasting operations in connection with the Contractor's work, or in connection with the work of his subcontractors.

Insurance carried by the Contractor on the insurable portions of the work shall not relieve the Contractor of the responsibility for the protection of all materials and all work until the project has been accepted by the Owner. Any loss suffered on the project by reason of the perils named under Article 3.d. or under this sub-part of Article 3. shall be borne by the Contractor and/or the Insurance Company providing the coverage for the Contractor; and the Owner shall not be liable for any cost of replacement of lost of damaged work or material.

The Contractor shall purchase Builder's Risk "all risk" insurance providing protection against losses stemming from natural disasters.

F. Protection of the Owner and the Engineer. The Owner and his agents, and the Engineer shall also be named insureds in all insurance policies provided by the Contractor for his own protection and for that of his subcontractors.

In the event that the Contractor or his Surety is prevented by law or by charter from naming the Owner and his agents, and the Engineer, as insureds in the policies providing the coverages listed under this Article, the Contractor shall purchase and maintain during the life of this agreement Owner's & Contractors's Protective Liability Insurance in amount of not less than $1,000,000.00; and the named insureds shall be the Owner, his agents, and the Engineer. The insurance shall protect the Owner and his agents, and the Engineer, from any claim or loss arising from any act of the Contractor or his subcontractors, or any failure to act on the part of the Contractor or his subcontractors, during the performance of work under this agreement.

4. INDEMNIFICATION

4.1 The Contractor shall hold harmless, indemnify and defend the Owner and the Engineer, their subconsultants, and each of their officers, agents and employees, from and against all loss or expense (including costs and attorney's fees) by reason of any or all suits, actions or claims of any character, name or description brought for or on account of any injuries or damages received or sustained by any person or persons, by any property, or by the Contractor or any of his employees, as a consequence of any action of the Contractor or actions of his employees in connection with the prosecution of the work, or by or on account of any claim arising from or any amounts recovered under the Workmen's Compensation Law or any other law, ordinance, or decree, excepting only such injury or damage as shall have been occasioned by the sole negligence of the Owner or Engineer.

5. PATENTS AND ROYALTIES

5.1 The Contractor shall pay the costs of all royalties, license fees and patent fees involved by use, or manner of use in the work of all designs, devices, materials, equipment or processes, and the Contractor shall provide for such use or manner of use by legal agreement with the Owner of the patent or a duly authorized licensee of such owner. All such costs referred to hereinabove shall be included in the price bid for the work under this Contract.

5.2 The Contractor shall save harmless the Owner and the Engineer from any and all loss or expense by reason of use, or manner of use, in the work of any design, device, material, equipment or process covered by letter of patent or copyright; and the Contractor shall defend all suits resulting from claims for royalties, license fees or patent fees on designs, devices, materials, equipment or processes purchased by the Contractor for use in the work, and from claims for royalties, license fees or patent fees involved by use, or manner of use, of such items by the Owner.

6. LICENSES AND PERMITS

6.1 All licenses, fees, inspections and permits necessary for the prosecution of the work shall be secured and paid for by the Contractor at no expense to the Owner other than as reflected in the price bid for the work.

7. COMPLIANCE WITH LAWS, ORDINANCES AND REGULATIONS

7.1 The Contractor shall comply with all Federal, State, and Local Laws, Ordinances and Regulations which in any manner affect the work or the conduct of the work; shall comply with all orders and decrees as may have been adopted or as may be enacted by bodies or tribunals having any legal jurisdiction or authority over the work. The Contractor shall file all reports and give all notices as required for compliance with the above. The Contractor shall indemnify and save harmless the Owner and the Engineer against any suits or actions of any kind or nature brought, or may be brought, against them for any claim or liability arising from or based upon the violation of any such laws, ordinances, work regulations, safety and health regulations, orders or decrees by the Contractor, his subcontractors, his agents, his representatives, his employees, or employees of his subcontractors.

8. SAFETY

8.1 The Contractor, in the prosecution of his work under the Contract, is bound by the requirements of "Safety and Health Regulations for Construction" of the Occupational Safety and Health Administration, U.S. Government Department of Labor, and of other authorities having jurisdiction in safety matters.

8.2 Under the terms and conditions of this Contract, the Engineer shall not act as Safety Supervisor, since such responsibility remains solely with the Contractor. The Engineer shall not be responsible for establishing safety practices or for prescribing safety measures for the contractor.

8.3 The Contractor is solely and completely responsible for conditions of the job site, including safety of all persons and property affected directly or indirectly by his operations during the performance of the work; and this requirement is not limited in application to normal working hours, but applies continuously twenty-four (24) hours per day until acceptance of the work by the Owner, and thereafter shall be subject to the terms and conditions of the Guaranty.

8.4 The duty of the Engineer to review the work in order to determine its acceptability in accordance with the Contract Documents and to conduct construction review of the Contractor's performance for the benefit of the Owner, shall not be construed as a duty to review the adequacy of the Contractor's safety measures on or near the construction site and/or to direct the actions of the Contractor's employees in the performance of the work as such duties are not included among the responsibilities of the Engineer.

9. WARNING SIGNS AND BARRICADES

9.1 The provision by the Contractor of warning signs, warning lights, barricades and watchmen is subject to the requirements of "Safety and Health Regulations for Construction" of the Occupational Safety and Health Administration, U.S. Government Department of Labor, of the State "Manual on Uniform Traffic Control Devices for Streets and Highways," and of other authorities having jurisdiction in the areas of safety and traffic control. The Contractor is solely responsible for satisfying the safety and traffic control requirements of authorities concerned with or affected by this work. Traffic control measures and traffic signage shown in the drawings/plans are a minimum required to satisfy the Alabama Department of Transportation Utility Construction Permit obtained by the Owner. The Contractor shall provide these measures as well as any others necessary to conform with the above mentioned agencies.

10. PUBLIC CONVENIENCE

10.1 The Contractor is required to conduct his work as to ensure the least possible obstruction to traffic, to ensure the least possible inconvenience to the general public and the residents in the vicinity of the work, and to ensure the protection of persons and property. Permission of the proper authority is required before any road or street is closed to the public. The maintenance of accessibility of fire-fighting equipment to fire hydrants and to such areas as are necessary for the provision of fire protection is a requirement of the Fire Department of the authority having jurisdiction. The provision of temporary measures as required to ensure the safe use of sidewalks and streets by the public is the responsibility of the Contractor. The proper functioning of all gutters, sewer inlets, drainage ditches and irrigation ditches is to be ensured by constant clean-up along with the work and by provision of temporary facilities where required for the maintenance of natural surface drainage. The implementation of all such maintenance measures and safety precautions is the sole responsibility of the Contractor.

11. SANITARY PROVISIONS

11.1 The Contractor is responsible for the maintenance of proper sanitary conditions in the area of his work. The provision and maintenance of such sanitary accommodations as may be required for the use of his employees and of his subcontractor's employees is subject to the Rules and Regulations of the State Board of Health and to all local Codes and Ordinances. Refer to Article 7.

12. EXISTING CONSTRUCTION AND FACILITIES

12.1 Where construction work under this Contract is adjacent to or crosses highways, railroads, streets, roads, access facilities, or utilities under the jurisdiction of State, County, City or other public agency, public utility or private entity, the Contractor is required to secure written permission from the proper authority and to furnish such bond (cash or surety as required), or insurance agreement as may be required before executing such construction work. A copy of the written permission and bond or insurance agreement (when required) must be filed with

the Owner before any work is done. The Contractor is responsible for the replacement and/or repair of all existing construction, utilities or facilities damaged in the execution of work under this Contract. The Contractor will be required to furnish releases from all authorities affected by the work before final acceptance of the work under this Contract.

12.2 The type, size and physical location of existing facilities are shown from available records and the accuracy of said information is not guaranteed. The Contractor is requested to make additional investigations as he may desire. The Contractor shall assume all risks arising from, or out of, performing work in the vicinity of existing facilities, or connection to existing facilities.

13. COMMENCEMENT, PROSECUTION, AND COMPLETION OF THE WORK

13.1 Following the execution of the Contract by the Owner and the Contractor, a written Notice to Proceed will be given to the Contractor by the Owner. The Contractor shall commence work on the project in good faith within the number of days specified in the Contract Agreement; and the Contractor, in accordance with the terms and provisions of the Contract Agreement, will be required to prosecute the work in such a manner and with such force as will enable him to secure the satisfactory completion of the project within the time period stated in the Contract Agreement.

13.2 It is intended that the date of issuance of the Notice to Proceed will coincide with the date of the execution of the Contract, or as soon thereafter as is practicable. The time allowed for commencement of the work shall be the number of consecutive calendar days specified in the Proposal and in the Contract Agreement; and the number of days shall be reckoned from the date of the Notice to Proceed. The time allowed for the completion of the work shall be the number of consecutive calendar days as specified in the Proposal and in the Contract Agreement; and the number of days shall be reckoned from the date specified in the Notice to Proceed for commencement of work.

13.3 Should the work under this Contract not be completed within the time specified, it is understood and agreed that there will be deducted from the monthly and final estimates of work performed by the Contractor a sum computed at the rate per day as shown in the Contract Agreement, beginning from the stated date of completion and extending to the date of final acceptance of the work. It is understood and agreed that the above deduction is not a penalty, but money due to reimburse the Owner for the extra cost and expense caused by the delay in the completion of the work. It is also understood and agreed that, in the event that the work should be completed in advance of the scheduled date of completion, the Contractor will make no claim for extra payment therefor.

13.4 The Owner may grant an extension of time for completion of the work when prosecution of the work is delayed or, halted by occurrences beyond the Contractor's control, such as strikes, lockouts, acts or omissions on the part of the Owner, fire or other catastrophes, provided however, that the Contractor shall, within ten days after the delay first occurs, give written notice to the Engineer of the cause of the delay and its probable effect on progress of the entire Work.

13.5 Adverse weather conditions that are more severe than anticipated for the locality of the Work during any given month may entitle the Contractor to an extension of Contract Time provided, however;

(1) the weather conditions had an adverse effect on construction scheduled to be performed during the period in which the adverse weather occurred, which in reasonable sequence would have an effect on completion of the entire Work,

(2) the Contractor shall, within twenty-one days after the end of the month in which the delay occurs, give the Engineer written notice of the delay that occurred during that month and its probable effect on progress of the Work, and

(3) Within a reasonable time after giving notice of the delay, the Contractor provides the Engineer with sufficient data to document that the weather conditions experienced were unusually severe for the locality of the Work during the month in question. Unless otherwise provided in the Contract Documents, data documenting unusually severe weather conditions shall compare actual weather conditions to the average weather conditions for the month in question during the previous five years as recorded by the National Oceanic and Atmospheric Administration (NOAA) or similar record-keeping entities.

13.6 Adjustments, if any, of the Contract Time pursuant to this Article shall be incorporated into the Contract by a Contract Change Order prepared by the Engineer and signed by the Contractor, Owner, and other signatories to the Construction Contract or, at closeout of the Contract, by mutual written agreement between the Contractor and Owner. The adjustment of the Contract Time shall not exceed the extent to which the delay extends the time required to complete the entire Work of the Contract.

13.7 The Owner shall not suffer any loss or expense as a result of such occurrences or delays, except when caused by any act or omission on the part of the Owner; and the Contractor shall not be allowed any damages or claims for extra compensation resulting from such occurrences or delays, except when caused by any act or omission on the part of the Owner.

14. CONSTRUCTION SCHEDULE

14.1 The Contractor is instructed to submit to the Owner, prior to initiating the work but not later than thirty days after the execution of the Contract, a schedule of construction operations so planned as to ensure completion of the work within the time limit specified in the Proposal and in the Contract Agreement. The maintenance of such schedule in order to fulfill the terms of the Contract Agreement is the responsibility of the Contractor, and he may employ such reasonable and proper measures, subject to other conditions of these Documents, as he deems to be required to expedite the work and to ensure that it will be fully and satisfactorily completed within the stated time limit. If the Contractor's

progress falls materially behind the currently approved construction schedule and, in the opinion of the Engineer or Owner, the Contractor is not taking sufficient steps to regain schedule, the Engineer may, with the Owner's concurrence, issue the Contractor a Notice to Cure. In such a Notice to Cure the Engineer may require the Contractor to submit a revised construction schedule to demonstrate the manner in which schedule will be regained. The Contractor shall not be allowed additional compensation for employment of such measures.

14.2 The Contractor will be required to show in the schedule the proposed dates of commencement and completion of the various subdivisions of work comprising the project, and also to show in the schedule the estimated amount of each monthly payment (periodic estimate) that will become due to the Contractor as he maintains the progress schedule prepared by him. The preparation and submittal of the progress and payment schedule to the Owner is of benefit both to the Contractor and the Owner in that it will enable the Owner to anticipate the periodic financial needs of the project and facilitate the making of timely payments for the work. Submission of a schedule showing a completion date beyond the contract completion date should not be interpreted as approval of a contract extension by the Owner.

14.3 The Contractor shall prepare and keep current a schedule of submittals coordinated with the Contractor's schedule of construction operations. The submittal schedule shall be approved by the Engineer and shall allow the Engineer reasonable time the review submittals.

15. SUPERVISION OF THE WORK

15.1 The Contractor shall be solely responsible for planning, scheduling, organization and prosecution of the work in accordance with the Contract Documents. Observations, construction reviews, tests, recommendations or comments made by the Engineer, or by persons other than the Contractor, shall in no way relieve the Contractor of his obligation to complete all work in accordance with the Contract Documents. All work shall be done under the direct supervision of the Contractor. The Contractor shall be solely responsible for construction means, methods, techniques, sequences and procedures. The Contractor is solely responsible for safe access to the work, safe use of the work, safe working conditions, and safe occupancy of the work by and/or for all authorized persons.

15.2 The Contractor shall maintain on the project a qualified superintendent who is acceptable to the Owner, and who is capable of providing the efficient supervision required for the successful and satisfactory completion of the work. The superintendent shall have the authority to act in behalf of the Contractor, and all communication with the superintendent shall be considered a communication with the Contractor. The Contractor's superintendent is responsible for coordinating the work of all subcontractors, and his presence at the site of the work is necessary for the adequate performance of his supervisory duties and for the coordination of the work of all subcontractors.

15.3 The responsibilities of the Contractor relating to supervision of the work as outlined hereinabove, and the duties of the Contractor as outlined hereinabove,

are all a part of the Conditions of this Contract as referred to in the Contract Agreement.

16. SUBCONTRACTORS

16.1 The Contractor may utilize the services of specialty subcontractors on those parts of the work, which under normal contracting practices, are performed by subcontractors. No part of the work, however, shall be sublet by the Contractor without the prior written consent of the Owner, or the Engineer acting upon the instructions of the Owner. Following the execution of the Contract, the Contractor shall submit in writing for review by the Owner the names of subcontractors to whom he proposes to subcontract portions of the work. The Engineer shall promptly reply to the Contractor in writing stating whether or not the Owner or the Engineer has reasonable objection to any proposed subcontractor. If the Owner or the Engineer has reasonable objection to a listed subcontractor, the Contractor shall propose another which is acceptable to the Owner. Any documented changes to the Contract Amount or Time due to the replacement of a subcontractor shall be increased or decreased by the difference, and a Change Order issued prior to commencement of the substitute subcontractor's work. The early selection of subcontractors, in the case where the Contractor proposes to subcontract any part of the work, is essential to the proper organization of the work, and the Contractor shall therefore submit any names of proposed subcontractors upon or before request by the Owner.

16.2 The names of proposed subcontractors so submitted shall not be changed by the Contractor after submittal of the list to the Owner unless the consent of the Owner is first obtained.

16.3 The Contractor shall be responsible to the Owner for the acts, deficiencies, and omissions of his subcontractors and those of their direct and indirect employees to the same extent as he is responsible for the acts, deficiencies, and omissions of his own and those of his employees.

16.4 The Contractor shall bind all subcontractors to the terms of the General Conditions and Contract Documents insofar as they are applicable to the work under subcontract, and shall insert in all agreements with subcontractors appropriate provisions such as 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. The Contractor is required to submit evidence of compliance with such conditions to the Owner before commencement of work by the particular subcontractors.

16.5 Nothing contained in the Contract Documents shall be construed as creating any contractual relationship between any subcontractor and the Owner.

16.6 For convenience of reference, to facilitate organization of the work, and for convenience in evaluating work in progress, the Specifications have been separated into titled Sections. Such separation shall not, however, operate to make the Owner or the Engineer an arbiter to establish limits of work in the contracts between the Contractor and subcontractors. The general charge to the

Contractor is that all work be fully completed in accordance with the Contract Documents, and that the Contractor adhere to the terms and provisions of the Contract Agreement, of which these Conditions are a part.

17. CONTRACTOR'S RESPONSIBILITIES WITH RESPECT TO WORK BY OTHERS

17.1 The Owner reserves the right to perform construction or operations related to the project with his own forces, and to place portions of the work on the project under separate contracts. The Owner shall provide for coordination of the activities of his own forces or of each separate contractor with the work of the Contractor. The Contractor is requested to cooperate with other contractors with regard to use of the site, storage or materials, and execution of their work.

17.2 It is the Contractor's responsibility to inspect all work performed by other contractors which in any manner affects his work, and to report to the Owner the existence of any irregularities or discrepancies which will not permit him to complete his work in a satisfactory manner. The failure of the Contractor to notify the Owner of the existence of such irregularities or discrepancies shall indicate that the work of other contractors has been satisfactorily completed and is in condition to receive his work.

17.3 The Contractor is required to keep himself informed of the progress and performance of other contractors; and, where the lack of progress or poor performance (defective workmanship) on the part of other contractors will affect the Contractor in the performance and completion of his work, he is requested to immediately notify the Owner of the existence of such conditions. Failure of the Contractor to keep himself informed of the status and condition of work being performed by other contractors on the project, where the status or condition of such work will affect the performance of his work, and failure of the Contractor to notify the Owner of status or conditions unfavorable to the proper coordination, performance, and completion of his work shall be construed to be acceptance by the Contractor that the status and condition of work being performed by other contractors is satisfactory for the proper coordination, performance, and completion of his work.

18. SATURDAY, SUNDAY, HOLIDAY, NIGHT AND OVERTIME WORK

18.1 Work on Saturdays, Sundays and Holidays, or at night, will be permitted only when the Contractor has received the written permission of the Owner. Work at such times may be required when special connections to existing systems are to be made, when new facilities are to be placed in service, when existing facilities are to be taken out of service, when it is more advantageous to the utilities involved, or when an emergency arises in the work schedule. In such cases the permission of the Owner must be secured prior to beginning work at such times, the work scheduled well in advance, and arrangements made for prosecution of the work with all safety and minimum inconvenience to the public. All work necessary to be performed on Saturdays, Sundays and Holidays, or at night shall be so performed without additional expense to the Owner.

18.2 Holidays for the purposes of this project shall be defined as those holidays normally observed by the Owner.

18.3 It is understood that the Contractor's proposed construction schedule is based on a 40 hour work week occurring within 10 hour days, Monday through Friday, less recognized holidays. The Contractor shall be responsible for additional expenses incurred by the Owner for the Engineer's field representative overtime premium associated with work hours in excess of the 40 hour work week. This cost will be deducted from the Contractor's monthly payment request, and will be $45 per hour. No overtime pay will be charged to the Contractor for work performed at night or on weekends, when, due to operational conditions of the Owner's facilities, the work must be performed during these non-standard work hours.

18.4 Maintenance work normally required for protection of persons, or for protection of the work or property, will be permitted at any time.

18.5 For work during an emergency threatening bodily injury, loss of life, or damage to property refer to Article 19 of these General Conditions.

19. EMERGENCY WORK

19.1 It is the Contractor's responsibility at all times to guard against bodily injury, loss of life, damage to the Owner's property, damage to his own work on the site, and damage to adjacent property. In the case of the development of an emergency which should threaten loss of life, injury to persons, or damage to property, it is the Contractor's responsibility to furnish and install all necessary materials and equipment, and to perform all work as could possibly be accomplished to prevent loss of life, bodily injury, or damage to property. In all such cases the contractor is requested to immediately notify the Owner of the emergency, but he need not wait for advice or authorization from the Owner before proceeding to employ all measures necessary to protect life and property. Nothing stated hereinabove shall be construed as limiting the Contractor's responsibility under the terms and provisions of the General Conditions and Contract Documents, to protect life and property and to pay claims resulting from loss of life, bodily injury, or damage to property. The substance of this Article of the General Conditions is that, in case of an emergency, the Contractor will act with all speed, with all force, and in an expeditious manner, to avert loss of life, bodily injury, and property damage.

20. CHANGES IN WORK

20.1 The Owner shall have the right to make changes in the work, and to require the Contractor to perform extra work necessary for the satisfactory completion of the project. These changes in the work may be accomplished by Change Order, Construction Change Directive or by order for minor changes in the work, and shall be performed under applicable provisions of the Contract Documents. Such increases, decreases, changes, and extra work shall not invalidate the Contract. Should the Contract Price or the Contract Completion Time be affected by such increases, decreases, changes or extra work, the compensation and time shall be adjusted at the time when such increases, decreases, changes or extra work items are ordered.

20.2 Where new and/or unforeseen items of work are found to be necessary for the satisfactory completion of the project, and where the character of the work is such that a reasonable price for the performance of the work cannot be established by use of contract prices or combinations thereof, such new and/or unforeseen items of work shall be classed as Extra Work. No Extra Work shall be undertaken except by written order from the Owner in the form of a Change Order or Construction Change Directive. The Contractor shall, upon receipt of written order from the Owner, perform such Extra work and furnish such materials as may be required for the proper completion of construction of the whole work contemplated. In the absence of such written order no claim for extra compensation by reason of performance of Extra Work shall be allowed. Extra Work shall be performed in accordance with the Contract Documents, insofar as they are applicable; and where such Extra Work is not covered by the Contract Documents, the performance of the work shall be consistent with the intent of these Contract Documents.

21. FAULTY WORK AND DEFECTIVE WORK

21.1 The performance of satisfactory work is, under the terms and conditions of this Contract, the obligation of the Contractor. Any faulty work or defective work, whether the result of poor workmanship, use of defective materials, damage through carelessness or any other cause, will neither be accepted nor paid for. The terms "Faulty Work" or "Defective Work" shall apply to: (1) any product, material, system, process, equipment, or service, or its installation or performance, which does not conform to the requirements of the Contract Documents, (2) in-progress or completed work the workmanship of which does not conform to the quality specified or, if not specified, to the quality produced by skilled workers performing work of a similar nature on similar projects in the state, (3) substitutions and deviations not properly submitted and approved or otherwise authorized, and (4) materials or equipment rendered unsuitable for incorporation into the work due to improper storage or protection. The Contractor shall bear all expenses related to the correction of faulty or defective work, including but not limited to: (1) additional testing and inspections, including repeating specified inspections and tests, (2) reasonable services and expenses of the Engineer, (3) regulatory fines, and (4) the expense of making good all work done by the Contractor, Owner, or separate contractors which is destroyed or damaged by the correction of the faulty or defective work. Payment for faulty or defective work will not be made until such work has been removed, re-executed and corrected in manner and form satisfactory to the Owner and in accordance with the Contract Documents. The existence of any faulty or defective work will prevent the acceptance of the project. The fact that the Engineer may have previously overlooked such faulty or defective work shall not constitute acceptance of any part of it. The failure by the Engineer to discover faulty or defective work prior to the making of final payment by the Owner to the Contractor, or the discovery or appearance of faulty or defective work after the making of said final payment, shall not relieve the Contractor of responsibility for defective materials or faulty workmanship. The Contractor shall, at his own expense, promptly replace all defective materials or equipment and correct all faulty workmanship discovered

and/or appearing within one year from date of written acceptance of the work. Refer to Article 26.

21.2 If the Contractor fails to correct nonconforming work within a reasonable time, the Owner may, upon written notice to the Contractor, correct the nonconforming work and reduce all costs associated with the correction of nonconforming work from the Contractor's final payment.

22. UNCOVERING WORK

22.1 If any portion of the work is covered by the Contractor or his subcontractors contrary to the requirements expressed in the Contract Documents or the Engineer's specific request, it shall be uncovered for the Engineer's observation and recovered at the Contractor's expense without change in the Contract Amount or Contract Time.

22.2 The Engineer may request to see covered work which has not been specifically requested by the Contract Documents or Engineer to remain uncovered until observed by the Engineer. If such work has been properly installed according to the Contract Documents, costs for uncovering and replacement shall be charged to the Owner. However, if such work is not in accordance with the Contract Documents, the Contractor shall bear all costs for uncovering and replacement.

23. USE OF COMPLETED PORTIONS OF THE WORK

23.1 The Owner shall have the right to take possession of and use any completed or partially completed portion of the work provided all insurers and authorized public authorities having jurisdiction over the project consent to this partial occupancy, notwithstanding that the time for completing the entire work or such portions of the work may not have expired; but such taking possession and use shall not be deemed to be acceptance of any work not completed in accordance with the Contract Documents. The Owner and Contractor shall agree in writing the equitable assignment of security, maintenance, utilities, commencement of warranties, insurance and damages to the areas of work to be used by the Owner. If such prior use should increase the cost of or delay the completion of uncompleted work, or should cause refinishing of completed work subjected to such prior use, the Contractor shall be entitled to extra compensation or extension of time, or both, as agreed upon by the Owner.

23.2 Prior to occupancy by the Owner of any partially completed work, the Owner, Contractor and Engineer shall inspect the portion of work to be occupied by the Owner to record the condition of the work.

24. CUTTING AND PATCHING OF WORK

24.1 The Contractor shall perform all necessary cutting and patching as required to connect new work to existing work and as required in new work to properly receive the work of the various trades involved in the entire work; and the Contractor shall restore all such cut and patched work, and shall refinish all surfaces affected by such work, to conditions acceptable to the Engineer. Cutting

of the existing work, or any work, in such a manner as would endanger the work, adjacent property, the workmen, or the public, is contrary to the provisions of Article 8, SAFETY.

25. CLEANING UP THE WORK

25.1 During construction of the work, the Contractor shall keep the property and the surrounding areas free from the accumulation of waste materials or rubbish caused by the Contractor's operations. If the Contractor fails to keep the site clean, the Owner may do so at the expense of the Contractor.

25.2 At completion of the work the Contractor shall remove from the property of the Owner, and from all public and private property, all temporary structures, rubbish, waste materials resulting from his operations or caused to be in such locations by actions of his employees and surplus materials. The Contractor shall remove all of his equipment, tools, and supplies from the property of the Owner. The entire work shall be clean and finished as specified. The site shall be clean, true to finished contours given, and improved as specified. The entire work shall be ready for permanent occupancy and/or use before acceptance of the work can become fact. Should the Contractor fail to remove his equipment, tools and supplies from the property of the Owner, the Owner shall have the right to remove them at the expense of the Contractor.

26. CONTRACTOR'S RESPONSIBILITY FOR PERFORMANCE AND ACTIONS OF WORKMEN

26.1 The Contractor is responsible for the conduct, performance, acts, and omissions of all persons and entities on the project site who are engaged in work on behalf of the Contractor under this contract between the Owner and the Contractor. All workmen should have such skill and experience as would enable them to reliably, safely and properly perform the particular work or task assigned to them. It is in the best interest of the Contractor to terminate the employment of workmen whose performance endangers the safety of other workmen or any person, or results in unsatisfactory work, or contributes to delay in the progress of the work, before the Contractor bears the burden of re-executing unsatisfactory work and suffers the cost of delays in the prosecution of the work.

26.2 The Contractor may be requested by the Owner to remove or to have removed from the job site for the duration of the project any of his employees, or any of his subcontractors, or any of the employees of his subcontractors who acts in a disorderly or intemperate manner, or who is abusive to representatives of the Owner or of the Engineer or of any Agency having jurisdiction over the project, or who acts in such a manner as would endanger the safety of any person or of the work, all of which acts could give cause for concern for the safety of any person or of the work, for which safety the Contractor is solely responsible.

27. GUARANTY

27.1 Neither the final certificate of payment, nor any provision of the Contract Documents, nor partial or entire occupancy and/or use of the work by the Owner,

shall constitute an acceptance of work not done in accordance with the Contract Documents or relieve the Contractor of liability in respect to any express warranties or responsibility for faulty materials or workmanship. The Contractor shall remedy any defects in the work which shall appear within a period of one year from the date of final acceptance of the work, and shall pay for damages to other work, facilities, persons, or property resulting from such defects. Equipment items replaced under the one year warranty period shall carry a new one year warranty beginning on the date of acceptance of the associated corrective work.

27.2 The Performance Bond shall remain in full force and effect during the guaranty period, and the Surety shall be liable for the correction of any faults and/or defects that may have appeared within the guaranty period and have not been corrected by the Contractor.

28. MATERIALS AND EQUIPMENT

28.1 The materials and equipment incorporated and/or installed in the work shall be of good quality and shall meet the requirements of the Contract Documents. All materials and equipment shall be subject to review by the Engineer, and no materials and equipment shall be ordered until information relating to such materials and equipment has been reviewed by the Engineer. The Contractor shall be responsible for furnishing and installing all materials and equipment required for the complete work, and all materials and equipment so furnished and installed shall be guaranteed by the Contractor in accordance with the provisions of Article 27.

28.2 It is essential that all material, manufactured articles and equipment be applied, installed, erected, connected, cleaned, conditioned for use and placed in service in accordance with the instructions of the particular manufacturer of such materials, articles and equipment.

28.3 Only those manufactured and fabricated items fully complying with applicable standards of the Occupational Safety and Health Administration may be offered, and the manufacturer's or fabricator's certificate to that effect will be required with the submittal of each item by the Contractor.

28.4 Items of equipment, articles or materials which are not equal to samples reviewed by the Engineer, do not conform to the requirements of the Specifications or the requirements of applicable standards, or are in any way unsatisfactory or unsuitable for the purpose or service for which they are intended, shall neither be furnished nor installed.

28.5 In order to establish standards of quality, the detailed Specifications, or the Plans, include references to certain products by name or by name and catalog number. This procedure is not to be construed as eliminating from competition other products of equivalent or better quality as manufactured by other companies, unless specifically stated that no other manufacturers will be acceptable. Materials or articles which, according to the judgment of the Engineer, will fully meet the design criteria, are equivalent in function and durability, and are suitable for use in arrangement as shown on the Plans, may be acceptable.

28.6 It must be understood that equipment and articles of different manufacturer, although they may be equivalent in construction, quality, durability and performance, may not have the same dimensions, configurations and arrangement of connections. It then becomes the responsibility of the Contractor to take into consideration any variations in dimensions and connection arrangement of the equipment or articles that he proposes to offer from those of equipment shown on the Drawings, or called for in the Specifications, and make certain that the proposed equipment or article can be installed in a neat and efficient arrangement in the space available. In the layout of the equipment and connections thereto, accessibility for proper maintenance is a requirement in order to ensure satisfactory operation.

28.7 Substitution of equipment, articles or materials other than those shown on the Plans or specifically named in the Specifications, when requested by the Contractor, will be considered, provided that the design and construction of such equipment, articles or materials indicate that they will meet the requirements of these Specifications. All substitution requests shall be accompanied by a fully completed CSI form 13.1A. By tender of a request for a substitution, the Contractor implies that he has fully investigated and analyzed the product, and that he guarantees that the product will fully meet the design criteria of the product specified, has the durability and life expectancy of the product specified, is equivalent in function and performance to the product specified, and is suitable for installation in efficient arrangement in the space shown on the plans. The Engineer will review the proposed substitutions and make his recommendations within a timely manner as defined below. The Contractor shall abide by the Engineer's decision when proposed substitute equipment, articles or materials are not recommended for installation and, in such case, shall furnish the specified article, item of equipment or material. The decision of the Engineer to accept the substitute product shall not relieve the Contractor of his guarantee as set forth hereinabove, and such guarantee shall be furnished before the equipment is ordered.

28.8 In order to be considered by the Engineer, any request by the Contractor for substitution of products must be made in a timely manner. By "timely" it is meant that any such requests should be made as early after the commencement of the project as is possible so that sufficient time will be allowed for: review by the Engineer along with review of other submittals in connection with the project; in case of rejection of the submittal, preparation of succeeding submittals covering other substitute products; reviews of the succeeding submittals; ordering and manufacture of an acceptable product; delivery of product to job site well in advance of the time that it is scheduled to be installed.

29. SHOP DRAWINGS AND PRODUCT DATA

29.1 Shop drawings are drawings, diagrams and other data prepared for the work by the Contractor, subcontractor, or supplier to illustrate some portion of the work. Product data are illustrations, schedules, charts, brochures, instructions or other information furnished by the Contractor, subcontractor, or supplier to illustrate materials or equipment for some portion of the work. Shop drawings and product

data are submitted to demonstrate how the Contractor proposes to conform to the information given in the Contract Documents.

29.2 The Contractor shall provide all shop drawings and product data as may be necessary for the proper and satisfactory prosecution of the work, all in accordance with the intent of the Contract Documents to secure a complete and operable project capable of satisfactory performance of the service intended. The shop drawings and product data shall be submitted in accordance with an orderly schedule based upon time required for fabrication or manufacture and delivery, and upon time at which materials, fabricated items, or manufactured items will be required to be incorporated in the work. The Contractor shall perform no portion of the work requiring submittal and review of shop drawings and product data prior to receipt of the Engineer's approval. Ordering material or equipment by the Contractor prior to receipt of concurrence from the Engineer will be fully at the Contractor's risk, even if the materials or equipment ordered are identical to the items listed in the specifications or shown or the drawings. No consideration will be made for reimbursement to the contractor for restocking fees, purchase costs, delivery costs, or any other expenses caused by the Contractor's decision to place premature orders for materials or equipment.

29.3 The Engineer’s review of shop drawings is not intended to verify the accuracy and completeness of details such as dimensions and quantities nor to substantiate installation instructions or performance of equipment or systems, all of which remain the responsibility of the Contractor. Deviations from the Contract Documents shall be called to the attention of the Engineer by the Contractor at the time when such shop drawings or product data are first submitted to the Engineer for his consideration. The Engineer's review of any drawings shall not release the Contractor for responsibility for such deviations, or any subsequent deviations not noted by the Contractor or the Engineer.

29.4 Shop drawings and product data submitted for review by the Engineer shall bear the Contractor's certification that he has reviewed, checked, and approved the submittals, that they are in harmony with the requirements of the project and with the provisions of the Contract Documents, and that he has verified all field measurements, construction criteria, materials, catalog numbers, and similar data. The Contractor shall also certify that the work represented by the shop drawings is recommended by the Contractor and that the Contractor's Guaranty will fully apply.

29.5 All shop drawings and product data submitted to the Engineer shall be numbered by the Contractor using a three part numbering methodology. The three part number shall include a submittal number, the specification section number where the submitted item is described, and an indication of whether the information is an initial submittal or a resubmittal.

30. SAMPLES OF MATERIALS

30.1 All samples called for in the Specifications or required by the Engineer shall be furnished by the Contractor and submitted to the Engineer for his review. Samples shall be furnished well in advance of the anticipated time of fabrication or

use of materials represented, and the Engineer shall be allowed reasonable time for consideration of samples submitted.

30.2 When required, samples shall be accompanied by laboratory test reports and/or certified compliance statements indicating that the materials represented conform to the requirements of the Specifications. Sampling and testing of materials shall be performed in accordance with standard methods referred to in the Specifications.

30.3 All samples submitted by the Contractor shall be accompanied by a covering letter indicating that such samples are recommended by the Contractor and that the Contractor's Guaranty will fully apply. All materials, equipment, and workmanship represented by samples accepted for use in the work shall be guaranteed by the Contractor in accordance with the Guaranty provisions of the Contract Documents.

31. PROJECT RECORD DOCUMENTS

31.1 The Contractor shall maintain at the site one record copy of the Contract Documents, approved Shop Drawings, Product Data, Samples and other required submittals. These are to be in good order and marked to record changes made during construction. All site documents shall be delivered to the Engineer for submittal to the Owner at the completion of the work.

32. TEST REPORTS AND CERTIFICATES

32.1 Laboratory test reports on materials proposed to be used in the work shall be furnished by the Contractor in accordance with the provisions of Article 30.

32.2 Certified statements of compliance, where required by the Specifications, shall be furnished by the Contractor.

32.3 Certified mill test reports, where required by the Specifications, shall be furnished by the Contractor.

33. STORAGE OF MATERIALS AND/OR EQUIPMENT

33.1 Materials and/or equipment to be incorporated in the work shall be properly housed or otherwise protected from corrosion and damage so as to ensure the preservation of their finish, quality, and fitness for the work. Where considered necessary to secure proper protection, the materials shall be placed on racks, platforms, or hard clean surfaces not subject to surface drainage. Factory finished items shall be stored above ground, covered, individually sealed, or housed indoors as required. Materials not properly stored, housed and maintained in condition for service as intended will neither be paid for as stored materials nor as materials incorporated in the work.

33.2 Stored materials and equipment shall be located and arranged so as to facilitate observation. Private property shall not be used for storage purposes without the written consent of the owner or lessee of said property. When the Contractor desires to accept delivery of material or equipment which cannot be

accommodated or housed on the site of the work he may, but only with the permission of the Owner, store such material and/or equipment in an insured warehouse. Any agreement for rental of such storage space by the Contractor shall contain a provision that the material and/or equipment thus stored shall not be subject to a lien for payment of storage. The Owner shall be protected against loss of or damage to such stored equipment by the terms and endorsements of the Contractor's insurance policies.

34. LANDS AND RIGHTS-OF-WAY

34.1 The Owner will provide the lands (property, easements and /or rights-of-way) shown on the Drawings, or described in the Specifications, upon which the work under the Contract is to be performed, and which are to be used for access to the work. Any delay in furnishing these lands by the Owner that would prevent the Contractor from beginning the work or continuing the prosecution of the work, may be deemed to be proper cause for adjustment of the Time of Completion of the work or for adjustment of the Contract Amount.

34.2 Any land and access thereto not specifically shown to be furnished by the Owner that may be required for temporary construction facilities or for storage of materials shall be provided by the Contractor with no liability to the Owner. The Contractor shall confine his equipment, apparatus, and storage to such additional areas as he may provide at his own expense.

34.3 The Contractor shall not enter upon private property for any purpose without obtaining permission; and the Contractor shall be responsible for the preservation of all public property, trees, monuments, structures and improvements, along and adjacent to the street and/or right-of-way, and shall use every precaution necessary to prevent damage or injury thereto. The Contractor shall use suitable precautions to prevent damage to pipes, conduits, other underground structures, and utilities. The Contractor shall carefully protect from disturbance or damage all monuments and property marks until an authorized agent has witnessed or otherwise referenced their location; shall not remove such monuments and property marks until authorized to do so; and, in the event that they should be removed, shall replace them in original location when the work in the area has been completed.

35. ACCESS TO THE WORK

35.1 The Engineer and his representatives shall have free access to the work and shall be given full opportunity to observe the work in progress and to examine such records of the Contractor as may have bearing on the proper review and observation of the work. The Contractor shall provide at the site of the work such space as would be reasonably adequate to serve as a field office for representatives of the Engineer and as storage area for their equipment and supplies.

36. OBSERVATION OF THE WORK

36.1 The Engineer will decide questions which may arise as to the quality and acceptability of materials and/or equipment furnished, the quality and acceptability of work performed, interpretations of the Contract Documents, and all questions with respect to the acceptable fulfillment of the Agreement on the part of the Contractor. The Contractor shall abide by these decisions. The duties and responsibilities of the Engineer as set forth herein shall not be extended except through written consent of the Engineer and the Owner.

36.2 All materials and each part or detail of the work shall be subject at all times to observation by the Engineer and the Owner, and the Contractor shall be held strictly to the intent of the Contract Documents in regard to quality of materials, equipment and workmanship, and also in regard to the diligent execution of the Contract. Observations may be made at the site or at the sources of supply, of material whether mill, plant or shop. The Engineer shall be allowed access to all parts of the work and shall be furnished with such information and assistance by the Contractor as is required to make his observations and construction review.

36.3 The Engineer's decision as to the acceptability or adequacy of the work shall be final and binding upon the Contractor. The Contractor agrees to abide by the Engineer's decision relative to the performance of the work.

36.4 All claims made by the Contractor shall be submitted to the Engineer for his decisions. Such decisions shall be final except that, in cases where time and/or financial considerations are involved, the claims shall be submitted to the Owner for his review and shall be subject to the approval of the Owner. Meritorious claims shall be resolved, if possible, by mutual agreement between the Contractor and the Owner.

36.5 During the construction of the work, as defined by the Plans and Specifications therefore, a Field Representative will be assigned to the project. The duties of the Field Representative shall consist of visual review of materials, equipment and construction work for the purpose of ascertaining that the product of the Contractor's work substantially conforms to the Contract Drawings and is in substantial conformance with the reasonable intent of the Specifications for the project. The presence of the Field Representative at the site of the work shall not be relied upon by others as acceptance of the work, nor shall it be so construed as to relieve the Contractor in any way from his obligations and responsibilities under the Contract, the Specifications and the Contract Documents. Review of the construction work by the Field Representative or by the Engineer shall not require either the Engineer or the Field Representative to assume responsibilities for the means and methods of construction nor for safety on the project site, in areas adjacent to the project site, or in other areas affected by the work performed on the project.

37. SCHEDULE OF VALUES & UNIT PRICES

37.1 The Contractor shall, within ten (10) days of receipt of Notice to Proceed, submit a Schedule of Values showing the value assigned to each part of the work, the total of the assigned values of all parts or components being equal to the total Contract

Price. Such breakdown, or division of the work into parts or components according to trades and/or sections of the Specifications shall have the concurrence of the Engineer before being used as the basis for estimating partial payments for work performed under the Contract. No partial payment will be made to the Contractor until an acceptable Schedule of Values is received by the Engineer. The costs shown in the Schedule of Values shall not, however, be considered as fixing a basis for additions to or deductions from the Contract Price, nor shall they be considered as fixing a basis for computing the cost of Extra Work.

37.2 The Schedule of Values shall correlate with the construction categories which make up the Application for Payment and shall be updated and resubmitted when a Change Order or Construction Change Directive is issued which results in a change to the Contract Amount.

37.3 Where unit prices form the basis for payment under the Contract, such unit prices as set forth in the Proposal, when applied to the corresponding quantities of work performed during a given estimate period, shall represent the value of work performed during that estimate period. It shall be understood, however, that the estimated quantities of work shown in the Proposal to be paid for on unit price basis are given for the purposes of determining the approximate value of the work and comparing bids, that the Owner reserves the right to increase or decrease the estimated quantities of work as may be deemed reasonably necessary or desirable by the Owner to complete the work contemplated under this Contract, and that such increase or decrease in the estimated quantities of work shall in no way, neither vitiate this Contract nor give cause for claims or liability for damages.

38. APPLICATIONS FOR PAYMENT

38.1 The Owner shall make monthly progress payment to the Contractor, and such payment shall be based upon a duly certified and approved estimate of the work performed under this Contract during the preceding calendar month, but, to ensure the proper performance of the work under this Contract, the Owner shall retain five percent (5%) of the amount of each estimate until final completion and acceptance of all work covered under this Contract. Such periodic payment shall, however, be subject to the following provisions:

A. That the Contractor or his Superintendent on the work shall have agreed with the representative of the Engineer regarding value of work performed during an estimate period before the estimate is submitted to the Engineer.

B. That the estimate of value of work performed in the month preceding the month during which payment is to be made be submitted to the Engineer by the first day of the calendar month during which payment is to be made.

C. That payment may not be made for work on which satisfactory test reports have not been received before the submittal of the estimate.

D. That payment shall not be made for defective work, or for faulty work not completely corrected before the submittal of the estimate.

E. That if, after fifty percent (50%) of the construction work, including the value of materials and/or equipment stored, has been satisfactorily completed, no additional deductions for retainage will be made from the succeeding periodic payments made to the Contractor after the retainage amount becomes equal to five percent (5%) of one-half of the completed construction value of the project. The intent of this provision is that, at the time when the value of the completed Contract work equals or exceeds fifty percent (50%) of the completed Contract value no additional retainage will be withheld so that the retainage amount shall be equal to two and one-half percent (2½%) of the completed Contract value, and this amount shall be retained until the Contract has been completed and the work has been accepted subject, however, to other provisions of these General Conditions. Should the Contractor fail at any time to maintain satisfactory progress and quality of work, the five percent (5%) retainage will be reinstated until the progress and quality of work is consistent with the Contract Documents.

F. That, following a certification by the Engineer that the work has been substantially completed in accordance with the provisions of the Contract Documents but has not yet been fully completed and accepted, the retainage may be reduced to such an amount as would reasonably cover the cost of correction of minor items of work heretofore found to be faulty and the cost of the work remaining to be done in order to effect the completion of all of the work in full accordance with the provisions of the Contract Documents. The consent of the Surety shall be obtained prior to any reduction in retainage.

38.2 The value of preparatory work done and the value of materials and/or equipment stored in accordance with these Specifications may be taken into consideration in the preparation of estimates, provided that materials stored meet the requirements of the Contract Documents.

38.4 The Contractor agrees that he will indemnify and save the Owner harmless from all claims arising out of the lawful demands of subcontractors, laborers, workmen, mechanics, and suppliers of machinery, parts, equipment, power tools, fuel, materials and other construction items, incurred in the performance of work under this Contract. The Contractor shall, at the Owners request, furnish satisfactory evidence that all obligations of the nature hereinabove described have been paid, discharged, or waived. If the Contractor should fail to do so, then the Owner may, after having served written notice on the Contractor, either directly pay those unpaid bills of which the Owner has received written notice, or withhold from the Contractor's unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is presented that all such liabilities have been fully discharged, whereupon payment to the Contractor shall be resumed in accordance with the terms of this Contract, but, in no event, shall the provisions of this sentence be construed to impress upon the Owner any obligations to either the Contractor or this Surety. In paying any unpaid bills of the Contractor the Owner shall be deemed to be the temporary agent of the Contractor for this specified purpose; and any payment so made by the Owner shall be considered as a payment made under the Contract by the

Owner to the Contractor, and the Owner shall not be liable to the Contractor for any such payments made in good faith.

39. PAYMENT FOR MATERIALS STORED

39.1 Payment for materials and equipment stored shall be subject to the requirements of Articles 28, 29, 30, 32 and 33 of these General Conditions.

39.2 No materials or supplies for the work shall be purchased by the Contractor or by any subcontractor subject to any chattel mortgage, or under a conditional sale contract or other agreement by which an interest is retained by the seller. The Contractor warrants that he has good title to all materials, equipment, and supplies used by him in the work, and that such title is free from all liens, claims or encumbrances.

39.3 Payment for materials stored will be conditioned upon evidence submitted to establish the Contractor's title to materials and/or equipment stored, such as paid invoices, receipts of payment, satisfied purchase agreements, etc. When value of materials stored is allowed to be included in the Contractor's periodic estimates, the materials and/or equipment represented by such value shall become the property of the Owner, and the Contractor shall be responsible for safeguarding and using such materials and/or equipment in accordance with the provisions of the Contract Documents.

40. PAYMENT FOR EXTRA WORK

40.1 Extra Work shall be undertaken and prosecuted in accordance with the provisions of Article 20 of these General Conditions.

40.2 Payment for Extra Work may be made by use of any one of the following methods:

A. Unit prices or combinations of unit prices which formed the basis of the original Contract.

B. A lump sum based upon the Contractor's estimate and accepted by the Owner.

C. Work Performed by the Prime Contractor: Actual cost of performing the work plus fifteen percent (15%) of actual cost to cover supervision, overhead, bond and profit. The Contractor shall submit to the Owner itemized cost sheets showing actual cost of performance of the work. Actual costs are defined as follows:

1. Labor costs, including time of superintendent and foremen while engaged directly on the extra work.

2. Labor Insurance and Workmen's Benefits.

3. Social Security and unemployment contributions.

4. Ownership or rental costs of construction plant and/or equipment used in the actual prosecution of the extra work. Such costs shall not exceed the AED Green Book standard rental rates or rental rates prevailing in the area of the work. Charges for equipment already allocated to the project shall be based upon standard or prevailing monthly rental rates. Daily rates shall be determined by dividing monthly rates by twenty-two (22); and hourly rates shall be determined by dividing monthly rates by one hundred and seventy-six (176). Rental rates or use rates shall not be charged for equipment having a value of less than $50.00 since equipment and tools having values of less than $50.00 are classed as small tools and as such are considered to be part of overhead.

5. Costs of materials and/or equipment entering permanently into the work.

6. Costs of power and consumable supplies for the operation of power equipment where such costs are not included in rental rates or use charges.

D. Work Performed by a Subcontractor for Prime Contractor: The Prime Contractor shall receive five (5%) percent of Subcontractor's costs to defer cost of insurance, supervision, and management. The Subcontractor shall be entitled to actual costs of performing the work plus fifteen percent (15%) of actual cost to cover supervision, overhead, bond and profit. The Prime Contractor shall submit to the Owner itemized cost sheets showing actual cost of performance of the work. Actual costs are defined above in C.1. through C.6.

41. SUBSTANTIAL COMPLETION

41.1 Substantial Completion is the point at which all or a designated portion of the work has been sufficiently completed in accordance with the Contract Documents so the Owner can occupy the work for its intended use.

41.3 When the Contractor considers the work, or a designated portion of the work which the Owners agrees to accept separately, to be substantially complete, the Engineer will observe the work and develop a list of remaining items of work to be finished by the Contractor prior to final acceptance. The Engineer will make repeat inspections when requested and assured by the Contractor that the work has been substantially completed. Following the repeat inspections the Engineer may add to the list of items required for final acceptance. The Engineer will notify the Owner when in the judgement of the Engineer the work, or designated portion thereof, has reached a point of substantial completion. The Owner may then elect to accept the work, or designated portion thereof, as substantially complete.

41.4 Failure of the Contractor or Engineer to include an item on the list of items to be completed for final acceptance does not alter the Contractor's responsibility to complete all work in accordance with the Contract Documents.

42. ACCEPTANCE AND FINAL PAYMENT

42.1 When the Contractor shall have completed all of the work in accordance with the terms of the Contract Documents, he shall certify to the Owner that he has completed all of the work in accordance with the provisions of the Contract Documents. The Contractor shall also prepare and submit to the Owner a Final Request for Payment in an amount which shall be the Contract Amount plus all approved additions, less all approved deductions and less previous payments made.

42.2 The Contractor shall give notice of the completion of the work by advertisement in a newspaper of general circulation in the area in which the work has been performed and said notice shall appear once each week for a period of four (4) consecutive weeks. Proof of publication of said notice shall be furnished by the Contractor to the Owner by affidavit of the publisher of the newspaper, to which affidavit shall be attached a copy of the Notice.

42.3 When the Owner and the Engineer have completed a review of the work and of the request for final payment, and have determined that all of the work has been completed in substantial accordance with the provisions of the Contract Documents, final payment of the amount determined to be due under the Contract will be made to the Contractor, provided that:

A. Any deficiencies in the work noted during the review shall have been satisfactorily corrected.

B. Final acceptance has been achieved.

D. The Contractor shall have submitted an Affidavit of Release of Liens, and Affidavit of Payment of Debts and Claims, both as outlined below; and satisfactory evidence that there are not outstanding claims or demands against the Contractor in any manner connected with the work.

The Affidavit of Release of Liens shall include the following wording:
"The undersigned hereby certifies to the best of his knowledge, information, and belief, the Releases of Waivers of Lien attached hereto include the Contractor, all Subcontractors, all suppliers of materials and equipment, and all performers of work, labor, or services who have or may have liens against any property of the Owner arising in any manner out of the performance of the referenced Contract."

The Affidavit of Payment of Debts and Claims shall include the following wording:
"The undersigned hereby certifies that he has paid in full or has otherwise satisfied all obligations for all materials and equipment furnished, for all work, labor, and service performed, and for all known indebtedness and claims against the Contractor for damages arising in any manner in connection with the performance of the Contract referenced for which the Owner or his property might in any way be held responsible."

42.4 Final Acceptance of the work shall be achieved (1) when all punch list items are accounted for by their completion or correction by the Contractor and acceptance by the Engineer and Owner and, (2) all outstanding warranty items have been satisfactorily addressed.

42.5 Acceptance of the work by the Owner will release the Contractor except as to the conditions of the Performance Bond and the Labor and Material Payment Bond, any legal rights of the Owner, required guaranties, and correction of faulty work after final payment.

42.6 Acceptance of final payment by the Contractor shall be, and shall operate as a release to the Owner of all claims and all liability to the Contractor for all things done or furnished in connection with the work, and for every act and neglect of the Owner and others relating to or arising out of the work. No payments, final or otherwise, shall release the Contractor or his Sureties from any obligations under this Contract or under the Performance and Payment Bonds.

43. TESTS AND INSPECTIONS

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

44. TESTING OF COMPLETED WORK

44.1 After completion of work and before acceptance of the work by the Owner, the Contractor shall perform all tests as required by the Specifications. The cost of all labor, tools, materials and equipment necessary for making the required test, including the initial supply of treatment chemicals from a vendor approved by the Owner, shall be borne by the Contractor. Any work found to be defective, faulty, or otherwise unsatisfactory shall be corrected by the Contractor without additional compensation. All work shall be guaranteed against defects for a period of one year after the acceptance of the work.

45. INCIDENTALS ABSORBED

45.1 All work and material covered by these Specifications, or the drawings illustrating the same, or any work, or material that may be reasonable from the information given upon plans or in the Specifications and that is necessary to complete the work, or any tools, or appliances, or structures that may be constructed by the Contractor for carrying out the work, shall be furnished by the Contractor and the cost of all this material and work shall be included in and absorbed by the prices and amounts mentioned in the Contractor's Proposal.

45.2 The Contractor shall arrange and pay for all water, power, gas, sewer, telephone, cable, or other utility services used in his construction operations. The Contractor

shall also establish and pay for all temporary/permanent utility services for the project until acceptance of the completed work by the Owner.

46. ASSIGNMENT OF CONTRACT

46.1 The Contractor shall not assign his Contract, nor any part thereof, nor any monies due, or to become due hereunder, without prior written consent of the Owner. In case the Contractor, with the consent of the Owner, assigns any or all of any monies 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 monies due or to become due to the Contractor shall be subject to prior valid claims of all persons, firms, and corporations for services rendered or materials supplied for the performance of work under this Contract.

47. ORAL AGREEMENTS

47.1 No oral order, objection, claim or notice given by any party to the others shall affect or modify any of the terms or obligations contained in any of the Contract Documents, and none of the Contract Documents shall be held to be waived or modified by reason of any act whatsoever, other than by a definitely agreed upon waiver or modification thereof in writing, and no evidence of any other waiver or modification shall be introduced in any proceeding.

48. NOTICE AND SERVICE THEREOF

48.1 All notices, demands, requests, instructions, approvals and claims shall be in writing.

48.2 Any notice to or demand upon the Contractor shall be sufficiently given if delivered at the local office of the Contractor, or by personal service upon the representative of the Contractor in local charge of the work, or by depositing in United States mail in a sealed envelope with sufficient postage prepaid, or delivered with charges prepaid to any telegraph company for transmission to the Contractor, addressed to such Contractor at the address stated by the Contractor in the Proposal, or at the local address used by the Contractor during the process of the work (or at such other address as the Contractor may from time to time designate to the owner in writing). Any notice to or demand upon the Owner shall be sufficiently given if delivered to the Owner or deposited in the United States Mail in a sealed, postage prepaid envelope, or delivered with charges prepaid to said Owner or to authorized representatives of the Owner, or to such address as the Owner may subsequently specify in writing to the Contractor for such purposes.

49. SUSPENSION OF WORK

49.1 The Owner shall have the right to suspend the work, wholly or in part, for such periods of time as he may deem necessary, when the prosecution of the work during unsuitable weather or under other conditions adversely affecting the work is considered to be unfavorable to the satisfaction of the provisions of the Contract, or when time is required to allow for the supplying of materials meeting

the requirements of the Contract Documents. The Contractor shall be entitled to adjust the Time of Completion and/or the Contract Amount caused by the suspension unless the suspension, delay or interruption was caused as a result of the performance of the Contractor; or unless an adjustment in the Time of Completion and/or the Contract Amount is made or denied under another provision of the Contract.

50. TERMINATION FOR BREACH

50.1 In the event that any of the provisions of this Contract are violated by the Contractor, or by any of his subcontractors, the Owner may serve written notice upon the Contractor and Surety of its intention to terminate such Contract, such notices to be signed by the Owner and to contain the reasons for such intentions to terminate the Contract. Unless within ten days after serving of such notice upon the Contractor such violation shall cease and arrangements satisfactory to the Owner for the correction of such default be made, the Owner may finally terminate the Contract by giving to the Contractor notice of such termination for the reasons stated in the initial notice. In the event of any such final termination, the Owner shall immediately serve notice thereof upon the Surety and the Surety shall have the right to take over and complete the performance of the Contract, providing, however, that if the Surety does not in good faith commence performance thereof within thirty (30) days from the date of the mailing of such notice to such Surety, the Owner may take over the work and prosecute the same to completion by Contract or otherwise for the account of and at the expense of the Contractor, and the Contractor and his Surety shall be liable to the Owner for any excess cost occasioned thereby, and in such event the Owner may take possession of and utilize in completing the work such materials, appliances, equipment and plant as may be on the site of the work and necessary or useful therefor.

50.2 The Owner may terminate the Contract if the Contractor persistently fails to supply enough properly skilled workers or proper materials; fails to make payment to Subcontractors for materials or labor; persistently disregards laws, ordinances or regulations of a public authority having jurisdiction; or otherwise is guilty of substantial breach of a provision of the Contract Documents.

51. ADDITIONAL OR SUBSTITUTE BONDS

51.1 If, at any time after the execution of the Contract Agreement and the Surety Bonds attached thereto, the Owner should, for justifiable cause, deem the Surety or Sureties then upon the Performance and/or Payment Bonds, to be unsatisfactory, the Contractor shall within five (5) days after notice from the Owner to do so, furnish an acceptable bond (or bonds) in such form as may be satisfactory to the Owner and with such Surety or Sureties as may be satisfactory to the Owner. The premiums on such bond (or bonds) shall be paid for by the Contractor. No further payments to the Contractor shall be deemed to be due until such new and/or additional security for the performance of the work and/or for the payment for labor and materials shall have been furnished in form and amount satisfactory to the Owner.

52. HAZARDOUS MATERIALS

52.1 The term "hazardous materials" shall mean any substances, including but not limited to asbestos, toxic or hazardous waste, PCBs, combustible gases and materials, petroleum or radioactive materials (as each of these is defined in applicable federal statutes) or any other substances under any conditions and in such quantities as would pose a substantial danger to persons or property exposed to such substances at or near the Project site.

52.2 If reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a hazardous material encountered at the site, the Contractor shall, upon recognizing the condition, immediately stop work in the affected area and report the condition to the Owner and Engineer in writing.

52.3 The Contractor is responsible for being aware of and complying with the Asbestos National Emission Standard for Hazardous Air Pollutants (NESHAP). The Contractor shall perform all work activities in accordance with the Asbestos NESHAP regulation and any other applicable federal, state or local codes, laws, and regulations.

53. SCHEDULE OF WORK

53.1 All activities associated with the work requiring partial or complete shutdown of the existing facilities shall be scheduled by the Contractor and approved the Owner. The schedule approved by the Owner must include the exact time and duration of any and all periods of shutdown of the existing facilities.

END OF SECTION

SECTION 01 10 00 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Phased construction.
4. Work by Owner.
5. Work under separate contracts.
6. Future work.
7. Purchase contracts.
8. Owner-furnished products.
9. Contractor-furnished, Owner-installed products.
10. Access to site.
11. Coordination with occupants.
12. Work restrictions.
13. Specification and drawing conventions.
14. Miscellaneous provisions.

1.2 PROJECT INFORMATION

A. Project Identification: Baltzell Gate Lift Station Elimination, Work Order No. 6496

1. Project Location: 149 Baltzell Gate Road, Anniston, AL 36202

B. Owner: Anniston Water Works and Sewer Board

C. Engineer: Clifton Osborne P.E., Anniston Water Works and Sewer Board, 931 Noble Street, Anniston, Alabama 36202, Phone: 256-241-2000

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:

1. The project consists of approximately 630 linear feet of 12" D.I. gravity sewer, including a bored highway crossing and a bored creek crossing.

B. Type of Contract:

1. Project will be constructed under a single prime contract.

a. Baltzell Lift Station Elimination

1.4 WORK BY OWNER

A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.

1.5 ACCESS TO SITE

A. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.

B. Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Limits: Confine construction operations to areas within the Owner's property, easements and/or public right of ways.
2. Driveways, Walkways and Entrances: Keep driveways and entrances serving premises and adjoining property clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

1.6 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

B. On-Site Work Hours: Limit work to normal business working hours of 7:00 a.m. to 5:00 p.m., Monday through Friday, unless otherwise indicated.

1. Weekend Hours: See General Conditions for specific requirements on non-standard work hours.

2. Early Morning Hours: Will be evaluated on a case by case basis.
3. Hours for Utility Shutdowns: Scheduled on an as needed basis
4. Holiday Hours: No regular work activities by the Contractor shall occur on Owner observed Holidays. The following is a list of Owner observed Holidays:

    a. Martin Luther King Day
    b. Good Friday
    c. Memorial Day
    d. Independence Day
    e. Labor Day
    f. Veterans Day
    g. Thanksgiving (2 days)
    h. Christmas (2 days)
    i. New Years Day

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:

1. Notify Engineer not less than two (2) days in advance of proposed utility interruptions.
2. Obtain Engineer's/Owner's written permission before proceeding with utility interruptions.

D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.

1. Notify Engineer not less than two (2) days in advance of proposed disruptive operations.
2. Obtain Engineer's/Owner's written permission before proceeding with disruptive operations.

E. Controlled Substances: Use of tobacco products and other controlled substances on the Project site is not permitted.

1.7 WORK SEQUENCE

A. The Baltzell Lift Station consists of an existing and operational sanitary sewage lift station. This existing facility must remain operational for the full extent of the project or until such time that flow can be diverted to the new gravity sewer. Prior to diverting flow from the existing lift station the following the new gravity sewer shall be installed, successfully tested and complete.

1.8 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 10 00

SECTION 01 22 00 - UNIT PRICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for unit prices.

1.2 DEFINITIONS

A. Unit price is an amount incorporated in the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.3 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.

B. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

C. Measurement and Payment: Methods of measurement and payment using unit prices are as follows:

1. D.I Gravity Sewer Pipe (Installed on Grade): The accepted length of installed pipe is measured along the pipe centerline and shall include manholes installed along the line. Terminal points on the measurements shall be the ends of existing pipe lines to which the new pipe is connected; the center lines of manholes (5 ft. diameter or less); the inside face of any junction box or of manholes with diameters greater than 5 ft.; and the outlet face of headwalls. The depth of cut shall be measured from the invert of the new pipe to the original ground surface. Unless specifically indicated otherwise, pipe installed at a depth of cut equal to the limit of a cut range shall be considered to fall within the shallower cut range. Payment will be made for furnishing and installing the accepted length of pipe using the unit prices in the proposal form. The price shall include compensation for furnishing pipe, trenching, bedding, laying, jointing, testing, backfilling, surface restoration (except pavement replacement), connections to new manholes, cleanup and all appurtenances as required.

2. Bored & Jack Crossings: Each specific crossing indicated for payment will be considered accepted for payment when it has been completed. The acceptable payment length for each crossing is the distance measured along the crossing centerline between the two ends of casing pipe. Payment will be made for each specific crossing using the unit prices in the proposal form. Such payment will be considered compensation for furnishing and installing casing pipe, carrier pipe, supports, vents, bulkheads, and all other miscellaneous items required within the indicated limits of the crossing.
    a. Crossings are unclassified as to the material encountered, therefore the Contractor shall install crossings at the locations indicated, or at other locations approved by the Owner, at no additional cost to the Owner. If the Contractor is unable to complete a crossing at a given location and elects to move to another location (approved by the Owner) no additional compensation will be paid by the Owner for uncompleted crossings or work required to appropriately abandon uncompleted crossings.

3. Precast Concrete Manholes, 48": The accepted payment depth will be the vertical distance from the manhole invert to the top of the cone section (or top of flat concrete cover slab) for each particular diameter of manhole. Payment will be made for the total vertical feet of manhole installed using the unit prices in the proposal form. Such payment will be considered compensation for furnishing and installing all manhole sections, bedding, gaskets, connectors, boots, invert construction, vents, steps, excavation, backfilling, surface restoration (except pavement replacement), testing, and all other miscellaneous appurtenances, except manhole ring and cover, required for installation of the manhole. Payment for manhole ring and cover will be made separately.
4. Precast Concrete Drop Manhole, 48": The accepted payment depth will be the vertical distance from the manhole invert to the top of the cone section (or top of flat concrete cover slab) for each particular diameter of manhole. Payment will be made for the total vertical feet of manhole installed using the unit prices in the proposal form. Such payment will be considered compensation for furnishing and installing all manhole sections, bedding, gaskets, connectors, boots, invert construction, vents, valve box covers, concrete, screw cap, ductile iron fittings, steps, excavation, backfilling, surface restoration (except pavement replacement), testing, and all other miscellaneous appurtenances, except manhole ring and cover, required for installation of the manhole. Payment for manhole ring and cover will be made separately.
5. Manhole Ring & Cover, standard: The number of furnished and installed ring and cover assemblies of particular size and type installed shall be counted for payment. Payment will be made for furnishing and installing each size and type of ring and cover assembly using the unit prices in the proposal form.
6. 48" Manhole Interior Rehabilitation: Payment will be made for each vertical foot of manhole rehabilitation performed. Such payment shall be considered compensation for furnishing and installing surface preparation, mortar coat (if

required), multi-component liner system, finishing, and all other miscellaneous items required.

7. Connections to Existing Sewer System (Gravity Sewer): Each specific connection to the existing system (gravity sewer) indicated for payment will be considered accepted for payment once the connection has been completed. Payment will be made for each specific connection using the lump sum unit prices in the proposal form. Such payment will be considered compensation for furnishing and installing fittings, pipe, pipe boots/seals, concrete encasement, excavating, backfilling, bypass pumping (if required), connection to existing manhole, grout invert installation, and all other miscellaneous items required.
8. Ductile Iron Fittings: The accepted payment weight for ductile iron pipe fittings and appurtenances will be those listed in the manufacturer's data for the particular item installed. When a compact fitting is installed, the weight of the corresponding compact fitting will be used for establishing payment weight; and if a full-bodied fitting is installed, the weight of a full-bodied fitting will be used. Payment will be made for the total weight of fittings using the unit prices in the proposal form. Such payment will be considered compensation for furnishing and installing fittings, bolts, glands, restraining glands, gaskets, concrete braces, or other appurtenances required for the installation of the fitting.
9. Cut, Cap and Brace Existing Sewer Lines: Each specific cut, cap and brace of existing sewer lines indicated for payment will be considered accepted for payment once the disconnection has been completed. Payment will be made for each specific cut, cap, and brace using the unit prices in the proposal form. Such payment will be considered compensation for excavation, partial demolition of the pipe, isolation of the system, disposal of demolished pipe material, concrete pipe filler, concrete braces, and all other miscellaneous items required.
10. Mulching, Seeding and Grass Stabilization: The length of mulching, seeding and grass stabilization shall be measured along the length of pipeline installed. Payment will be made for each linear foot of mulching, seeding and grass stabilization using the unit prices in the proposal form. Such payment will be considered compensation for furnishing and installing all necessary materials, upkeep, maintenance records, and all other miscellaneous items required.
11. Chain Link Fence: Payment will be made for furnishing and installing the accepted length of chain link fence using the unit prices in the proposal form. The price shall include compensation for furnishing, installing, cleanup and all appurtenances as required.
12. Silt Fence: The accepted payment length for silt fence will be based upon the actual length of installed silt fence installed as determined by field measurements. Payment will be made for installing the accepted length of silt fence using the unit prices in the proposal form. Such payment will be considered compensation for furnishing and installing silt fence, excavation, backfill, upkeep, maintenance records, and all other miscellaneous items required.

13. Undercutting Unsuitable Soils and Disposing Off-Site: Acceptable volume of undercut shall be volume required by Engineer for the removal and disposal of unsuitable soils. Payment will be made for each cubic yard of soil removed using the unit price in the proposal form. Such payment will be considered compensation for the excavation and removal of unsuitable soils, disposal and all other miscellaneous items required to complete the work.
14. Backfill Undercut Soils with Crushed Stone to Include Hauling and Compaction: Acceptable volume of backfill with crushed stone shall be volume required by Engineer for the replacement of removed unsuitable soils. Payment will be made for each cubic yard of crushed stone placed and compacted using the unit price in the proposal form. Such payment will be considered compensation for furnishing the crushed stone, placement, compaction, and all other miscellaneous items required to complete the work.

END OF SECTION 01 22 00

SECTION 01 29 00 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.2 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.3 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.

1. Correlate line items in the schedule of values with other required administrative forms and schedules, including the following:

    a. Application for Payment forms with continuation sheets.
    b. Submittal schedule.
    c. Items required to be indicated as separate activities in Contractor's construction schedule.

2. Submit the schedule of values to Engineer in accordance with the General Conditions.

B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the schedule of values:

    a. Project name and location.
    b. Name of Engineer.
    c. Engineer's project number.
    d. Contractor's name and address.
    e. Date of submittal.

2. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:

    a. Related Specification Section or Division.
    b. Description of the Work.
    c. Name of subcontractor.
    d. Name of manufacturer or fabricator.
    e. Name of supplier.
    f. Change Orders (numbers) that affect value.
    g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

        1) Labor.
        2) Materials.
        3) Equipment.

3. Mobilization and Demobilization may be allocated as a line item in the schedule of values for mobilization, demobilization, office overhead, temporary facilities, filed offices, bonds, insurance, permits, and any other fixed costs associated with the execution of the work. The value of the Mobilization and Demobilization line item shall not exceed six percent (6%) of the total base bid. Any fixed cost in excess of this percent value shall be included in other schedule of valve line items. Fifty percent (50%) of the Mobilization and Demobilization line item can be included as work complete on the first application for payment after the Contractor has occupied the site, moved in equipment, and began work. The remaining percentage shall be equally divided over the remaining partial payment applications.

1.4 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as certified by Engineer and paid for by Owner.

    1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

B. Payment Application Times: Progress payments shall be submitted to Engineer by the 1st of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.

    1. Submit draft copy of Application for Payment five business days prior to due date for review by Engineer.

C. Application for Payment Forms: Use forms acceptable to Engineer and Owner for Applications for Payment. Submit forms for approval with initial submittal of schedule of values.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Engineer will return incomplete applications without action.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.

E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

    a. Materials previously stored and included in previous Applications for Payment.
    b. Work completed for this Application utilizing previously stored materials.
    c. Additional materials stored with this Application.
    d. Total materials remaining stored, including materials with this Application.

F. Transmittal: Submit four (4) signed and notarized original copies of each Application for Payment to the Engineer by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of values.
3. Contractor's construction schedule (preliminary if not final).

4. Products list (preliminary if not final).
5. Submittal schedule (preliminary if not final).
6. List of Contractor's staff assignments.
7. List of Contractor's principal consultants.
8. Copies of building permits.
9. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
10. Initial progress report.

H. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

I. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
6. AIA Document G707, "Consent of Surety to Final Payment."
7. Evidence that claims have been settled.
8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 29 00

SECTION 01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Start-up construction schedule.
2. Contractor's construction schedule.
3. Daily construction reports.
4. Material location reports.
5. Field condition reports.
6. Special reports.

1.2 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

1.3 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:

1. PDF electronic file.

B. Start-up construction schedule.

1. Approval of cost-loaded start-up construction schedule will not constitute approval of schedule of values for cost-loaded activities.

C. Start-up Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.

D. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

1. Submit a working electronic copy of schedule, using software indicated, and labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.

E. Daily Construction Reports: Submit at monthly intervals.

F. Field Condition Reports: Submit at time of discovery of differing conditions.

G. Special Reports: Submit at time of unusual event.

H. Qualification Data: For scheduling consultant.

1.4 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

B. Coordinate Contractor's construction schedule with the schedule of values, submittal schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Time Frame: Extend schedule from date established for Notice to Proceed to date of Final Completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

B. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 15 days, unless specifically allowed by Engineer.

2. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
3. Startup and Testing Time: Include not less than 10 days for startup and testing.
4. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Engineer's administrative procedures necessary for certification of Substantial Completion.
5. Punch List and Final Completion: Include not more than 30 days for punch list and final completion.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal Gantt-chart-type, Contractor's construction schedule within 15 days of date established for Notice to Proceed. Base schedule on the start-up construction schedule and additional information received since the start of Project.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in ten (10) percent increments within time bar.

2.3 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.
6. High and low temperatures and general weather conditions, including presence of rain or snow.
7. Accidents.
8. Meetings and significant decisions.
9. Unusual events (refer to special reports).
10. Stoppages, delays, shortages, and losses.
11. Meter readings and similar recordings.
12. Emergency procedures.
13. Orders and requests of authorities having jurisdiction.
14. Change Orders received and implemented.

15. Change Directives received and implemented.
16. Services connected and disconnected.
17. Equipment or system tests and startups.
18. Partial completions and occupancies.
19. Substantial Completions authorized.
20. Weather events

B. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site.

C. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.

B. Distribution: Distribute copies of approved schedule to Engineer, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 01 32 00

SECTION 01 33 00 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

1.2 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Engineer's responsive action. Action submittals are those submittals indicated in individual Specification Sections as action submittals.

B. Informational Submittals: Written and graphic information and physical samples that do not require Engineer's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as informational submittals.

C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.

D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.3 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Engineer's Digital Data Files: Electronic copies of CAD Drawings of the Contract Drawings will be provided by Engineer for Contractor's use in preparing submittals upon request of Contractor.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.

2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

    a. Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Engineer's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Engineer will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 15 days for review of each resubmittal.
4. Sequential Review: Where sequential review of submittals by Engineer's consultants, Owner, or other parties is indicated, allow 15 days for initial review of each submittal.

D. Transmittal: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Engineer will return submittals, without review received from sources other than Contractor.

1. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Engineer on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

E. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.

3. Resubmit submittals until they are marked with approval notation from Engineer's action stamp.

F. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

G. Use for Construction: Use only final submittals that are marked with approval notation from Engineer's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Submit electronic submittals via email as PDF electronic files.

    a. Engineer will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

    a. Manufacturer's catalog cuts.
    b. Manufacturer's product specifications.
    c. Standard color charts.
    d. Statement of compliance with specified referenced standards.
    e. Testing by recognized testing agency.
    f. Application of testing agency labels and seals.
    g. Notation of coordination requirements.
    h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:

    a. Wiring diagrams showing factory-installed wiring.
    b. Printed performance curves.

c. Operational range diagrams.
d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data unless permitted by the Engineer.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

a. Identification of products.
b. Schedules.
c. Compliance with specified standards.
d. Notation of coordination requirements.
e. Notation of dimensions established by field measurement.
f. Relationship and attachment to adjoining construction clearly indicated.
g. Seal and signature of professional engineer if specified.

2. Submit Shop Drawings in the following format:

a. PDF electronic file.

D. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, and telephone number of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.
4. Submit subcontract list in the following format:

a. PDF electronic file.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Engineer.

B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ENGINEER'S ACTION

A. General: Engineer will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: Engineer will review each submittal, make marks to indicate corrections or modifications required, and return it. Engineer will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action as follows:

1. **No Exceptions Taken** – CONTRACTOR may incorporate product(s) or implement work covered by submittal.

2. **Make Corrections** – CONTRACTOR may incorporate product(s) or implement Work covered by submittal, in accordance with ENGINEER's notations.

3. **Amend and Resubmit** – CONTRACTOR may not incorporate product(s) or implement Work covered by submittal until a new submittal is made and returned to the Engineer for review and approval.

4. **Rejected** – Material, equipment or work method does not comply with specification requirements. CONTRACTOR may not incorporate product(s) or implement Work covered by submittal until a new submittal is made and returned to the Engineer for review and approval.

C. Informational Submittals: Engineer will review each submittal and will not return it, or will return it if it does not comply with requirements. Engineer will forward each submittal to appropriate party.

D. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Engineer. Incomplete submittals are not acceptable, will be considered nonresponsive, and will be returned without review.

E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 01 33 00

SECTION 01 73 00 - EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. Installation of the Work.
4. Progress cleaning.
5. Starting and adjusting.
6. Protection of installed construction.
7. Correction of the Work.

1.2 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to the Engineer for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of all underground utilities, mechanical systems, electrical systems, and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
2. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
3. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
4. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of the Contractor, submit a request for information to Engineer.

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Engineer promptly.

B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
3. Inform installers of lines and levels to which they must comply.
4. Check the location, level and plumb, of every major element as the Work progresses.
5. Notify Engineer when deviations from required lines and levels exceed allowable tolerances.
6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Engineer.

3.4 FIELD ENGINEERING

A. Identification: Owner will identify existing benchmarks, control points, and property corners.

B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

1. Do not change or relocate existing benchmarks or control points without prior written approval of Engineer. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Engineer before proceeding.
2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

3.5 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

G. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Engineer.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

a. Utilize containers intended for holding waste materials of type to be stored.

4. Coordinate progress cleaning for joint-use areas where more than one installer has worked.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways.

3.7 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.8 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.9 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.

1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Restore permanent facilities used during construction to their specified condition.

C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 01 73 00

SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final completion procedures.
3. Warranties.
4. Final cleaning.

1.2 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete with request.

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
2. Advise Owner of pending insurance changeover requirements.
3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
5. Prepare and submit Project Record Documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
8. Complete startup testing of systems.
9. Submit test/adjust/balance records.
10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
11. Advise Owner of changeover in heat and other utilities. Changeover of utilities into the Owner’s name shall not occur until, in the judgment of the (Engineer), full beneficial use of the competed work has been achieved.

12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
13. Complete final cleaning requirements, including touchup painting.
14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Engineer, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.3 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."
2. Submit certified copy of Engineer's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Engineer. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report and warranty.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.4 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:

    a. Project name.
    b. Date.
    c. Name of Engineer.
    d. Name of Contractor.
    e. Page number.

4. Submit list of incomplete items in the following format:

    a. PDF electronic file.

1.5 WARRANTIES

A. Submittal Time: Submit written warranties on request of Engineer for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
4. Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide table of contents at beginning of document.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers for cleaning efforts. Final Cleaning of buildings shall be performed by a professional cleaning service experienced in post-construction cleaning efforts.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Remove snow and ice to provide safe access to building.
f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
h. Sweep concrete floors broom clean in unoccupied spaces.
i. Remove labels that are not permanent.

j. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

   1) Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates.

k. Leave Project clean and ready for occupancy.

END OF SECTION 01 77 00

SECTION 01 78 39 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.
4. Miscellaneous record submittals.

1.2 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit 0ne (1) set(s) of marked-up record prints.
2. Number of Copies: Submit copies of record Drawings as follows:

a. Initial Submittal: Submit one paper copy set of marked-up record prints. Engineer will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
b. Final Submittal: Submit one paper copy set of marked-up record prints. Print each Drawing, whether or not changes and additional information were recorded.

B. Record Specifications: Submit one paper copy set of Project's Specifications, including addenda and contract modifications.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings.

1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer,

subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Accurately record information in an acceptable drawing technique.
c. Record data as soon as possible after obtaining it.
d. Record and check the markup before enclosing concealed installations.
e. Cross-reference record prints to corresponding archive photographic documentation.

2. Content: Types of items requiring marking include, but are not limited to, the following:

a. Dimensional changes to Drawings.
b. Revisions to details shown on Drawings.
c. Depths of foundations below first floor.
d. Locations and depths of underground utilities.
e. Revisions to routing of piping and conduits.
f. Revisions to electrical circuitry.
g. Actual equipment locations.
h. Duct size and routing.
i. Locations of concealed internal utilities.
j. Changes made by Change Order or Change Directive.
k. Changes made following Engineer's written orders.
l. Details not on the original Contract Drawings.
m. Field records for variable and concealed conditions.
n. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Utilize personnel proficient at recording graphic information in production of marked-up record prints.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

2.2 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
5. Note related Change Orders on record Drawings where applicable.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and modifications to project record documents as they occur; do not wait until the end of Project.

B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Engineer's reference during normal working hours.

END OF SECTION 01 78 39

SECTION 02 41 19 - SELECTIVE STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.
2. Demolition and removal of selected site elements.
3. Salvage of existing items to be reused or recycled.

1.2 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner.

C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, salvaged, or removed and reinstalled.

1.3 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.4 FIELD CONDITIONS

A. Notify Engineer of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

B. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. If suspected hazardous materials are encountered, do not disturb; immediately notify Engineer and Owner. Hazardous materials will be removed by Owner under a separate contract.

C. Storage or sale of removed items or materials on-site is not permitted.

D. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

PART 2 - PRODUCTS

2.1 PEFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Demolition items shall be as specified herein and as shown on the plans.

C. Review record documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in record documents.

D. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

E. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Engineer.

3.2 UTILITIES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

1. Comply with requirements for existing services/systems interruptions specified in Division 01 Section "Summary."

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of the existing facility.
3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated to be removed.

    a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
    b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
    c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
    d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
    e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
    f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
    g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.

3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Comply with requirements for access and protection specified in Division 01 Section "Temporary Facilities and Controls."

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. Cover and protect furniture, furnishings, and equipment that have not been removed.
5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Division 01 Section "Temporary Facilities and Controls."

C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition.

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.

5. Maintain adequate ventilation when using cutting torches.
6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
9. Dispose of demolished items and materials promptly.

B. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

C. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

3.5 CLOSING ABANDONED FACILITIES

A. Abandoned Sewer Main

1. 12 inch diameter and smaller: Lines 12 inch and smaller shall be plugged at the upper and the lower end and abandoned in place. Grout filling of abandoned sewer main is not required.

2. All pipe to be abandoned shall first be TV'd to determine if any active sewer connections exist.

B. Abandoned Structures

1. Manholes shall be abandoned in place by filling the base of the manhole with low slump concrete to a level of 6" above the crown of the highest incoming line. The remainder of the manhole up to 12" below grade shall be filled with sand. The top/cone section of the manhole shall be removed to a level 4" below finished grade with a minimum of 12" of suitable fill installed to grade.

2. Backfill according to Section 31 20 00 “Earth Moving”.

3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, then remove concrete between saw cuts.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-Approved landfill.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.8 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 02 41 19

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:

1. Footings.
2. Concrete toppings.

1.2 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1. Indicate amounts of mixing water to be withheld for later addition at Project site.

C. Steel Reinforcement Shop Drawings: Details of fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement." Include material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports of concrete reinforcement. Include special reinforcement required for openings through concrete structures.

D. Formwork: Submit the type of system(s) to be used. Design and engineering of formwork are the Contractor's responsibility.

E. Material Certificates for cementitious materials, aggregates and waterstops; signed by manufacturers certifying compliance with requirements.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed concrete Work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

C. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

D. ACI Publications: Comply with ACI 301 (Specifications for Structural Concrete) and ACI 117 (Specifications for Tolerances for Concrete Construction and Materials), unless more stringent provisions are indicated.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle steel reinforcement to prevent bending and damage.

B. Cement: Store in dry, weather-tight, well ventilated storage shed or storage bin.

C. Aggregate: Store to protect against contamination from surface runoff, trash, debris, dirt, site materials, oils, grease, etc. Store coarse aggregate to prevent segregation, and store fine aggregate in bins or compartments.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. PVC Waterstops:

    a. Greenstreak
    b. Approved Equivalent

2. Self Expanding Strip Waterstops:

    a. Superstop; Progress Unlimited Inc.
    b. Approved Equivalent

3. Joint Filler Material:

    a. Sika Chemical Corp.
    b. Grace Construction Products Co.
    c. W.R. Meadows, Inc.
    d. Approved Equivalent

4. Cement Based Sealers:

    a. Thoro Concrete Products (ChemRex)
    b. Approved Equivalent

2.2 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Plywood, metal, or other approved panel materials.
2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1.

B. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation. Maintain true radii so that no irregularities or breakpoints around the circumferences of the circles will be visible.

C. Chamfer Strips: Wood, Metal, PVC, or rubber strips, ¾ by ¾ inch, minimum.

D. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

E. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
2. Furnish ties that, when removed, will not leave holes through the concrete surface.
3. Furnish ties with integral water-barrier plates.

2.3 STEEL REINFORCEMENT

A. Fabricating Reinforcement: Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

2.4 REINFORCEMENT ACCESSORIES

A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

B. Joint Dowel Bars: Plain round stick steel bars, ASTM 675, Grade 80. Bars used in expansion joints shall be ¾" x 24" long fitted with end caps. Cut bars true length with ends square and free of burs.

2.5 WATERSTOPS

A. Flexible PVC Waterstops: CE CRD-C 572, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.
1. Profile: Flat, dumbbell with center bulb for expansion joints, 9" width and ¾" thickness, min.
2. Profile: Ribbed with center bulb for construction joints, 6" width and ¾" thickness, min.

B. Self-Expanding Strip Waterstops: Manufactured rectangular or trapezoidal strip, sodium bentonite or other hydrophylic material for adhesive bonding to concrete.

2.6 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. Fly Ash: 25 percent.
2. Combined Fly Ash and Pozzolan: 25 percent.
3. Ground Granulated Blast-Furnace Slag: 50 percent.
4. Combined Fly Ash or Pozzolan and Ground Granulated Blast-Furnace Slag: 50 percent portland cement minimum, with fly ash or pozzolan not exceeding 25 percent.

C. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water reducing or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

2.7 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type II

1. Fly Ash: ASTM C 618, Class F.

B. Normal-Weight Aggregate: ASTM C 33, uniformly graded, intended for moderate weathering region, but not less than Class 3M, and as follows:

1. Fine Aggregate: Clean, hard, durable, uncoated particles of natural silica or acceptable alluvial sand with the following gradation requirements:

a.	Passing 3/8" Standard Sieve	100 %
b.	Passing #4 Standard Sieve	95 - 100 %
c.	Passing #8 Standard Sieve	80 - 100 %
d.	Passing #16 Standard Sieve	50 - 85 %
e.	Passing #30 Standard Sieve	25 - 60 %
f.	Passing #50 Standard Sieve	10 - 30 %
g.	Passing #100 Standard Sieve	2 - 10 %

2. Coarse Aggregate with the following gradation requirements:

a.	Passing 1 ½" Standard Square Sieve	100 %
b.	Passing 1" Standard Square Sieve	95 - 100 %
c.	Passing ½" Standard Square Sieve	25 - 60 %

d. Passing #4 Standard Square Sieve 0 - 10 %
e. Passing #8 Standard Square Sieve 0 - 5 %

Water: Potable and complying with ASTM C 94.

2.8 ADMIXTURES

A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material and to be compatible with other admixtures and cementitious materials. Do not use admixtures containing calcium chloride.

B. Air-Entraining Admixture: ASTM C 260.

C. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.

D. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E.

E. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.

2.9 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Membrane Curing Compounds: Conform to ASTM C 309 and shall have a minimum of 18% solids, be non-yellowing, and have a unit moisture loss of less than 0.039 gm/cm^2 at 72 hours. Rate of application of curing compounds should follow manufacturer's recommendations or be in the range of 150 to 200 ft^2/gal.

1. Curing compounds for use in water treatment facilities shall be nontoxic, free of taste and odor, and NSF approved.
2. Curing compounds must be suitable for specific applications such as underneath floor treatments etc.

2.10 RELATED MATERIALS

A. Joint Filler Material: Isolation/Expansion Joints

1. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber for non-water bearing applications.
2. Joint-Filler Strips: ASTM D 1752, Type 1, elastic sponge rubber for water bearing applications
3. Backer Rod: Premium grade polyethylene foam or Rescor type filler material.
4. Joint Primer: Recommended by manufacturer of the joint sealant, similar and equivalent to Sikaflex Primer 429.
5. Joint Sealer: Provide non-sag elastomeric, moisture cured sealant (one component, polyurethane base)

B. Bonding Agents: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

C. Epoxy-Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class and grade to suit requirements.

D. Reglets: Fabricate reglets of not less than 0.0217-inch-thick galvanized steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

E. Dovetail Anchor Slots: Hot-dip galvanized steel sheet, not less than 0.0336 inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

F. Cement Based Sealers: Portland cement based coatings to fill and seal concrete pores and voids; to correct surface irregularities; capable of being overcoated with decorative finish

G. Water Based High Build Acrylic Coatings: Refer to Division 9 Section "High Performance Coatings"

H. Reinforced Structural Concrete: Proportion concrete mix as follows:

1. Compressive Strength (28 Days): 4000 psi.
2. Slump: 3 to 5 inches
3. Maximum Slump for Concrete Containing High-Range Water-Reducing Admixture is 8 inches after admixture is added to concrete that had an initial slump of 3 to 5 inches.
4. Maximum W/C (water-to-cementious materials) ratio = 0.45

I. Unreinforced Concrete: Proportion concrete mix as follows:

1. Compressive Strength (28 Days): 3,000 psi.
2. Maximum Slump: 3 to 5 inches

J. Reinforced Masonry Walls:

1. Compressive Strength (28 Days): 3,000 psi.
2. Maximum Slump: 8 inches.
3. Coarse Aggregate: Pea Gravel no greater than ½ inch.

K. Grout

Grout to be used for various purposes and in various locations on the project shall be as specified below.

Place grout with a cement/sand ratio of 1:2 in forms for starting pours or lifts of concrete.

General Construction grout shall be non-shrink, expanding type, and shall have the following characteristics: non-ferrous; non-staining; non-bleeding; high density; and not containing gas-generating agents. The compressive strength at 28 days of grout mix of 50 pounds with 5-3/4 quarts of water shall not be less than 4500 psi (per ASTM C109). The mix shall retain high compressive strength when containing coarse aggregate crushed stone in size range ¼" – 3/8". General construction grout shall be used for closing in box-outs, filing holes in concrete, patching walls, etc.

All prepared grout mixes shall be used in strict accordance with the manufacturer's recommendations. Compressive strength testing of grout cubes may be required if requested by the Engineer.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual to ¼".

D. Construct forms tight enough to prevent loss of concrete mortar or water.

E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5

horizontal to 1 vertical. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.

1. Do not use rust-stained steel form-facing material.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Chamfer exterior corners and edges of permanently exposed concrete.

I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

J. Block or bulkhead openings for pipe to prevent entrance of water.

K. Form openings for gates even and true both horizontally and vertically so that gates can be installed watertight.

L. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

M. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

N. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor bolts, accurately located, to elevation required.
2. Install reglets to receive top edge of foundation sheet waterproofing and to receive through-wall flashing in outer face of concrete frame at exterior walls, where flashing is shown at linlets, shelf angles, and other conditions.
3. Install dovetail anchor slots in concrete structures as indicated.

3.3 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Do not heat, straighten, or re-bend reinforcing steel in a manner that will injure the material.

C. Roll bars to radius per CRSI recommendations. Roll bars if located in critical areas with tight placing tolerances where straight bars sprung in place to fit would not be satisfactory.

D. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials.

E. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

1. Shop- or field-weld reinforcement according to AWS D1.4, only where indicated on plans.

2. Minimum cover requirements for reinforcing steel:

a. Conc. cast against/permanently exposed to earth: 3 inches
b. Conc. exposed to earth/water: 2 inches
c. Conc. slabs and walls not exposed to earth/water: 1 inch
d. Conc. beams/columns not exposed to earth/water: 1.5 inches

F. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

G. Clips, wire ties, spacers, or any material installed to support the reinforcing steel shall not be in contact with the forms in any location.

H. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

I. Contractor must submit plans for alternate splices for review.

3.4 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Engineer.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
2. Form from preformed galvanized steel, plastic keyway-section forms, or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.
3. Avoid locating joints in beams, girders, and joists. If required, locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
5. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
6. Use a bonding agent at locations where fresh concrete is placed against existing concrete surfaces.

C. Dowel Joints: Install dowel sleeves and dowels or slick steel dowel bar and support assemblies at joints where indicated. Use dowel sleeves or lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.5 WATERSTOPS

A. Install all waterstops within 8 months after date of manufacture.

B. Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of the Work. Field fabricate joints in waterstops according to manufacturer's written instructions.

C. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions, adhesive bonding, mechanically fastening, and firmly pressing into place. Install in longest lengths practicable.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, verify that previously placed concrete has attained sufficient strength to bear the weight of new concrete; and that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. All debris, mud and water shall be entirely removed from the forms.

C. Water may be added at the jobsite provided the following conditions are met:

1. The approval of the Engineer is obtained.
2. The maximum slump and water-cementitious ratio is not exceeded after the addition of the water.
3. High-range water-reducing admixtures, if used, are added at the plant and not at the jobsite.
4. The truck can accurately measure the water added.

Add water prior to any concrete being discharged (except that used for slump testing). Turn mixing drum an additional 30 revolutions, minimum. No water may be added to the batch at any later time. Air content and slump shall be checked after the water is added.

D. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation.

E. Deposit concrete in forms in continuous horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Place each layer while preceding layer is still plastic, to avoid cold joints. No more than 30 minutes shall elapse between placement of successive layers.

1. In congested walls, lifts above horizontal construction joints shall be started with the placement of cement/sand grout having the same water-cement ratio as the concrete and a slump of not more than 6". The grout bed shall be approximately 2" thick, and placement of concrete shall be started as soon as the mortar bed has been spread.
2. Consolidate placed concrete with mechanical vibrating equipment. Use equipment and procedures for consolidating concrete recommended by ACI 309R.

F. Placement of concrete in lifts greater than 10 vertical feet shall require prior written approval of the Engineer, unless otherwise shown on the plans.

G. When placing concrete in walls, the concrete shall be deposited in tremies or by other approved methods to prevent segregation and to minimize splatter.

H. When conveying by chutes, the equipment shall be of such size and design as to insure a continuous flow in the chute. The slope shall not be less than 2:1 and shall be such that will prevent segregation of materials. The discharge end of the chute shall not be more than five feet above the surface of the concrete.

I. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Maintain reinforcement in position on chairs during concrete placement.
3. Screed slab surfaces with a straightedge and strike off to correct elevations.
4. Slope surfaces uniformly to drains where required such that no standing water is allowed on the surface.
5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, free of humps or hollows, before excess moisture or bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

J. Concrete in drilled piers shall be placed continuously and in a smooth flow by methods which prevent segregation of ingredients. Temporary casing shall be withdrawn as the concrete is being placed in order to maintain sufficient head of concrete within the casing. The top 5 feet of concrete shall be vibrated after the temporary casing has been withdrawn and dowels/anchor bolts are set.

1. If concrete placement is interrupted, the surface shall be left rough and keyed.
2. If concrete placement is interrupted, the surface shall be doweled as directed by the Engineer.

K. Concrete poured in footing extensions shall be reinforced and shall extend to greater depth than indicated in order to bear on firm ground. Locations around existing footings that have been excavated shall be backfilled with lean concrete.

L. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mix designs.
4. Obtain concurrence of protection measures from the Engineer.

M. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows, when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

N. If completion of the pour is prevented, fit the placed concrete with a keyway.

O. If completion of the pour in prevented for walls or water containing structures, fit the placed concrete with a keyway and waterstop.

P. Prior to resuming concrete placement on the area of the uncompleted pour, the area shall be “green-cut” and coated with a bonding agent as specified.

Q. In the case where concrete pours in beams and columns are terminated prior to completion, the pours shall not be restarted until all concrete placed in the incomplete pour has been removed and until all the reinforcement affected has been cleaned and adjusted to the correct location.

3.7 REMOVING AND REUSING FORMS

A. General: Formwork, for sides of beams, walls, columns, and similar parts of the Work, that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 36 hours after placing concrete provided concrete is hard enough to not be damaged by form-removal operations and provided curing and protection operations are maintained.

B. Leave formwork, for beam soffits, joists, slabs, and other structural elements, that supports weight of concrete in place until the concrete has achieved at least 70 percent of 28-day design compressive strength.

1. Determine compressive strength of in-place concrete by testing representative field- or laboratory-cured test specimens according to ACI 301.

2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

3. Concrete has attained sufficient strength to withstand any live loads that may be imposed by succeeding steps in the construction process.

C. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

D. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by the Engineer.

3.8 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Engineer. Remove and replace concrete that cannot be repaired and patched to Engineer's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than ½ inch in any dimension in solid concrete but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar/grout before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
2. Form tie holes and form bolt holes shall be immediately plugged. Where form ties or form bolts are left in the concrete, such accessories shall be equipped with integral waterstops, and the ends of such accessories shall be equipped with integral waterstops, and the ends of such accessories shall not be closer than one inch (1") to the surface of the concrete. The holes left in each face shall then be primed with a tack coat of grout mixed with an approved accelerator, a stiff mix of mortar with approved accelerator tamped in the holes, and the surfaces finished flush with the concrete surfaces.
3. In cases where a form bolt of approved through-type is used, the hole left by withdrawal of the form bolt shall be sealed by driving a PVC plug (furnished by the manufacturer of the form bolt) to the mid-point of the length of the hole, by coating the interior surfaces of the hole on each side of the plug with a tack coat of grout mixed with an approved accelerator, by

tamping in the hole, on each side of the plug, a stiff mix of mortar with acceptable bonding agent, and by finishing the surfaces of the mortar mix flush with the concrete surfaces.

4. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
5. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Engineer.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks regardless of width, and other objectionable conditions.
2. After concrete has cured at least 14 days, correct high areas by grinding.
3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing. Finish repaired areas to blend into adjacent concrete.
4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of ¼ inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least ¾ inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mix as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding

agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours

E. Perform structural repairs of concrete, subject to Engineer's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Engineer's approval.

3.9 CONCRETE FINISHING

A. Formed Finishes

1. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch in height.

    a. Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, or painting.
    b. Do not apply rubbed finish to smooth-formed finish.

2. Rubbed Finish:

    a. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
    b. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.

3. Applied Finishes:

    a. Cement Based Sealer Finish: Prepare and clean cured concrete surfaces, apply base coat, let set 24 hours, then apply finish coat. When finish coat has set, sponge float to provide uniform texture. Coordinate color selection with Engineer.
    b. Other Coatings: See Division 9 Section “High Performance Coatings”
    c. Maintain all expansion and control joints.

B. Unformed Finishes (Floors and Slabs)

1. General:

    a. Comply with recommendations in ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
    b. Finish concrete surfaces to designed elevations.
    c. Finish concrete surfaces to level below the final finish elevations as correct or suitable for the particular final finish.
    d. No water shall stand on the finished floors or slabs.
    e. Floors shall be sloped to floor drains and/or sumps such that no standing water shall remain.
    f. At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

2. Broom Finish: Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Engineer before application.
3. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes and apply scratch finish to surfaces indicated and to surfaces to receive concrete floor topping or mortar setting beds for ceramic or quarry tile, portland cement terrazzo, and other bonded cementitious floor finishes.
4. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture. Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.
5. Trowel Finish: After applying float finish, apply first trowel finish and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings. Apply a trowel finish to surfaces indicated and to floor and slab surfaces, including steps and stairs, exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system.
6. Trowel and Fine-Broom Finish: Apply a partial trowel finish, stopping after second troweling, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method.

Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.

7. Hardened/Colored Floors:

    a. Apply only after concrete has cured a minimum of 28 days.
    b. Roughly strike off floors at a level 1-1/2" below finished grade.
    c. Slump of base mix shall not exceed 1-1/2".
    d. All laitance shall be brushed off leaving only coarse aggregate, and a bonding agent shall be used.
    e. Place final topping consisting of a 3,500 psi mix, with 1/8" to 3/8" aggregate, to complete monolithic slab.
    f. Prepare and apply hardener/colorer during the finishing operation according to manufacturer's recommendations.

8. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller according to manufacturer's written instructions.

C. Schedule of Concrete Finishes

1. All exposed concrete shall receive a broom finish.
2. Below grade concrete shall be smooth form finished,

3.10 CONCRETE PROTECTION AND CURING

A. General:

1. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with recommendations in ACI 305R for hot-weather protection during curing.
2. Keep concrete poured in walls wet until forms have been removed. Upon removal of the forms, cure the concrete using one or a combination of the specified methods.
3. Concrete finished prior to completion of the project shall be protected from damage by covering with boards and sisal kraft building paper.
4. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
5. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the specified period using one or a combination of the specified methods.

6. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces, by one or a combination of the specified methods.

B. Curing Methods

1. Moisture Curing: Keep surfaces continuously moist for not less than twenty-one days with the following materials:

   a. Water.
   b. Continuous water-fog spray.
   c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than twenty-one days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

   a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
   b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
   c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer recommends for use with floor coverings.

3. Curing Compound: Apply curing compound meeting ASTM Designation C-309 uniformly in continuous operation by power spray or roller according to manufacturer's written instructions or at a uniform rate of approximately 150 to 200 sq. ft. per gallon in accordance with ACI 308. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.11 MISCELLANEUOS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as

specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.

D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel-finish concrete surfaces.

3.12 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions. Defer joint filling until concrete has aged at least six months. Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

C. Install semirigid epoxy joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.13 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage an independent testing and inspecting agency to sample materials, transport cylinders, perform tests, and submit test reports during concrete placement. The Owner will pay all costs associated with initial tests; including compressive strength testing (4 cylinders per sample as described below), slump, air, temperature and unit weight.

B. Contractor shall pay all costs for re-testing, non-destructive testing, and other additional tests required due to questionable or unsatisfactory concrete.

C. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Sampling Frequency:

a. When several intermittent pours are made in separate locations during a single day, one (1) sample shall be taken for each eight (8) cubic yards of concrete placed.
b. When a continuous pour of concrete is made in a single location during a single day, two (2) samples shall be taken for the first twenty-five (25) cubic yards of concrete placed, and one (1) sample shall be taken for each succeeding fifty (50) cubic yards placed, or fraction thereof.
c. There shall be no concrete poured at any location on the project site(s) that is not represented by a sample (cylinder specimens).

2. Compressive Strength Testing:

a. Cast and laboratory cure (ASTM C 31/C 31M) one set of four standard cylinder specimens for each composite sample.
b. Test (ASTM C 39) one (1) laboratory-cured specimen at 7 days and one (1) at 28 days. A third cylinder will be broken at 56 days only if needed, and the fourth cylinder will be considered a spare.
c. The strength of each concrete mix will be considered satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified 28 day compressive strength and no 28 day compressive-strength test value falls below 85 percent of the specified compressive strength.
d. When the 28 day compressive strength of a single cylinder falls below 85 percent of the specified strength, a third cylinder shall be broken at 56 days.
e. When the average 28 day compressive cylinder strength of three (3) consecutive cylinders is less than 85 percent of specified strength, the Contractor shall evaluate operations, provide corrective procedures for protecting, and curing in-place concrete, and additional testing may be required at no cost to the Owner.
f. Test results will be reported in writing to Engineer and Contractor within 48 hours of testing. Reports of compressive-strength tests will contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for 7 day, 28-day and 56 day (if required) tests.
g. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted or required by Engineer (at no cost to Owner) but will not be used as sole basis for approval or rejection of concrete.
h. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Engineer. Testing and inspecting agency

may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Engineer at no cost to the Owner.

3. Slump Testing: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
4. Air Content Testing: ASTM C 231, pressure method, for reinforced concrete; ASTM C 173, volumetric method, for unreinforced concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
5. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.

D. Testing Concrete Watertightness:

1. The basins, tanks, or any structure to contain liquid shall be so constructed that when completed and tested, there shall be no appreciable loss of water and no wet spots, damp spots or visible moisture shall show. **Testing shall not begin until all visible leaks, damp spots, wet spots..etc have been eliminated. Testing shall be successfully completed prior to backfilling or covering walls, elevated slabs..etc., such that all surfaces of the structure may be visually inspected.**
2. Furnish and install all necessary bulkheads over pipe or gate openings and all necessary pipe plugs to permit proper testing of the structures as soon as possible after completion of the concrete work.
3. Fill water containing structure(s) (basins, tanks...etc.) with water to the overflow line or to the maximum operating level if no overflow exists. The duration of each test (and all retests) shall be a minimum of 72 hours. There are two general requirements for each test:

    a. The first requirement is that no leakage, damp spots, wet spots or visible moisture will be accepted. The second requirement is that the water level must be monitored during the test and the loss of water in the structure cannot exceed one tenth of one percent (0.1%) of the volume of water in the structure in a 24 hour period, excluding evaporation.
    b. If either of these requirements is not met at any time during the test, then the defective structure(s) must be emptied and the leakage must be corrected in a manner acceptable to the Engineers at the Contractor’s expense. All repairs must be made by qualified individuals experienced in concrete repair and repair methods must be submitted in writing to the Engineer for review prior to beginning the work.

c. Once the problem(s) have been addressed, the testing must be performed again and both requirements must be met.
d. Substantial leakage requiring extensive repair work, such as multiple damp or wet spots in a single area or wall section, shall be cause for removal and replacement of the structure at the discretion of the Engineer, and at no cost to the Owner.

4. Leakage testing and re-testing shall be included in cost of concrete for payment purposes and full payment will not be made until the concrete has passed leakage tests. This also includes furnishing and installing (temporary or permanent) piping, valves, equipment and other appurtenances required to fill the structures for testing. The Owner will not charge the Contractor for the water required for initial testing. However, the Contractor may, at the Owner's discretion, be charged for the use of water during any retesting.

END OF SECTION 03 30 00

SECTION 03 94 00 - CONCRETE SAWING AND CORING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Concrete Coring

PART 2 - EXECUTION

2.1 EXAMINATION

A. Notify Engineer seven days in advance of dates when areas of sawing or coring concrete and reinforcing bars will be located.

B. Mark areas of concrete for removal.

2.2 PREPARATION

A. Temporary Support and shoring: Provide temporary support of Work to be cut.

B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting or coring operations.

C. Coring Area: Lay out area to be cored using a color that does not conflict with color representing other utilities. Spray marking with a clear coat.

D. Over-cut: All cuts shall be within the perimeter of the area to be removed. Approval for any over-cut shall be given by the Engineer prior to any cutting.

2.3 PERFORMANCE

A. General: Employ skilled workers to perform sawing and coring. Proceed with sawing and coring at the earliest feasible time, and complete without delay.

1. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
2. Avoid existing utilities located in areas to be cut.
3. Excavating and Backfilling: Comply with requirements in applicable

Division 2 Sections where required by cutting operations.

4. Utilities: Locate and turn off all services within the work area.

B. Coring: Core existing construction by using coring methods least likely to damage elements retained or adjoining construction.

1. Drill holes over 1 inch in diameter with a non-impact rotary tool in order to minimize spalling at the exit point.
2. Use diamond-core drill bits of the proper size.
3. Use rotary tools that operate below OSHA noise standards.
4. Use water or a lubricant to cool the drill bits.
5. Hole diameter requirements

a. For Installation of Ductile Iron Pipe:

Pipe Size (nominal inches)	Inside Diameter (inches)
2	4
4	8
6	10
8	12
10	14
12	18
14	20
16	22
18	24
24	30
30	36
36	43
42	49
48	56

6. Sealing:

a. Install a watertight seal between the pipe and the cored hole.
b. Annular space between concrete surface and pipe shall be grouted.

C. Clean-up:

1. Wash or vacuum slurry or tailings generated from coring operations to remove them from the work area. Slurry and tailing shall be disposed of in a location approved by the Engineer.
2. Collect, treat, and dispose of water used in coring operations.
3. Thoroughly clean removal areas of loose concrete, dust, and debris.

PART 3 - EXECUTION – NOT USED

END OF SECTION 03 94 00

SECTION 09 90 00 – MULTI-COMPONENT MANHOLE LINING SYSTEM

PART 1 - GENERAL

1.1 SUMMARY OF WORK

A. This section covers all workmanship, equipment, materials and quality requirements for wastewater structure rehabilitation and lining work. Provide and apply lining materials as specified.

B. WORK AREAS: The work areas will be designated by the Engineer/Owner. The Installer's personnel shall not be permitted in any area other than those expressly designated by the Engineer.

C. COORDINATION: The Installer shall coordinate with the Engineer regarding availability of work areas, completion times, safety, access and other factors that can impact sewer collection operations.

1.3 REFERENCES

Referenced publications found within this specification shall be the latest revision unless otherwise specified; and applicable parts of the referenced publications shall become a part of this specification as if fully included.

A. ASTM
1. ASTM C 920 – Specification for Elastomeric Joint Sealants
2. ASTM D 3960 – Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings
3. ASTM D 4259 – Practice for Abrading Concrete
4. ASTM E 337 – Standard Practice Test Method for Measuring Humidity with a Psychrometer
5. ASTM 4541 – Adhesion
6. ASTM D 412 – Tensile Strength and Elongation
7. ASTM D 2240 – Tear Strength
8. ASTM D 1737 – Hardness
9. ASTM 460 – Taber Abrasion

B. NACE
1. NACE Pub. 6D-173 – A Manual for Painter Safety
2. NACE Pub. TPC2 – Coatings and Linings for Immersion Service
3. NACE Pub. 6F-163 – Surface Preparation of Steel or Concrete Tank Interiors
4. NACE RP0892-92 – Standard Recommended Practice, Lining over Concrete in Immersion Service

5. NACE RP0288-88 – Standard Recommended Practice, Inspection of Linings on Steel and Concrete

C. SSPC
1. SSPC-SP12 (Steel Structures Painting Council) – Surface Preparation and Cleaning of Steel and Other Hard Materials by High and Ultrahigh Pressure Water Pressure Prior to Recoating
2. SSPC-SP13 – Surface Preparation of Concrete
3. SSPC-PA-3 – "A Guide to Safety in Paint Application"

D. Federal Standard Colors: F 595B

E. Federal Standard Colors and International Concrete Restoration Institute: Guideline No. 03732 – Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays

F. The Published Standards of the National Association of Corrosion Engineers

G. OSHA 1915.35 – Standards – 29 CFR – Painting

I. ANSI/ASC Exhaust Systems – Abrasive Blasting Operations – Ventilation and Safe Practice

1.4 SUBMITTALS

A. PRE-APPROVAL SUBMITTALS

1. Products will not be considered by Engineer as an "or-equal" or substitute unless a written request for approval has been submitted by Bidder and has been received by Engineer at least 15 days prior to the date for receipt of Bids. Requests for approval shall include all of the following information:
   a. A cover sheet stating the name of the proposed product and the name of the currently specified product (with applicable specification section number) which the proposed product is requesting to be approved as an "or-equal."
   b. A letter from the Installer stating that the proposed product is in compliance with all aspects of the specifications including all physical properties, thicknesses, dimensions, cure-times, and warranty requirements; and the Installer shall also include with the letter complete references (with current contact

information) showing exactly how many successful installations of the proposed product that the Installer has completed to date.

c. A letter from the Manufacturer stating that the proposed product is in compliance with all aspects of the specifications including all physical properties, thicknesses, dimensions, cure-times, and warranty requirements.

2. The burden of proof of the merit of the proposed item is upon Bidder. Engineer's decision of approval or disapproval of a proposed item will be final. If Engineer approves any such proposed item, such approval will be set forth in an Addendum issued to all prospective Bidders. Bidders shall not rely upon approvals made in any other manner.

B. PROJECT SUBMITTALS

1. Submit the following prior to commencing with any phase of the work covered by this Section:
   a. Manufacturer's current printed recommendations and product data sheets for all coating system products supplied under this section including performance criteria, surface preparation and applications, volatile organic compound (V.O.C.) data, and safety requirements.
   b. Material Safety Data Sheets (MSDS) for any materials brought on-site including all resurfacing system materials, solvents, and abrasive blast media (if applicable).
   c. Storage requirements including temperature, humidity, and ventilation for resurfacing system materials.
   d. Manufacturer's requirements, including application procedures for resurfacing materials shall be in writing and shall be followed in detail. All safety precautions recommended by the Manufacturer shall be strictly adhered to at all times when work is in progress.
   e. Submit daily reports that contain the following information: Substrate conditions, ambient conditions, application procedures, work completed and location thereof.

1.5 QUALITY ASSURANCE

A. Do not use or retain contaminated, outdated, or diluted materials for resurfacing. Do not use materials from previously opened containers.

B. Use only products meeting the design included in this specification and those that are applied by the prior approved Installer. Use products of one manufacturer in any one resurfacing system with compatible materials. Provide same material product for touch-up as for original material.

C. If any requirements of this specification conflict with a referenced standard, the more stringent requirement shall apply.

D. Make available all locations and phases of the work for access by the Engineer or other personnel designated by the Engineer. The Installer shall provide ventilation and egress to safely access the coating work areas for inspection.

E. Conduct work so that the resurfacing system is installed as specified herein and according to manufacturer's recommendation. Inspect work continually to ensure that the resurfacing system is installed as specified herein. The Installer shall inspect the work to determine conformance with the specifications and referenced documents. The Installer shall inform the Engineer of the progress and the quality of the work through daily reports as specified below. Any nonconforming coating system work shall be corrected as specified herein or as recommended by the Manufacturer.

F. The methods of construction shall be in accordance with all requirements of this specification.

G. Employ only tradespeople who have completed at least ten similar projects within the last 2 years using similar materials. This experience shall be strictly limited to lining wastewater structures as specified in this Section with only products approved prior to bid. Lining projects with products not approved for use on this project will not be considered for record of experience.

1.6 DELIVERY AND STORAGE

A. Materials shall be stored in accordance with Manufacturer's recommendations in enclosed structures and shall be protected from weather and adverse temperature conditions. Flammable materials shall be stored in accordance with state and local codes. Materials exceeding storage life recommended by the manufacturer shall be removed from the site.

B. If applicable, store all materials only in area or areas designated by the Engineer solely for this purpose. Confine mixing, thinning, clean-up and associated operations, and storage of materials-related

debris before authorized disposal, to these areas. If material is delivered in buckets or bags, all materials are to be stored on pallets or similar storage/handling skids off the ground in sheltered areas in which the temperature is maintained between 50F and 90F.

C. If applicable, mix all resurfacing materials in an enclosed mixing area designated by the Engineer. This enclosed area must protect the mixing operation and materials from direct sunlight, inclement weather, freezing, or other means of damage or contamination. Protect all other concrete and metallic surfaces and finishes from any spillage of material(s) within the mixing area.

D. Do not use floor drains, dikes or storm drains for disposal of resurfacing system materials.

E. If applicable, the Installer shall take all precautions and implement all measures necessary to avert potential hazards associated with the resurfacing system materials as described on the pertinent Material Safety Data Sheets or container labels.

F. If applicable to manufacturer’s packaging standards, deliver all materials to the job site in their original, unopened containers. Each container shall bear the Manufacturer's name and label.
   1. Labels on all material containers must show the following information:
      a. Name or title of product
      b. Federal Specification Number if applicable
      c. Manufacturer's batch number and date of manufacture
      d. Manufacturer's name
      e. Generic type of material
      f. Application and mixing instructions
      g. Hazardous material identification label
      h. Shelf life date
      i. Storage requirements
   2. All containers shall be clearly marked indicating any personnel safety hazards associated with the use of or exposure to the materials.
   3. All materials shall be handled and stored to prevent damage or loss of label.
   4. Resurfacing material storage and mixing areas shall be designated by the Engineer.
   5. Do not use or retain contaminated, outdated, prematurely opened, diluted materials, or materials which have

1.7 JOB CONDITIONS:

A. Environmental:
   1. Air and Surface Temperatures: If epoxy based products are used, prepare surfaces and apply and cure coatings within air and surface temperature range in accordance with Manufacturer's instructions.
   2. Relative Humidity: If epoxy based products are used, prepare surfaces and apply and cure coatings within relative humidity range in accordance with Manufacturer's instructions.
   3. Precipitation: Do not prepare surfaces or apply coatings in rain, snow, fog, or mist.
   4. Wind: Do not spray coatings if wind velocity causes overspray of the coating materials.

1.8 WARRANTY

A. The supplied lining system shall include a 10-year limited warranty covering both materials AND installation beginning on the date of final acceptance. Both the Manufacturer and the Applicator shall stand behind this warranty for 10 years. For products not already approved, the following must accompany a request for pre-approval:

   1. An affidavit executed under seal by an officer of the Manufacturer and the Installer stating that if their proposed lining system is used on this project; the Manufacturer will warrant the finished, in-place, lining system against infiltration and corrosion for a minimum of 10 years from the installation date.

PART 2 - PRODUCTS

2.1 PRE-APPROVED INSTALLERS

A. Gulf Coast Underground, LLC (Multi-Component Lining System with AnchorShield)
3158 Old Shell Rd.
Mobile, AL 36607

B. Pre-approved Installers and their proposed systems

C. As part of the proof of equality, the Engineer will require at the cost of the Installer, certified test reports from a nationally known, reputable and independent testing laboratory conducting comparative tests as directed by the Engineer between the product specified and the requested substitution.

D. Requests for substitution shall meet all requirements of Section 1.4 Submittals, found in this specification section.

2.2 MATERIALS

A. MULTI-COMPONENT STRESS PANEL LINER SYSTEM

The following list specifies the material property requirements for the multi component stress panel liner system:

1. Modified polymer shall be sprayable, solvent free, two component polymeric, moisture/chemical barrier specifically developed for the corrosive wastewater environment.
2. AnchorShield Mechanical anchoring system shall be imbedded and sprayed into the liner at all Infiltration locations and at the wall/floor termination.

3. Typical Chemical Analysis of Polyurea:

"A" Component	
Viscosity, 77° F, cps., ASTM D-1638	300-400
Physical State	Liquid
Color	Clear to amber
Hygroscopicity	Reacts with water

"B" Component	
Viscosity, 160° F, cps., ASTM D-1638	400-600
Physical State	Liquid
Non-Volatile	100%

Reaction Profile (100 grams, 175° F sample)	
Gel Time, seconds	1-2
Tack Free Time, seconds	15
Cure Time, seconds	30

Processing	
A System / B System, volume ratio	1.00 / 1.00

4. Typical Physical Properties of Polyurea

Tensile Strength (PSI)	ASTM D412	2670
Elongation (%)	ASTM D412	430
100% Modulus	ASTM D412	2200
300 % Modulus	ASTM D412	2600
Tear Strength (PLI)	ASTM D624	280
Hardness (shore D)	ASTM D2240	42D

Flexibility (1/ 8 "Mandrel)	ASTM D522	Pass
Flashpoint (°F)	ASTM D93	>200
Taber Abrasion (mg loss)	ASTM D4060	25

5. Typical Chemical Analysis of Polyurethane Rigid Structure, low viscosity two-component, containing flame retardants.

"A" Component

Viscosity, 77° F, cps., ASTM D-1638	200
Physical State	Liquid
Color	Dark Brown
Hygroscopicity	Reacts with water and evolves CO2 gas

"B" Component

Viscosity, 77° F, cps., ASTM D-1638	600-1000
Physical State	Liquid
Color	Tan
Hygroscopicity	Absorbs water rapidly thus changing ratio

Reaction Profile (100 grams, 77° F sample)

Cream Time, seconds	1-4
Tack Free time, seconds	5-8
Rise Time, seconds	6-10

Processing

A System / B System, volume ratio	1.00 / 1.00

C. OTHER MATERIALS

1. Active infiltration must be stopped prior to application of the multi-component stress panel liner system. The following products are pre-approved to assist in leak stopping:
   a. Injectable Grouts as manufactured by:
      1) Avanti International (acrylamide or hydrophilic)
      2) Alchemy Polymers (acrylamide or hydrophilic)
      3) Pre-approved Equal
   b. Rapid Setting Cements as manufactured by:
      1) Quadex
      2) Strong Seal
      3) Pre-approved Equal

PART 3 – EXECUTION

3.1 SAFETY

1. The Installer's work forces should comply with the provisions outlined in the following documents: SSPC-PA-3 "A Guide to Safety in Paint Application" NACE Pub. "A Manual for Painter Safety"
2. The Installer shall provide personnel with all safety equipment necessary to protect them during any phase of the work. This shall include, but not be limited to safety glasses, goggles, earplugs, hard hats, steel toed work shoes, appropriate personal protective clothing, gloves, and approved escape respirators (where required).
3. No work shall be performed until the appropriate Work Requests and lock-outs are approved by the Engineer/Owner. The Lockout system is a safety procedure to prevent unintended equipment activation.
4. Keep any flammable materials such as cleaning solvents, thinners, or resurfacing materials away from open flames, sparks or temperatures higher than 150F. Drums containing flammable materials will be grounded. No solvent in any quantity shall be allowed inside containment enclosures or permitted confined spaces at any time during resurfacing work.
5. Power tools are to be in good working order to avoid open sparking. No spark producing tools shall be utilized in restricted areas as indicated herein.
6. The Installer shall fireproof all work areas by maintaining a clean work area and having Underwriter's Laboratories approved fire extinguishers on-hand. The Installer shall furnish these fire extinguishers.
7. If applicable, workers doing abrasive blasting or chemical coating operations shall wear a fresh air supplied protective helmet and hood and personal protective clothing acceptable to industry standards and all government regulations.
8. Dispose of rags used for wiping up resurfacing materials, solvents, and thinners by drenching them with water and placing in a metal container with a tight fitting metal cover. Complete this disposal process at the end of each day. Final disposal of these materials is the Installer's responsibility.

3.2 EXAMINATIONS

1. Comply with the Manufacturer's recommendations as to environmental conditions under which materials can be applied.

    A. It is the responsibility of the Installer to inspect and report unacceptable concrete substrate surface conditions to the Engineer prior to the commencement of surface preparation activities.
    B. All specified surface preparation shall be performed in

accordance with the latest version of the SSPC, NACE, ICRI and other standards referenced in this section.

C. Unacceptable concrete surface conditions are defined as the presence of water infiltration/inflow, cracked surfaces or concrete deteriorated to a depth of greater than 1 1/2" or otherwise unable to withstand surface preparation as specified herein.

3.3 MULTI-COMPONENT STRESS PANEL LINING SYSTEM

1. SUBSTRATE PREPARATION REQUIREMENTS

A. Hydro blasting equipment shall remove all corrosion from structure. Final product shall be a cleaned, mostly dry surface ready for liner application. Structures 6' diameter or greater, and those with large flat walls shall use a 40,000 psi hydro-blaster to achieve the desired anchoring profile.

B. After completion of surface preparation, blasting phase, perform the seven point check list, which is the inspection for:
   1. Leaks
   2. Cracks
   3. Holes
   4. Exposed Rebar
   5. Ring and Cover condition
   6. Invert Condition
   7. Inlet and Outlet Pipe Condition

C. After the defects in the structure are identified, repair all leaks with a chemical or hydraulic sealant designed for use in field sealing of ground water. Severe cracks shall be "repaired with a urethane based chemical" sealant. Product to be utilized shall be as approved by owner/engineer prior to installation. Repairs to exposed rebar, defective pipe penetrations or inverts, etc. shall be repaired utilizing non-shrink grout or approved alternative method.

2. APPLICATION REQUIREMENTS

A. The limits of the corrosion protection system shall be all exposed concrete/brick surfaces including walls, tap sections, risers, etc., unless otherwise directed by the owner/engineer.

B. AnchorShield Mechanical anchoring system shall be imbedded and sprayed into the liner at infiltration locations and at the wall/floor termination.

C. Application of multi-component system shall be in strict accordance with manufacturer's recommendation and must be performed by an Installer licensed and trained by the Manufacturer. A permanent identification number and date of work performed shall be affixed to the structure in a readily visible location.

D. Provide final written report to owner/engineer detailing the location, date of report, and description of repair.

3. INSTALLATION OF MULTI-COMPONENT STRESS PANEL LINER SYSTEM

A. Apply Moisture Barrier. This layer of polyurea shall be spray applied to all surfaces to achieve a minimum DFT of 30-100mils

B. Install AnchorShield Mechanical anchoring system where required.

C. Apply Surfacer. This layer of polyurethane rigid structure foam shall be spray applied to all surfaces previously lined with the moisture barrier to achieve a minimum DFT of 300-370mils. Layer thickness may vary depending on the condition of the substrate and the level of deterioration. Mechanical anchoring system shall be embedded in this layer.

D. Apply Final Corrosion Barrier to all surfaces lined with the Surfacing layer. This layer of polyurea shall be spray applied to achieve a minimum DFT of 60-100mils.

E. total multi-component, inert, polymer lining thickness shall be a minimum of 500 mils.

3.6 FIELD QUALITY CONTROL INSPECTION AND TESTING

A. Inspection by the Engineer or others does not limit the Installer's responsibilities for quality control inspection and testing as specified herein or as required by the Manufacturer's instructions. Tests specifically required for epoxy lining systems may not necessarily be applicable to polyureas such as those used in the mulit-component system specified.

B. Perform the quality control procedures listed below in conjunction with the requirements of this Section.

C. Inspect all materials upon receipt to ensure that all are supplied by the Manufacturer.

D. Provide specified storage conditions for the resurfacing system materials (if applicable), solvents, and abrasives.

E. Inspect and record that the "pot life" of resurfacing materials are not exceeded during installation.

F. Verify curing of the resurfacing materials in accordance with the Manufacturer's instructions.

G. Upon full cure, the installed lining system shall be checked by high voltage spark detection in accordance with NACE RP0188-90 to verify a pinhole-free surface. Voltage shall be set at 11,000+ volts. Areas which do not pass the spark detection test shall be corrected at no cost to the Owner and rechecked.

H. Upon completion of the lining system installation the lined area shall be cleaned and prepared to permit close visual inspection by the Engineer or the Engineer's Representative. Any and all deficiencies or defective work (not in compliance with this section or related sections) will be marked for repair or removal/replacement by the Installer at no additional cost to the Owner.

3.7 CLEANUP

A. Upon completion of work, the Installer shall remove surplus materials, equipment, protective coverings, and accumulated rubbish, and thoroughly clean all surfaces and repair any work-related damage. The surrounding surface areas including roadways and all other surfaces shall be restored to their pre-project condition.

END OF SECTION

SECTION 22 13 13 - SANITARY SEWERAGE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes sanitary sewerage piping and specialties outside buildings for the following:

1. Pipelaying
2. Bracing of Pipe and Fittings
3. Pipeline Testing
4. Connections to Existing System

1.2 PROJECT CONDITIONS

A. Site Information: Perform site survey, research public utility records, and verify existing utility locations.

B. Locate existing structures and piping to be closed and abandoned.

C. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Engineer not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Engineer's written permission.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 PIPELAYING

A. Minimum depth of cover for all pipes shall be 3'-0" unless otherwise shown. The Contractor shall excavate the trenches to such depths so as to obtain the cover specified hereinabove or as indicated.

B. Ductile Iron Pipe

1. Installation and joining of ductile iron pipe shall be performed in accordance with the requirements of ANSI/AWWA C600, latest revision, and with the requirements of these Specifications.
2. Ductile iron pipe shall be installed so as to conform to the alignment and grade indicated. If other utilities, pipe, cables, conduits, etc., are encountered they shall be handled as described in these Specifications.
3. Ductile iron pipe shall be laid so that the invert elevations will correspond to those indicated for the particular stations along the pipe line.

    a. The difference in elevation between any two consecutive grade points (elevation control points or stations) shall be uniformly and proportionately distributed between the pipe lengths comprising the section of pipe line between such control points.
    b. The maximum deflection for a particular size and length of pipe shall be in accordance with the manufacturer's recommendations.

4. Proper and suitable tools and appliances for handling of the pipe shall be used.
5. The bottom of the trench shall be prepared as described in these Specifications.
6. Each piece of pipe or fitting shall be cleaned and carefully examined for defect.
7. No defective pipe or fittings shall be used. If a defective piece should be discovered after having been used it shall be removed and replaced with a non-detective piece by the Contractor at the Contractor's expense.
8. The pipe shall be accurately installed to the lines and grades indicated
9. Whenever a length of pipe requires cutting to fit the lines, it shall be done as to leave a smooth end at right angles to the axis of the line; and the Contractor shall not receive extra compensation for this work.
10. Open ends of the unfinished pipe line shall be securely closed when the work is stopped temporarily at night or other times.

3.2 CONNECTIONS TO EXISTING SYSTEM

A. The Contractor shall make all connections to existing mains as indicated and as specified herein.

1. These connections shall be made at such times and in such manner as will keep to a minimum any interruptions of service or inconvenience to users of the system.
2. Connections to the existing system shall only be made after obtaining permission from the Owner specifically for each connection.
3. The Contractor shall be solely responsible for investigating the existing conditions (prior to bid if necessary), determining the requirements, and furnishing and installing all tools, equipment, labor and materials necessary for making the connection(s).

3.3 PIPELINE TESTING

A. The Contractor shall furnish all equipment, labor, materials, and supervision necessary to perform the tests required.

1. The Contractor shall bear the cost of testing, retesting, and any replacement work required (including all materials required).
2. The Contractor is solely responsible for observance of all safety regulations and for the maintenance of safe conditions during all testing work.
3. Should any pipe line, or any section of the line fail to meet the criteria established hereinbelow, all deficiencies shall be corrected and the testing repeated until the specified test results have been achieved.

B. All pipelines shall be tested in accordance with procedures and practices applicable to the various types and kinds of pipe and to the various sizes of pipe. The Contractor is reminded that personnel not experienced in testing procedures and practices, and particularly in air-testing of pipelines, should neither be allowed to conduct the test nor assist in the test procedures.

C. Testing Gravity Sewers

1. As heretofore stated in these Specifications, the Contractor shall prosecute the sewer construction work so as to secure the following:

    a. Sewers uniformly bedded and backfilled.
    b. Sewers having tight joints with gaskets fully compressed and joint openings (exceeding 1/4 inch) completely filled.
    c. Sewers having smooth and uniform interior sections with respect to surfaces, grade, and alignment. Sewers shall have no “humps” or “dips” and absolutely no standing water will be acceptable in the line(s).
    d. Sewer shall be watertight within the allowable limits.

2. The total quantity of infiltration into the sewer (including manholes) shall not exceed 50 gallons per mile of sewer per inch of inside diameter per 24 hours and in no case shall it exceed 2,500 gallons per mile per 24 hours. Regardless of the amount of infiltration leakage which occurs, the Contractor shall repair and correct any and all visible or audible leaks in any section of the sewer, manholes, or appurtenances.
3. In order that final testing of the sewers not be deferred until the sewers are operating under 'wet weather' and high water table conditions, and that surface restoration work can closely follow construction work, the Contractor shall employ the "low-pressure air testing procedure" in order to determine the probable acceptability of the sewers as reasonably watertight conduits (within the limits specified) when operating under 'wet weather' and high water table conditions.
4. Sewers of sizes up to and including 24" in diameter shall be tested by use of one of the following:

a. Low-Pressure Air Test of Vitrified Clay Pipe Lines, ASTM C828, latest revision
b. Standard Practice for Testing Concrete Pipe Sewer Lines by Low-Pressure Air Test Method, ASTM C 924, latest revision
c. Infiltration and Exfiltration Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines, ASTM D969, latest revision

5. The use of Test Practices (a) or (b) shall not preclude acceptance by appropriate water infiltration or exfiltration testing such as Test Practice (c) hereinabove. The infiltration test shall not be used when the elevation of the groundwater table is less than two (2) feet above the top of the pipe throughout the entire length of the test section of the pipeline during the performance of the test.
6. Sewers of sizes 30" and larger will be examined for leaks and/or other interior deficiencies by making a complete interior examination of the pipelines.

    a. All visible leaks and deficiencies shall be repaired, and any and all leaks and other deficiencies appearing after all other leaks and other deficiencies have been repaired shall also be repaired.
    b. If the elevation of the ground water table, at the time of the last visual examination and measurement of leakage should have been less than two (2) feet over the top of the pipe throughout the entire length of the test section, the section shall then be tested for exfiltration by use of the testing practice as set forth in ASTM C 969, latest revision.

7. The "low-pressure air test" shall generally conform to the hereinafter outlined procedure, recommended by the National Clay Pipe Institute for testing sanitary sewers.

    a. Clean pipe to be tested. For small diameter sewers this may be done by "balling" the line, that is, utilizing water pressure for propelling a rubber ball through the sewer; and, in the case of larger diameter sewers, the Contractor may elect to employ interior cleaning crews. A wetted interior pipe surface will be advantageous in securing more consistent results.
    b. Plug all open ends and pipe outlets with suitable test plugs, and brace each plug securely. Brace all plugged fittings and plugged service lines to prevent blow-out of plug.
    c. If the pipe to be tested is subject to external pressure exerted by elevation of ground water table, the elevation of ground water table (with reference to invert of sewer) shall be determined. This may be done by either of the following methods: (1) Insert a pipe probe through backfill to elevation of invert by boring or jetting. Equip top end of probe with a bubbler head. Slowly pass air through bubbler head and probe. Read pressure from air gauge mounted on bubbler head. All base gage pressures specified for the test shall be increased by gage reading. Gage shall be low-pressure, wide range. (2) Install ½ inch diameter pipe through manhole wall at level approximately at

top of sewer; turn down pipe outside of manhole to run to elevation of invert; and cap pipe inside of manhole. This should be done at the time when the manhole is constructed. When the line is to be tested remove cap, clear test pipe with compressed air, and connect clear plastic tube to test pipe. Start flow of water through pipe and tube, and read elevation of water in tube (with reference to invert of pipe). Divide reading by 2.31 and add resulting to invert of pipe). Divide reading by 2.31 and add resulting pressure (in psi) to add base gage pressures specified for the test. After all testing has been completed cap or plug test pipe at manhole wall.

d. Add air slowly to the plugged section of the sewer under test until the internal air pressure has been raised to 4.0 psig base plus any pressure allowance representing external head as determined under 3. hereinabove.
e. After the pre-set pressure (4.0 psig base + allowance) has been obtained, allow at least two minutes for air temperature to stabilize, adding only the amount of air required to maintain the pre-set pressure, then close air supply valve.
f. When the pressure decreased to a gage reading equal to 3.5 psig base + allowance (such gage reading being termed stabilized pressure), start stopwatch. Determine time in seconds marking drop of 1.0 psig of internal air pressure.
g. Refer to the AIR TEST TABLE following this Section to determine minimum permissible pressure holding time in seconds for particular section of sewer being tested.

8. The Contractor shall furnish all labor, supervision, materials and equipment required for air testing of sewers.

9. As stated hereinabove, surface restoration shall closely follow construction work. It follows, therefore, that air testing of completed sections of sewer shall closely follow installation of the sewers in order that surface restoration work might be undertaken.

10. The Contractor shall be responsible for observance of all safety precautions and maintenance of safe conditions during air testing.

    a. These precautions shall include but not be limited to ensuring that personnel not experienced in air testing procedure not be allowed to conduct the air tests and that personnel are not allowed in the manholes at ends of test sections during tests.
    b. Pneumatic plugs shall be seal tested in pipe sections outside of trench before being used to plug sewers; and such test sections shall be internally pressurized to levels adequate to determine sealing efficiency of plugs.
    c. Air supply lines to pneumatic plugs and to sealed section shall be equipped with pressure regulating sets.
    d. Return line from sealed section shall be equipped with pressure gage to monitor pressure rise in sealed section.

AIR TEST TABLES*

MINIMUM HOLDING TIME IN SECONDS
REQUIRED FOR PRESSURE TO DROP FROM 3½ TO 2½ PSIG

PIPE SIZE

LF	4"	6"	8"	10"	12"	15"	18"	21"	24"	27"	30"	33"	36"	39"
25	4	10	18	28	40	62	89	121	158	200	248	299	356	418
50	9	20	35	55	79	124	178	243	317	401	495	599	713	837
75	13	30	53	83	119	186	267	364	475	601	743	898	1020	1105
100	18	40	70	110	158	248	356	485	634	765	851	935		
125	22	50	88	138	198	309	446	595	680					
150	26	59	106	165	238	371	510							
175	31	69	123	193	277	425								
200	35	79	141	220	317									
225	40	89	158	248	340									
250	44	99	176	275										
275	48	109	194	283										
300	53	119	211											
350	62	139	227											
400	70	158												
450	70	170												
500	88													
550	7													
600	106													

NOTE: TO BE USED WHEN TESTING ONE DIAMETER ONLY

*PUBLISHED BY NATIONAL CLAY PIPE INSTITUTE

END OF SECTION 22 13 13

SECTION 31 10 00 - SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Erosion control best management practices (BMP's).
2. Protecting existing trees and vegetation designated to remain.
3. Clearing and grubbing.
4. Topsoil stripping.
5. Demolition of existing above-grade and below-grade site improvements.
6. Disconnecting, capping or sealing, and abandoning site utilities in place.
7. Demolition of existing site utilities.

1.2 DEFINITIONS

A. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

B. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.

C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil and is the zone where plant roots grow.

D. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and indicated on Drawings.

E. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and indicated on the drawings.

F. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.3 MATERIALS OWNERSHIP

A. Anything of value found during the progress of the work, as determined by the Owner, shall become the property of the Owner.

B. Except for anything of value, materials indicated to be stockpiled or materials indicated to remain the Owner's property, cleared materials shall become the Contractor's property, be removed from the site and legally disposed of by the Contractor.

1.4 SUBMITTALS

A. Photographs or videotape, sufficiently detailed, of existing conditions of trees and plantings, adjoining construction, and site improvements that might be misconstrued as damage caused by site clearing.

1. Existing Conditions: Documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.

    a. Use sufficiently detailed photographs or videotape.
    b. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

B. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.5 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from the Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction over the site.

B. Limit of Construction Activity: Unless specifically authorized by the Owner, the Contractor shall confine all construction activity within the boundary of the Project property, adjacent public rights-of-way and prescribed rights-of-way or easements. Work within public rights-of-way is subject to permit. If clearing and grubbing limits are indicated, the Contractor shall confine all construction activity within those limits.

C. Improvements on Adjoining Property: Authority for performing any indicated work on property adjoining the Owner's property shall be obtained by the Owner before award of the Contract.

D. Items to be Salvaged: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.

E. The Contractor shall utilize utility locator services for the Project site before any site clearing work is commenced.

PART 2 - PRODUCTS

2.1 EROSION CONTROL MATERIALS

A. Silt Fence Materials: Silt fences shall consist of a geotextile filter fabric attached to posts by means of adjustable belts or loops or other means that will securely hold the fabric in an upright position. The filter fabric shall be a polymeric fabric formed from a plastic yarn of long-chain synthetic polymer composed of at least 85% by weight of propylene ethylene, amide, ester or vinyledene chloride and shall contain stabilizers and/or inhibitors added to the base plastic to make the filaments resistant to deterioration due to ultraviolet and heat exposure for at least six months. The filter fabric roll shall be a minimum of three feet in width.

1. The filter fabric shall conform to the following physical requirements:

Physical Property	**Test Method**	**Test Results**
Grab Tensile Strength, lbs, min.	ASTM D-4632	120
Grab Elongation, %, max.	ASTM D-4632	40
Mullen Burst Strength, psi, min.	ASTM D-3786	175
Apparent Opening Size, max., U.S. Standard Sieve	ASTM D-4751	30
Flow Rate, max. gal/minute/ft^2	ASTM D-4751	30
UV Resistance, %, min.	ASTM D-4632 ASTM D-4355	70

B. Riprap Materials:

1. Riprap shall be limestone conforming to the requirements of ALDOT Specifications Section 814.01, Class 2 Riprap (unless otherwise specifically shown on Drawings).
2. Riprap bedding, where required, shall consist of gravel or crushed stone ALDOT Size #467. All stone for riprap and bedding, such as shot rock, quarry rock, quarry waste or other materials, shall be sound, durable, and free from seams, cracks or other structural defects.

C. Grouted-In Riprap Materials: Riprap stone to be grouted in place shall be of the same size and placed in the same manner as specified for riprap. Grout for grouted-in riprap shall consist of 1 part hydraulic cement to 3 parts sand, thoroughly mixed with water to produce a thick, creamy consistency.

D. Geotextile Riprap Bedding Materials: The geotextile shall be of nonwoven construction. The geotextile shall be mildew, insect, and rodent resistant and shall be inert to chemicals commonly found in soil.

1. The geotextile shall conform to the physical property requirements listed in the table below:

Physical Property	**Test Method**	**Test Results**
Grab Tensile Strength, lbs, min.	ASTM D-4632	120
Puncture Strength, lbs, min.	ASTM D-4833	70
Grab Elongation, %, max.	ASTM D-4632	50
Mullen Burst Strength, psi, min.	ASTM D-3786	240
Apparent Opening Size, max., U.S. Standard Sieve	ASTM D-4751	70
Flow Rate, max. gal/minute/ft^2	ASTM D-4751	135

2. The geotextile shall be furnished in a protective wrapping which shall protect the fabric from ultraviolet radiation and from abrasion due to shipping and handling. The fabric shall be ultraviolet stabilized.

E. Hay Bale Materials: Hay bales shall be rectangular and may be either hay or straw securely bound with twine or wire. Bales shall contain a minimum of 5 cubic feet of material and shall weigh a minimum of 35 pounds when dry.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Locate and clearly flag trees and vegetation to remain and to be protected. All work shall be performed within the limits shown.

C. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to the Owner.

3.2 EROSION CONTROL BEST MANAGEMENT PRACTICES (BMP's)

A. General:

1. The Contractor shall utilize erosion control best management practices (BMP's) to prevent the discharge of sediment-bearing water runoff or airborne dust from the project site in accordance with all federal, state and local regulations during construction.
2. The Contractor shall be responsible for obtaining an NPDES Permit for stormwater discharge from the construction site(s) for all work described in these Specifications and shown on the Drawings. It shall be the Contractor's responsibility to meet all requirements and obligations of the Permit. The Contractor shall be responsible for all costs associated with making application for the permit and for meeting the requirements of the Permit.
3. The Contractor shall be responsible for the inspection and maintenance of all BMP's in accordance with the requirements of the permitting authority.
4. The Contractor shall ensure that all downslope BMP's are installed and functional before any land disturbing activity is commenced on any portion of the site.
5. The Contractor shall be responsible for the installation and maintenance of additional BMP's if required by field conditions, the Engineer or a permitting authority having jurisdiction over the site.

B. Silt Fence:

1. The installation of silt fences shall be in conformance with the silt fence manufacturer's recommendations. Particular care shall be exercised to ensure that all silt fencing is properly keyed into the earth at the toe.
2. The Contractor shall maintain, clean, repair or replace silt fence as may be required during the construction period. If a line of silt fencing exceeds its capacity to function properly and the need for a back-up fence becomes evident, the Contractor shall install a secondary line of silt fence at the affected area as required and authorized by the Engineer. Failure to maintain a silt fence shall not be cause for the Contractor to claim additional compensation.

C. Riprap:

1. Placement: Riprap shall be placed in accordance with ALDOT Specifications Section 610 for Class 2 riprap. Riprap shall be placed in such a manner as to produce a reasonably well graded mass or rock having the minimum practical percentage of voids. Riprap shall be placed to its full course thickness in one operation, and in such a manner as to avoid displacement of bedding material if bedding is required. The finished riprap shall be free from objectionable pockets of small stones and clusters of larger stones. The dumping of riprap shall be allowed provided that riprap bedding material, if required, is not displaced and that mechanical equipment is used to dress the stones to a reasonably uniform slope.
2. Riprap placed in unauthorized locations without prior approval of the Engineer shall be considered to have been wasted, and, therefore, placed at no cost to the Owner.
3. The Contractor shall maintain all riprap protection until the project is accepted, and any material displaced by any cause prior to acceptance of the project shall be replaced at the Contractor's expense.

D. Grouted-In Riprap:

1. Care shall be exercised during placement to keep fine materials from filling the voids between the stones.
2. After the stones are in place, the voids between them shall be completely filled with grout from bottom to top and the surface swept with a stiff broom.
3. No riprap shall be grouted in freezing weather. In hot, dry weather the grout work shall be protected and kept moist for at least 3 days by the use of saturated burlap.
4. Grouted-in riprap placed in unauthorized locations without prior approval of the Engineer shall be considered to have been wasted, and, therefore, placed at no cost to the Owner.
5. The Contractor shall maintain all grouted-in riprap protection until the project is accepted, and any material damaged or displaced by any cause prior to acceptance of the project shall be replaced at the Contractor's expense.

E. Geotextile Riprap Bedding: The fabric shall be placed in the manner described and in accordance with the manufacturer's recommendations.

1. The surface to receive the geotextile shall be prepared to a smooth condition free of obstructions, depressions and debris.
2. The fabric shall be placed loosely, not in a stretched condition.
3. The riprap shall be carefully placed so that the geotextile is not punctured.
4. The riprap shall completely cover the fabric.
5. The fabric shall be placed on the slopes so as to provide a minimum overlap of 18 inches at seams.

6. The geotextile may be placed with seams either parallel or perpendicular to the direction of the flow. If placed perpendicular to the flow, the upstream or higher panel shall overlap the downstream or lower panel. At the top of the bedding installation the fabric shall be keyed into the ground a minimum of 18 inches.
7. If a cushion layer is required, the bottom toe shall be finished by lapping the fabric back onto the cushion layer and securing with riprap.

F. Hay Bales: Hay bales shall be installed using keyways cut into grade or aggregate fill bedding as required. All hay bales shall be properly oriented and staked. Hay bales shall be removed and properly disposed of when the project area upslope from them has been stabilized.

1. The Contractor is responsible for the periodic checking and maintenance of hay bale installations. Silt trapped by hay bale installations shall be removed and properly disposed of.

G. Rock Check Dams: Rock check dams shall be carefully installed in the drainage ditch. Rock check dams shall be removed and properly disposed of when the project area upslope from them has been stabilized.

1. The Contractor is responsible for the periodic checking and maintenance of rock check dam installations. Silt trapped by rock check dam installations shall be removed and properly disposed of.

H. Sediment Traps: Sediment traps shall be backfilled and any associated granular material removed and properly disposed of when the project area upslope from them has been stabilized.

1. The Contractor is responsible for the periodic checking and maintenance of sediment trap installations. Silt trapped by sediment trap installations shall be removed and properly disposed of.

I. Temporary Sediment Basins: Temporary sediment basins which are installed at locations other than permanent storm water detention basins shall be backfilled and any associated granular material removed and properly disposed of when the project area contributing runoff to them has been stabilized.

1. Permanent storm water detention basins with temporary modifications to their outlet structures may serve as temporary sediment basins. The Contractor shall remove the temporary outlet structure modifications and properly dispose of the associated materials when the project area contributing runoff to the permanent storm water detention basin has been stabilized.
2. The Contractor is responsible for the periodic checking and maintenance of temporary sediment basin installations. Silt trapped by temporary sediment basin installations shall be removed and properly disposed of.

J. After stabilization of the disturbed area has been achieved, the Contractor shall remove and dispose of all temporary BMP's and dress out those areas to the proper line and grade.

3.3 PROTECTION OF DESIGNATED VEGETATION OR INDIVIDUAL TREES

A. The Contractor shall erect and maintain a clearly marked temporary fence around designated areas of the site, the perimeter drip line of groups of trees or the drip line of individual trees designated to remain and be protected.

1. Do not store construction materials, debris, or excavated material within the above-described fenced areas.
2. Do not permit vehicles, equipment, or foot traffic within the above-described fenced areas.
3. Remove temporary fencing around the above-described areas upon substantial completion.

B. Where excavation for new construction is required within areas designated to remain and be protected, the Contractor shall hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to the excavation limits as possible.

1. Cover exposed roots with burlap and water regularly.
2. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.
3. Clean cut limbs which obstruct the work. Minimize limb cutting as much as practicable.
4. Coat cut faces of roots or limbs more than 1-1/2 inches (38 mm) in diameter with an emulsified asphalt or other approved coating formulated for use on damaged plant tissues.
5. Cover exposed roots with wet burlap to prevent roots from drying out. Backfill with soil as soon as possible.

C. Repair or replace trees and vegetation indicated to remain and be protected that are accidentally damaged by construction operations.

1. Replace trees that cannot be repaired and restored to full-growth status, as determined by the Engineer.

3.4 UTILITIES

A. The Contractor will arrange for disconnecting and sealing indicated utilities that serve existing structures before site clearing.

1. Contractor shall coordinate with utility companies to shut off indicated utilities.

2. Contractor shall arrange for utility company to locate, identify, disconnect, and seal or cap off utilities indicated to be removed, or shall receive written permission from utility companies to perform work.

B. Existing Utilities: Do not interrupt utilities serving facilities occupied by the Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify utility companies in accordance with their policies in advance of any proposed utility interruption.
2. Do not proceed with utility interruptions without written permission from the Engineer.

3.5 CLEARING AND GRUBBING

A. Clearing and grubbing shall consist of cutting, removing and disposal of all trees, tree stumps, brush, grass, roots and other organic material within areas to be subject to earthwork and/or occupied by proposed structures or facilities. If clearing and grubbing limits are indicated, those lines shall define the extent of clearing and grubbing activity on the site.

1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated. Contractor shall replace all damaged tees, shrubs, or other vegetation at no cost to the Owner.
2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
3. Completely remove stumps, roots, obstructions, and debris extending to a depth of 18 inches below exposed subgrade.
4. Roots projecting from the walls of excavations shall be either cut or removed to provide a minimum clearance of 3 feet for the outside line of structures.

B. Fill depressions caused by clearing and grubbing operations with fill material in accordance with Division 31 Section “Earth Moving” unless area is designated for further excavation.

3.6 TOPSOIL STRIPPING

A. Strip topsoil to the depths indicated in the geotechnical report or a minimum depth of 6 inches.

1. The stripping layer may include topsoil, muck, trash, debris, grass, weeds, roots and other organic materials.
2. The stripping process should result in a clean subgrade surface free from organic material and ready for earthwork operations.

B. Stockpile topsoil materials in areas which will prevent intermixing with subgrade or fill soils. If topsoil is stockpiled on site, the stockpile locations must be acceptable to the Engineer and the Owner. Stockpile locations shall allow for access for the re-loading and spreading of topsoil.

1. Grade and shape stockpiles to drain surface water.
2. Stockpiles shall be protected from wind erosion by periodic water sprinkling, covering or temporary seeding.
3. Dispose of excess topsoil as specified for waste material disposal.

3.7 DEMOLITION OF EXISTING SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate construction. Break holes in structures as required to prevent collection of groundwater.

B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.

C. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.

3.8 DISPOSAL

A. Disposal: The Contractor shall remove cleared vegetation, surplus soil material, surplus topsoil, demolition debris, and waste materials including trash and dispose of them off of the Owner's property. All disposal shall conform to all applicable federal, state and local regulations.

B. Disposal of Wood Chips: If permitted by the Owner, processed wood chips may be left on the site. The location of wood chip stockpiles or spreading areas shall be as designated by the Owner.

END OF SECTION 31 10 00

SECTION 31 20 00 – EARTH MOVING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes excavation and backfill for structures, pipelines, embankments and other areas.

1.2 DEFINITIONS

A. Backfill: Suitable soil materials used to fill an excavation.

B. Base: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.

C. Base Course: Layer placed between the subgrade and slabs-on-grade, walkways, and pavements.

D. Bedding Course: Layer placed over the excavated subgrade in a trench before laying pipe.

E. Borrow: Suitable soil imported from off-site for use as fill or backfill.

F. Crushed Stone Backfill: Crushed stone, where specified to be used as backfill or a stone cushion for structures shall be crushed stone meeting Alabama Department of Transportation Gradation #57.

G. Drainage Course: Layer supporting slab-on-grade used to minimize capillary flow of pore water.

H. Drainage Fill: Washed, narrowly graded mixture of crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2- inch sieve and 0 to 5 percent passing a No. 8 sieve.

I. Excavation: Removal of material encountered above subgrade elevations.

1. Earth Excavation: Removal of all materials, not including that specified under the "Clearing and Grubbing" and "Rock Excavation" items. Rocks and boulders eight (8) cubic feet or less in volume shall be classified as earth.
2. Rock Excavation: loosening, removing, and disposing of all rock in original bed, in well defined ledges, or in boulder form. Boulders having a volume of eight (8) cubic feet or less shall not be classified as rock. Material that

can be loosened, separated, or ripped by means of heavy duty power tools or excavating equipment shall not be classified as rock.

3. Additional Excavation: Excavation below subgrade elevations as directed by Engineer.
4. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated dimensions without direction by Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be without additional compensation.

J. Fill: Suitable soil materials used to raise existing grades.

K. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and 0 to 5 percent passing a No. 4 sieve.

L. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

M. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

N. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below base, drainage fill, or topsoil materials.

O. Suitable Soils: As defined in the geotechnical report (if applicable), or the following ASTM D 2487 soil classification groups as a minimum; GW, GP, GM, SW, SP, and SM, or a combination of these group symbols; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

P. Unsuitable Soils: As defined in the geotechnical report (if applicable), or the following soil classification groups as a minimum; ASTM D 2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH, and PT, or a combination of these group symbols. Unsuitable soils also include suitable soils not maintained within 2 percent of optimum moisture content at time of compaction.

Q. Utilities include on-site underground pipes, conduits, ducts, and cables.

1.3 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by the Owner and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Owner not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Owner's written permission.
3. Contact utility-locator service for area where Project is located before excavating.
4. All existing underground utilities may not be indicated. Contractor is responsible for locating all underground utilities before beginning excavation.

B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient suitable soil materials are not available from excavations.

B. Structural Backfill:

1. Suitable backfill materials shall be within moisture limits required for compaction; silty-clay, weathered shale or other suitable soil mixtures; and such soils shall not contain rock or stone in sizes greater than ½".
2. Native soils as excavated from the site may be used provided that they satisfy the criteria specified herein. If native soils are unsuitable, then Contractor shall furnish and install suitable soils from off-site at Contractor’s expense.
3. Material for structural and general backfill may be that excavated on the site; but in the event that the excavated material is not in suitable condition at the time when it is required for backfilling purposes, or the quantity of material excavated is not sufficient to make the finished fills indicated, the Contractor shall provide, at his own expense, such additional suitable material as is required.
4. If paved areas (or areas to be paved) abut structures, then backfill material under these areas shall be crushed stone.
5. Contractor is responsible for removing and disposing of unsuitable materials off-site, unless otherwise specifically shown to be disposed of on-site.

C. Embankment and Fill Work:

1. The material used in embankments and fills shall be free from frost, stumps, trees, roots, sod, muck or debris of any kind.

2. Only materials as specified herein and/or approved by the geotechnical engineer shall be used.
3. Fill and embankment materials shall not be placed on frozen ground.
4. Embankment and fill materials shall be provided as follows:

    a. Underneath grass and planted areas: Use suitable soils.
    b. Underneath walks and pavements: Use suitable soils.
    c. Underneath footings, foundations, building slabs, steps and ramps: Use suitable soils, crushed stone, or ALDOT #57 stone or as indicated in the geotechnical report.
    d. Dikes and/or Embankments Intended to Hold Water: Use an impervious fill such as a sandy-clay or clayey sand or as indicated in the geotechnical report.

5. Rock greater than two (2) inches in any dimension shall not be placed in compacted fills for embankments, dikes or earth sections forming the walls of water containing structures (holding ponds, reservoirs, lagoons, etc.) unless all voids are filled with fine material and the complete fill is compacted to a dense mass as specified hereinabove.
6. Rock greater than one (1) cubic foot in volume, or having any dimension greater than one (1) foot, shall not be placed in compacted fills in areas to be occupied by structures, bearing slabs, footings, roadways, walks, etc.

    a. Rock of permissible size deposited in such fills shall be placed in layers not greater than one (1) foot in depth, and such rock layers shall be separated by not less than one (1) foot (compacted thickness) of clay or other acceptable backfill material.
    b. Rock shall not be placed nearer than two (2) feet to the surface of any fill, nor nearer than three (3) feet to the wall or surface of any structures.

7. Rock shall not be placed in fill areas which pipes, conduits, cables, etc., are to be laid, nor shall rock be placed in trench backfill except as described in these Specifications.

D. Utility Trench Bedding and Backfill:

1. Bedding Materials
    a. Where trenches are excavated in soil, bedding material shall be #57 stone to a depth of approximately 4" under barrel of pipe.
    b. Where trenches are excavated in rock, bedding material shall be #57 stone, placed and compacted to a depth of approximately 6" under barrel of pipe.

2. Backfill Materials
    a. Where trenches are excavated in soil, backfill material shall be #57 stone to ½ the depth of the pipe, then the remainder shall be suitable soil placed and compacted as described in these Specifications.

b. #57 stone shall be used in the following locations:
   1) For backfill where trenches are excavated in rock (to a depth of 12 inches above the top of the pipe)
   2) For backfill in trenches cut in paved streets, in paved areas, areas to be paved as part of this Contract or future work, beneath footings, beneath slabs, or as specifically indicated.
   3) For backfill (to a depth of 12" above the highest pipe) in areas of general excavation (where pipe lines are installed and where, because of proximity of several pipe lines, individual trenches cannot be excavated), and in areas where two or more utilities cross.

c. The top foot of depth of all trenches (except under slabs, footings, roads, walks and paved areas, along road shoulders and other areas where crushed stone may be specified or directed to be used) shall be backfilled with soil that can be smoothly dressed to match surface of ground adjoining the edges of the trench, and that will support the vegetation desired for the finished surface and required by the finished grading and grassing requirements.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.

C. Provide erosion control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways in accordance with Division 2 Section “Site Clearing.”

3.2 SITE DRAINAGE

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

2. Install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.
3. The Contractor shall complete all dewatering operations and dispose of the water from the work in a manner that will not cause damage to adjacent properties or environment, nor restrict access to any new or existing facilities. No water shall be drained into work under construction.
4. The Contractor shall keep excavations and work dry until the structures or facilities to be constructed are completed and the Engineer is in agreement with the Contractor to discontinue dewatering operations.

C. Drainage Ditches:

1. New ditches shall be cut and existing ditches shall be cleaned out and extended as required to provide for surface drainage around structures and to divert water away from excavations.
2. New (permanent) ditches:

    a. Flowlines shall be graded as indicated.
    b. The cross-sections of the ditches shall conform to details specified.

3. Temporary ditches:

    a. When temporary ditches have served their purpose, all such ditches shall be filled and finished to conform to existing contours or finished contours.
    b. It shall be the Contractor's responsibility to provide and maintain drainage ditches during the progress of the work.

3.3 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavation to subgrade elevations regardless of the character of surface and subsurface conditions encountered, including rock, soil materials, and obstructions.

1. All excavation for this Project is unclassified.
2. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

B. General Rock Excavation:

1. All rock excavated from the site shall be designated as rock spoil. Rock spoil must be removed and disposed of off-site unless Contractor receives written permission from Engineer to use it for rip rap on-site, or to dispose of it on-site in non-structural fill areas.
2. The permission of the Owner shall be secured before any rock spoil is disposed of on site.

C. The Contractor is reminded that all excavation is under the protective guidelines and requirements of OSHA "Safety and Health Regulation for Construction", as set forth in the Federal Register, latest revision, and all such protections are the responsibility of the Contractor and shall be provided at the Contractor's expense.

3.4 SHEETING, SHORING, AND BRACING

A. Sheeting, shoring, bracing and sloping are methods of excavation, and such methods may vary according to the Contractor's methods of dewatering, excavating and installing the work.

B. All such methods of accomplishing the work are the sole responsibility of the Contractor, in accordance with the OSHA guidelines referred to hereinabove, and the sole responsibility of the Engineer is to review the finished work for compliance with the requirements of the Plans and Specifications.

3.5 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. Extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

1. Earth Excavation for Footings, Foundations, and Floor slabs: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

    a. In the event that, at the elevation indicated, soil over the general area to be occupied by a bearing slab is found to be unsuitable for supporting the design load, the Contractor shall remove such soil and replace it with backfill material (compacted as specified herein), crushed stone, or concrete as concurred with the Engineer.
    b. In the event that, at the elevation indicated, soil over the area to be occupied by footings is found to be unsuitable for supporting the design load, the Contractor shall remove such soil and replace it with backfill material (compacted as specified herein), crushed stone, or concrete as concurred with the Engineer.
    c. Excavations shall not be exposed to rainfall and must be protected to keep dry. Excavations that are exposed to excessive moisture must be re-worked or soil must be replaced at Contractor’s expense.

2. Rock Excavation for footings, foundations, and floor slabs: Where rock is found to be the supporting material for footings, foundations, or floor slab, the Contractor shall reasonably clean the foundation area in order that proper inspection and evaluation of foundation conditions can be made.

a. If unusual conditions such as would be indicated by presence of seams, fissures or voids should be found, the Contractor may be directed to perform additional cleaning work, utilizing air jets, water jets, or other suitable methods.
b. All seams, voids or fissures found shall be filled with crushed stone of gradation suitable for the particular situation encountered.
c. In the event that, when excavation to grade line has been completed, it is found that the footing, foundation or slab would bear partly on soil and partly on rock, the rock shall be excavated to depth of six inches (6") below the gradeline indicated and/or specified herein, and a compacted crushed stone cushion shall be placed on the rock surface before the concrete is poured. The compacted cushion shall be wetted before placement of concrete.

3.6 EXCAVATION FOR UTILITY TRENCHES

A. All trenches for pipe shall be excavated in open cut to such depths as indicated or as required to secure the specified minimum cover over the pipe.

B. Where trenches are excavated in native soil, excavation shall be carried to a depth of approximately 4" under barrel of pipe for placement of the specified bedding material.

C. The trench shall have a uniform cross section and bottom conforming to the grades as indicated.

D. The pipe shall be laid on firmly compacted approved bedding material, and the barrel of the pipe shall have uniform bearing for its full length.

E. Any part of the trench excavation below the grade specified shall be corrected with bedding material placed and compacted in accordance with the requirements of these Specifications.

F. Where unsuitable or unstable material is encountered at the elevation indicated, the Contractor shall excavate below the grade (or elevation) shown and backfill such excavation with bedding or stabilizing material.

G. Boulders and large stones, rock or shale, shall be removed to provide a clearance of at least six (6) inches below all parts of the pipe or fittings and to clear width of at least six (6) inches on each side of all pipe and appurtenances.

H. Where the trench is excavated in rock or shale, the six (6) inch space below the pipe shall be filled with crushed stone firmly compacted in accordance with these Specifications to form a cushion for the pipe.

I. Bell holes of ample dimensions shall be dug to permit joining to be properly made and to insure that the pipe is evenly supported throughout its length rather than on joints or couplings.

3.7 SUBGRADE

A. Notify Engineer when excavations have reached required subgrade.

B. If Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

1. Additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.

C. Proof roll subgrade with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof roll wet or saturated subgrades.

D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Engineer.

3.8 UNAUTHORIZED EXCAVATION

A. In the event that the Contractor should excavate below the grade specified, and excess excavation is not authorized by the Engineer, such excess excavation shall be backfilled to the grade specified and/or indicated with compacted crushed stone or compacted backfill material. All such backfilling of excess excavation shall be done at the Contractor's expense.

B. Fill unauthorized excavations under other construction or utility pipe as directed by Engineer.

3.9 STORAGE OF SOIL MATERIALS

A. Stockpile borrow materials and satisfactory excavated soil materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.
2. Stockpile soil materials in a manner that will not cause damage to adjacent properties or environment, nor obstruct access to any new or existing facilities.
3. Drainage lines shall not be obstructed nor shall natural drainage of the surrounding ground be altered or obstructed.
4. If Contractor mixes suitable and unsuitable soil materials, then Contractor shall furnish and install equivalent amount of suitable materials from off-site at no additional cost to the Owner.

3.10 BACKFILL, EMBANKMENTS, AND FILL WORK

A. General: Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.
2. Surveying locations of underground utilities for record documents.
3. Inspecting and testing underground utilities.
4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring and bracing, and sheeting.
7. Embankments and fills shall not be started without the concurrence of the Engineer.
8. If embankment or fill is to be placed on a surface which slopes more than 4:1, the surface shall be scarified and compacted to provide bond with the new material.
9. Steep slopes may require the existing surface to be benched.
10. Wet ground to be covered by fill shall be drained.

B. Compaction Requirements:

1. Compact soil to not less than the following percentages of maximum dry unit weight according to ASTM D 698:
2. Under structures, building slabs, steps, and pavements, scarify and recompact top 6 inches of existing subgrade and each layer of backfill or fill material at 98 percent.
3. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill material at 95 percent.
4. Under lawn or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill material at 90 percent.
5. Place base course material over subgrade.
6. Compact base courses at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 98 percent of maximum dry unit weight according to ASTM D 1557.
7. Shape base to required crown elevations and cross-slope grades.
8. When thickness of compacted base course is 6 inches or less, place materials in a single layer.
9. When thickness of compacted base course exceeds 6 inches, place materials in equal layers, with no layer more than 6 inches thick or less than 3 inches thick when compacted.

C. Drainage Courses: Under slabs-on-grade, place drainage course on prepared subgrade and as follows:

1. Compact drainage course to required cross sections and thickness to not less than 98 percent of maximum dry unit weight according to ASTM D 698.

2. When compacted thickness of drainage course is 6 inches or less, place materials in a single layer.
3. When compacted thickness of drainage course exceeds 6 inches, place materials in equal layers, with no layer more than 6 inches thick or less than 3 inches thick when compacted.

3.11 STRUCTURAL BACKFILL

A. General:

1. Backfill shall be made around the walls of the structures as indicated; and backfill shall be placed only after the walls have gained sufficient strength to support the load.
2. No rock shall be placed in fill within three (3) feet of the walls of structures.
3. In all fill work the best dirt shall be used as top soil for any planting, sprigging, or sodding that may be required.
4. Backfill material shall be placed within foundation walls, under footings or slabs, under and around piping installed under footing or slabs, under and around piping located in areas of general excavation (where because of proximity of several pipe lines individual trenches could not be excavated) as indicated.
5. All such backfill material for purposes specified hereinabove, whether obtained from suitable on-site soils, crushed stone, or from suitable off-site soils, shall be furnished and placed by the Contractor at the Contractor's expense.
6. The Contractor shall be responsible for maintenance of the backfill; and shall promptly re-work and/or refill any areas where settlement of backfill has occurred.
7. All backfill around structures shall be sloped and graded as indicated or as requested by the Engineer.
8. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
9. Place backfill and fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
10. The surface of each layer shall be kept parallel to the elevation of the finished compacted fill by use of blade graders. In proximity to existing structures, leveling shall be accomplished by use of small spreaders, bulldozers, or hand method.
11. Each layer shall be compacted by use of heavy earth compaction equipment suitable for the particular type of soil/stone.
12. Each layer shall be rolled and compacted to the specified density before the succeeding layer is placed.
13. The final layer shall be brought to elevation of finished compacted fill before topsoil or pavement is placed to conform to the finished contour specified.

3.12 UTILITY TRENCH BACKFILL

A. General:

1. The Contractor shall notify the Engineer prior to backfilling any trench in which pipe has been installed.
2. No extra compensation will be allowed for backfill as specified herein.
3. Trench backfill materials shall be thoroughly compacted by means of pneumatic tampers or mechanical tampers.
4. Each layer of trench backfill shall be carried up to the same level on both sides of the pipe so as to avoid unbalanced loading.
5. Each layer of trench backfill shall be evenly compacted on both sides of pipe before the next layer is placed.
6. Backfill for pipe line trenches shall be placed in 4" layers from the bottom of the trench to a level 12" above the top of the pipe.
7. Backfill above a level 12" above the crown of the pipe shall be placed in layers not exceeding 6" in areas beneath pavement, slabs, footings, etc. and 12" in thickness elsewhere.
8. After the pipe has been covered to elevation three (3) feet above top of pipe, backfilling may be accomplished by use of bulldozer, bucket or other mechanical equipment if carefully performed in a manner suitable to the Engineer.
9. #57 stone backfill shall extend out from either end (or side) of the paved areas, slab or footing and along the trench on a 1:1 slope.

B. Special Trench Conditions: Where the character of the soil is such that the employment of proper and adequate drainage of the work will not enable the Contractor to secure a suitable bed for the pipe, the Engineer may request the Contractor to excavate below the specified bedding depth, and backfill the excess excavation with #57 stone. Backfill throughout remainder of trench depth shall be as specified.

3.13 MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air-dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.14 GRADING

A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

B. Provide a smooth transition between adjacent existing grades and new grades. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

C. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations

3.15 FIELD QUALITY CONTROL

A. Testing Agency: Owner will select a qualified independent geotechnical engineering testing agency to perform field quality-control testing.

1. The cost of initial sampling and testing shall be bourne by the Owner.
2. Subsequent re-testing of any samples or locations failing the initial test shall be performed at the expense of the Contractor.

B. Allow testing agency to inspect and test subgrades and to test each lift of fill or backfill as frequently as recommended by the geotechnical engineer, or as recommended by Engineer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements. Contractor shall be responsible for scheduling testing at the required intervals as work progresses.

C. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable.

D. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.16 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and re-establish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions. Scarify or remove and replace soil material to depth as directed by Engineer; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

3.17 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: The Contractor shall remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off of Owner's property.

B. The Contractor shall make all necessary arrangements for disposal areas, and pay all costs incidental to securing permission for their use and shall dispose of all surplus material without cost to the Owner, other than as reflected in the prices bid.

END OF SECTION 31 20 00

SECTION 31 23 19 - DEWATERING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes construction dewatering.

1.2 PERFORMANCE REQUIREMENTS

A. Dewatering Performance: Design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of ground water and permit excavation and construction to proceed on dry, stable subgrades.

1. Delegated Design: Design dewatering system, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
2. Continuously monitor and maintain dewatering operations to ensure erosion control, stability of excavations and constructed slopes, that excavation does not flood, and that damage to subgrades and permanent structures is prevented.
3. Prevent surface water from entering excavations by grading, dikes, or other means.
4. Accomplish dewatering without damaging existing buildings, structures, and site improvements adjacent to excavation.
5. Remove dewatering system when no longer required for construction.

1.3 ACTION SUBMITTALS

A. Shop Drawings: For dewatering system. Show arrangement, locations, and details of wells and well points; locations of risers, headers, filters, pumps, power units, and discharge lines; and means of discharge, control of sediment, and disposal of water.

1. Include a written plan for dewatering operations including control procedures to be adopted if dewatering problems arise.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning dewatering. Comply with hauling and disposal regulations of authorities having jurisdiction.

1.5 PROJECT CONDITIONS

A. Project-Site Information: A geotechnical report has been prepared for this Project and is available for information only. The opinions expressed in this report are those of geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by geotechnical engineer. Owner will not be responsible for interpretations or conclusions drawn from this data.

1. Make additional test borings and conduct other exploratory operations necessary for dewatering.
2. The geotechnical report is included elsewhere in the Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by dewatering operations.

1. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding site and surrounding area.
2. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

B. Install dewatering system to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

C. Provide temporary grading to facilitate dewatering and control of surface water.

D. Monitor dewatering systems continuously.

E. Promptly repair damages to adjacent facilities caused by dewatering.

F. Protect and maintain temporary erosion and sedimentation controls, which are specified in Division 31 Section "Site Clearing" during dewatering operations.

3.2 INSTALLATION

A. Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls.

1. Space well points or wells at intervals required to provide sufficient dewatering.
2. Use filters or other means to prevent pumping of fine sands or silts from the subsurface.

B. Before excavating below ground-water level, place system into operation to lower water to specified levels. Operate system continuously until drains, sewers, and structures have been constructed and fill materials have been placed or until dewatering is no longer required.

C. Provide an adequate system to lower and control ground water to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Install sufficient dewatering equipment to drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.

1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.

D. Reduce hydrostatic head in water-bearing strata below subgrade elevations of foundations, drains, sewers, and other excavations.

E. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction or completed. Dispose of water and sediment in a manner that avoids inconvenience to others. Provide sumps, sedimentation tanks, and other flow-control devices as required by authorities having jurisdiction.

F. Provide standby equipment on site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, restore damaged structures and foundation soils at no additional expense to Owner.

1. Remove dewatering system from Project site on completion of dewatering. Plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches below overlying construction.

G. Damages: Promptly repair damages to adjacent facilities caused by dewatering operations.

END OF SECTION 31 23 19

SECTION 32 31 13 – CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes materials and installation methods for chain link fencing and gates. All fencing provided under this project shall be vinyl coated as specified herein.

B. This Section includes the following:

1. Chain-Link Fence Fabric
2. Tension Wire
3. Barbed Wire
4. Chain-Link Fence Materials
5. Colored Chain-Link Fencing
6. Gates
7. Fence Grounding

1.2 DEFINITIONS

A. CLFMI: Chain Link Fence Manufacturers Institute.
B. Zn-5-Al-MM Alloy: Zinc-5 percent aluminum-mischmetal alloy.

1.3 SUBMITTALS

A. Product Data: Material descriptions, construction details, dimensions of individual components and profiles, and finishes for the following:

1. Fence and gate posts, rails, and fittings.
2. Chain-link fabric, reinforcements, and attachments.
3. Barbed wire.
4. Barbed tape.

B. Shop Drawings: Show locations of fence, each gate, posts, rails, and tension wires and details of extended posts, extension arms, gate swing, or other operation, hardware, and accessories. Indicate materials, dimensions, sizes, weights, and finishes of components. Include plans, elevations, sections, gate swing and other required installation and operational clearances, and details of post anchorage and attachment and bracing.

C. Maintenance Data: For the following to include in maintenance manuals specified in Division 1:

1. Polymer finishes.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed chain-link fences and gates similar in material, design, and extent to those indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Source Limitations for Chain-Link Fences and Gates: Obtain each color, grade, finish, type, and variety of component for chain-link fences and gates from one source with resources to provide chain-link fences and gates of consistent quality in appearance and physical properties.

1.5 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Do not proceed with utility interruptions without Owner's Representative written permission.

B. Field Measurements: Before commencing installation, verify layout information for chain-link fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

PART 2 - PRODUCTS

2.1 GENERAL

A. The Contractor shall furnish and erect fencing in locations indicated.

1. The fencing shall stand 7'-0" high when erected.
2. The 7'-0" height shall include 1'-0" height provided by extension arms and barbed wire.
3. Length of fencing shall be as indicated.

B. Fencing shall be complete with the following:

1. Fabric
2. Line posts
3. Corner and pull posts
4. Bracing

5. Top rails
6. Bottom tension wire
7. Gate posts
8. Truss bars
9. All fittings and accessories

2.2 CHAIN-LINK FENCE FABRIC

A. Fence fabric shall conform to the following requirements:

1. 6'-0" high.
2. Chain-link type.
3. 2" uniform square mesh.
4. Woven from No. 9 steel wire.
5. Helically wound and interwoven in such a manner as to provide a continuous mesh without knots or ties except in form of knuckling or of twisting and barbing the ends of wires to form the selvage of the fabric.
6. Top selvage shall be twisted and barbed. Bottom selvage shall be knuckled.

B. Fabric shall be zinc coated after weaving by the hot-dip galvanizing process.

C. Zinc for coating shall meet the requirements of ASTM Specification B6, and weight of coating shall be Class 2 in accordance with ASTM Specification A392 latest revision.

D. Zinc-coated steel chain-link fence fabric shall meet the requirements of ANSI/ASTM A392 latest revision.

2.3 TENSION WIRE

A. Tension wire shall conform to the following requirements:

1. Not less than No. 6 gage.
2. Meet the requirements of ANSI/ASTM Specification A 641 latest revision.
3. Be zinc coated.

    a. Weight of zinc coating shall be Class B.

2.4 BARBED WIRE

A. Barbed wire shall conform to the following requirements:

1. No. 12½ gage.
2. 4 point barbs at 5" o.c.
3. Meet the requirements of ANSI/ASTM Specification A 121 latest revision.
4. Be zinc coated.

a. Weight of zinc coating shall be Class 3.

2.5 CHAIN-LINK FENCE MATERIALS

A. Pipe:

1. Pipe shall be cold rolled high strength steel (50,000 psi yield) made from steel strip meeting ASTM A-1011 requirements.
2. Pipe shall be zinc coated at a rate of 1 oz./ft^2.
3. Exterior coating shall consist of hot-dip galvanizing, chromate conversion, and a final coating of cross-linked acrylic polyurethane material.

B. Tube Sections:

1. Tubular sections shall meet the requirements of ASTM Specification ANSI/ASTM A500 or ANSI/ASTM A501.
2. Tubular sections shall be zinc coated in accordance with ANSI/ASTM A120-78.

C. Steel Shapes:

1. Steel shapes shall meet the requirements of ASTM Specifications ANSI/ASTM A36.
2. Appurtenant materials shall be in accordance with Table 1 of ANSI/ASTM A36.
3. Steel shapes shall be zinc coated in accordance with the requirements of ASTM Specification ANSI/ASTM A123.
4. Appurtenant materials, castings and miscellaneous hardware shall be zinc coated in accordance with the requirements of ASTM Specification ANSI/ASTM A153.

5. Miscellaneous hardware shall include the following:

   a. Post caps and tops
   b. Extension arms
   c. Fittings
   d. Pull bars
   e. Straps and bands
   f. Catches
   g. Clips
   h. Drop rods
   i. Yokes
   j. Connectors

D. Fencing components shall be in accordance with the following size table:

Rails	1.625" O.D. @ 1.83#/LF pipe or 1-5/8" x 1-¼ roll-formed section.
Line Posts	2.0" O.D. Pipe @ 2.28#/LF, or 1.875" x 1.625" x 1.625" x 0.113" H @ 2.70#/LF, or approved C-section posts.
Corner and Pull Posts	2.5" O.D. Pipe @ 3.11#/LF, or 2.5" x 2.5" Sq. Tubing @ 5.70#/LF.
Braces	1.625" O.D. Pipe @ 1.83#/LF, or 2" x 2" Sq. Tubing @ 3.85#/LF.

2.6 SWING GATES

A. Swing gates shall conform to the following requirements:

1. Gate frames shall conform to Article 2.4.
2. Fabric shall be the same material used for the fencing.

B. Swing gate leaves shall have a minimum of two hinges. Hinges shall be steel or malleable iron 3 inches or more in width. Gate hinges shall be of a heavy pattern with large bearing surfaces. The number and arrangement of the hinges must be adequate to prevent gate leaf twisting and to permit operation by one person.

C. Swing gate latches shall be plunge-bar type and full gate height. Latches shall be designed to engage the plunge-bar catch and provide for padlocking capability. Plunge-bar catch shall be set in concrete flush with finished grade.

D. Swing gates shall be furnished with padlocks, Yale, Master, or equal.

2.7 COLORED CHAIN LINK FENCING

A. Colored chain link fencing shall be furnished under this project.

B. Fence fabric shall conform to the requirements outlined in this specification and shall conform to the following additional requirements:
1. Shall be furnished with a vinyl coating which has been continuously bonded over the galvanized steel wire by the extrusion bonding process.
2. Color shall be as selected by the Owner from the manufacturers full range.
3. Posts, rails, and tension wires shall be vinyl clad also, and barbed wire shall be color matched vinyl-bonded galvanized steel wire with 4 point aluminum alloy barbs.
4. Gates located within or adjacent to colored fencing shall be vinyl clad also.
5. Colored fencing shall be Colorbond II as manufactured by Colorguard Fence Products, Inc., or equivalent.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, and other conditions affecting performance.

1. Do not begin installation before final grading is completed, unless otherwise permitted by Owner's Representative.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

3.3 INSTALLATION, GENERAL

A. General: Install chain-link fencing to comply with ASTM F 567 and more stringent requirements specified.

1. Install fencing on established boundary lines inside property line.

B. All erection shall be performed by competent fencing mechanics.

1. The fencing shall be erected true, taut and straight in accordance with dimensions indicated.

C. The complete fencing assembly shall be completely connected and fastened, with no loose components.

D. The Contractor shall furnish and erect new fencing to replace any fencing damaged by his construction operations.

1. The replacement of fencing damaged by the Contractor's construction operations shall be at the expense of the Contractor and at no additional cost to the Owner.

E. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed or compacted soil.

F. Post Setting: Set all posts in concrete footing. Protect portion of posts

aboveground from concrete splatter. Place concrete around posts and vibrate or tamp for consolidation. Using mechanical devices to set line posts per ASTM F 567 is not permitted. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during placement and finishing operations until concrete is sufficiently cured.

1. Dimensions and Profile: As indicated on Drawings.

3.4 CHAIN-LINK FENCE INSTALLATION

A. Terminal Posts: Locate terminal end, corner, and gate posts per ASTM F 567 and terminal pull posts at changes in horizontal or vertical alignment.

B. Line Posts: Space line posts uniformly at 10 feet o.c.

C. Post Bracing Assemblies: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Install braces at end and gate posts and at both sides of corner and pull posts. Locate horizontal braces at midheight of fabric on fences with top rail and at two-thirds fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.

D. Tension Wire: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Pull wire taut, without sags. Fasten fabric to tension wire with 0.120-inch diameter hog rings of same material and finish as fabric wire, spaced a maximum of 24 inches o.c. Install tension wire in locations indicated before stretching fabric.

1. Top Tension Wire: Install tension wire through post cap loops.
2. Bottom Tension Wire: Install tension wire within 6 inches of bottom of fabric and

E. Top Rail: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Run rail continuously through line post caps, bending to radius for curved runs and terminating into rail end attached to posts or post caps fabricated to receive rail at terminal posts. Provide expansion couplings as recommended by fencing manufacturer.

F. Intermediate Rails: Install in one piece as indicated in Drawings, spanning between posts, using fittings, special offset fittings, and accessories.

G. Chain-Link Fabric: Apply fabric to outside of enclosing framework. Leave 2 inches between finish grade or surface and bottom selvage, unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.

H. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull, and gate posts with tension bands spaced not more than 15 inches o.c.

I. Tie Wires: Use wire of proper length to firmly secure fabric to line posts and rails. Attach wire at one end to chain-link fabric, wrap wire around post a minimum of 180 degrees, and attach other end to chain-link fabric per ASTM F 626. Bend ends of wire to minimize hazard to individuals and clothing.

1. Maximum Spacing: Tie fabric to line posts 12 inches o.c. and to braces 24 inches o.c.

J. Barbed Wire: Install barbed wire uniformly spaced and angled out towards property line. Pull wire taut and install securely to extension arms and secure to end post or terminal arms.

3.5 GATE INSTALLATION

A. General: Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach fabric as for fencing. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.

END OF SECTION 32 31 13

SECTION 32 92 00 - LAWNS AND GRASSES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Topsoil Placement and Preparation
2. Temporary Seeding
3. Permanent Seeding.

1.2 SUBMITTALS

A. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture stating the botanical and common name and percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging, as well as the name and telephone number of supplier.

B. Qualification Data: For landscape Installer.

C. Planting Schedule: Indicating anticipated planting dates for each type of planting.

1.3 QUALITY ASSURANCE

A. Qualifications: A qualified landscape installer whose work has resulted in successful lawn establishment. Require Contractor to maintain an experienced full-time supervisor on Project site when planting is in progress.

B. Soil-Testing Laboratory Qualifications: An independent laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.

C. Topsoil Analysis: Furnish soil analysis by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; deleterious material; pH; and mineral and plant-nutrient content of topsoil. Report suitability of topsoil for lawn growth. State recommended quantities of nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce a satisfactory topsoil.

1.4 CONTRACTOR RESPONSIBILITIES

A. It shall be the responsibility of the Contractor to do each of the following:

1. Remove all rocks and other debris, furnish and install topsoil and otherwise prepare ground for planting.
2. Secure a satisfactory stand of grass of such uniformity and cover as to at least match what existed prior to his construction operations;
3. Secure a stand of grass such as will minimize loss of soil by erosion;
4. Maintain all seeded areas until final acceptance of the work including irrigation of approximately 1" per week.
5. Restore or replace any portion of the grassing work that is found to be defective, or which results in an unsatisfactory stand of grass, or which becomes damaged prior to acceptance of the work.
6. Should all other work at the site have been completed and accepted, and should the Contractor have removed all forces and equipment from the plant site, he shall nevertheless, in the event of failure or partial failure of the grassing work, be obliged under the terms of the Bond given to the Owner to return such forces and equipment to the plant site as are necessary to insure the satisfactory completion of this item of work under the Contract.
7. The Contractor shall dispose of excess material as specified herein above, and shall remove all rubbish and surplus construction materials from the site.
8. The Contractor shall restore all areas (including grassing, paving, landscaping, etc.) of the Lenlock Lift Station Improvements project site which are affected by any of his construction operations to original condition or in accordance with these Specifications, whichever is the more stringent requirement. Final payment will not be made until such restoration is achieved to the satisfaction of the Owner.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Seed: Deliver seed in original sealed, labeled, and undamaged containers.

B. Sod: Harvest, deliver, store, and handle sod according to requirements in TPI's "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" in its "Guideline Specifications to Turfgrass Sodding."

C. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit.

PART 2 - PRODUCTS

2.1 TOPSOIL

A. Topsoil: ASTM D 5268, pH range of 5.5 to 7, a minimum of 6 percent organic material content; free of stones ½ or larger in any dimension and other extraneous materials harmful to plant growth.

1. Topsoil Source: Reuse surface soil, if any, stockpiled on-site. Verify suitability of stockpiled surface soil to produce topsoil. Clean surface soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.

    a. Amend existing in-place surface soil to produce topsoil meeting the requirements described above. Verify suitability of surface soil to produce topsoil. Clean surface soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.
    b. Supplement with imported or manufactured topsoil from off-site sources when quantities are insufficient. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches deep; do not obtain from bogs or marshes.

2. Contractor shall be responsible for furnishing a topsoil analysis for review by the Engineer unless the Contractor receives written permission to waive the requirement from the Engineer.
3. Contractor shall amend the topsoil to correct deficiencies based on the results of the test(s).

2.2 SEED

A. Seed shall meet the requirements of ALDOT Specification Section 860.01 and seed shall be furnished and installed according to the following tables.

TABLE 2 - PART 1 - MIXED SEEDING FOR RELATIVELY FLAT AREAS (POUNDS PER ACRE OF PURE LIVE SEED)							
Planting Zone	ZONE 1 – NORTH ALABAMA (no planting Jan 16 - Feb 28)						
Mix Number	1A		1AT	1B		1BT	
Planting Dates	Mar 1 Until May 15	May 16 Until Aug 1	Aug 2 Until Jan 15	Mar 1 Until May 15	Sept 1 Until Nov 15	May 16 Until Aug 31	Nov 16 Until Jan 15
Annual Rye Grass			25				25
Hulled bermuda Grass	15	20		10			
Unhulled Bermuda Grass	10			10			
Brown Top Millet						20	
Tall Fescue				50	50		
Weeping Love Grass							
Annual Lespedeza (Kobe)		30					
Sericea Lespedeza							
White Dutch Clover	5			5			
Centipede Grass							
Reseed Crimson Clover					30		
Pensacola Bahia Grass							
Required Permanent Grass	Common Bermuda Grass	Common Bermuda Grass	None	Tall Fescue	Tall Fescue	None	None

TABLE 2 - PART 2: MIXED SEEDING FOR RELATIVELY FLAT AREAS (POUNDS PER ACRE OF PURE LIVE SEED)									
Planting Zone	ZONE 2 - CENTRAL AL. No Planting Jan 2 - Feb 14			ZONE 3 - SOUTH ALABAMA					
Mix Number	2A	2A	2AT	3A	3AT	3B	3BT	3C	3CT
Planting Dates	Feb 15 Until Apr 15	Apr 16 Until Aug 15	Aug 16 Until Jan 1	Feb 15 Until Aug 31	Sept 1 Until Feb 14	Mar 15 Until Aug 15	Aug 16 Until Feb	Mar 1 Until Aug 15	Aug 16 Until Feb 14
Annual Rev Grass			25		25		25		25
Hulled Bermuda Grass	15	20		15		10			
Unhulled Bermuda	10			10				10	
Brown Top Millet									
Tall Fescue									
Weeping Love Grass									
Annual Lespedeza		30		30		20		20	
Sericea Lespedeza									
White Dutch Clover	5								
Centipede Grass						20			
Reseed Crimson Clover									
Pensacola Bahia Grass								40	
Required Permanent Grass	Common Bermuda Grass	Common Bermuda Grass	Common Bermuda Grass	None	Tall Fescue	Tall Fescue	None	None	Common Bermuda Grass

TABLE 3 - PART 1: MIXED SEEDING FOR SLOPES AND AREAS NOT SUBJECT TO FREQUENT MOWING (POUNDS PER ACRE OF PURE LIVE SEED)						
Planting Zone	1		1	2		
Mix Number	1D		1DT	2D		
Planting Dates	Mar 1 Until Jul 31	Aug 1 Until Nov 15	Aug 2 Until Jan 15	Feb 15 Until Jun 15	Jul 1 Until Aug 31	Sept 1 Until Nov 15
Annual Rye Grass			25			
Hulled Bermuda Grass					15	15
Unhulled Bermuda					10	
Brown Top Millet						30
Tall Fescue		30				
Weeping Love Grass	4			4	4	
Annual Lespedeza						
Sericea Lespedeza	50	75		50	75	75
White Dutch Clover						
Reseed Crimson Clover						
Pensacola Bahia Grass						
Required Permanent Plant	Sericea Lespedeza (Interstate Variety (3)	Sericea Lespedeza (Interstate Variety (1)	None - 1st Stage (2)	Sericea Lespedeza (Interstate Variety (3)	Sericea Lespedeza (Interstate Variety (3)	Sericea Lespedeza (Interstate Variety (1)

TABLE 3 - PART 2: MIXED SEEDING FOR SLOPES AND AREAS NOT SUBJECT TO FREQUENT MOWING (POUNDS PER ACRE OF PURE LIVE SEED)						
Planting Zone	2	3	3	1		
Mix Number	2DT	3D	3DT	1E		
Planting Dates	Nov 16 Until Jan 15	Feb 15 Until Aug 31	Sept 1 Until Jan 1	Mar 1 Until Jul 31	Aug 1 Until Nov 15	Nov 16 Until Feb 28
Annual Rye Grass	25		25			15
Hulled Bermuda Grass				15		
Unhulled Bermuda				10	15	30
Brown Top Millet						
Tall Fescue				30	30	30
Weeping Love Grass		4		2		
Annual Lespedeza						
Sericea Lespedeza		50		30	30	
White Dutch Clover						
Reseed Crimson Clover					25	
Pensacola Bahia Grass						
Required Permanent Plant	None - 1st Stage (2)	Sericea Lespedeza (Interstate Variety) (3) (4)	None - 1st Stage (2)	Mixed Species (3)	Mixed Species	Mixed Species

TABLE 3 - PART 3: MIXED SEEDING FOR SLOPES AND AREAS NOT SUBJECT TO FREQUENT MOWING (POUNDS PER ACRE OF PURE LIVE SEED)						
Planting Zone	2			3		
Mix Number	2E			3E		
Planting Dates	Feb 15 Until Aug 31	Sept 1 Until Nov 15	Nov 16 Until Feb 14	Feb 15 Until Aug 31	Sept 1 Until Nov 30	Dec 1 Until Feb 14
Annual Rye Grass	5	10	10		10	10
Hulled Bermuda Grass	15	10		10	10	
Unhulled Bermuda	10	10	20	15	10	25
Brown Top Millet						
Tall Fescue		30	25		30	25
Weeping Love Grass	2	2		2	2	
Annual Lespedeza	40			40		
Sericea Lespedeza						
White Dutch Clover						
Reseed Crimson Clover		25	25		25	25
Pensacola Bahia Grass	25	25	25	20	25	25
Required Permanent Plant	Mixed Species (3)	Mixed Species (3)	Mixed Species	Mixed Species (3)	Mixed Species (3)	Mixed Species

2.3 FERTILIZER AND MULCH

A. Fertilizer: Fertilizer shall meet the requirements of ALDOT Specification Section 860.12.

1. Fertilizer shall be uniformly applied to all areas to be planted at the time of seeding or sodding; and the rate of application shall be a minimum of 900 lbs. of 13-13-13 per acre.
2. The rate of application shall be adjusted based on the results of soil tests.

B. Mulch: Mulch shall meet the requirements of ALDOT Specification Section 860.03, Class A.

1. Mulch for hydroseeding shall consist of specially prepared wood cellulose or a natural wood fiber containing clean whole cut chips.
2. It shall be processed in such a manner that it will contain no growth or germination inhibiting factors and shall be dyed an appropriate color to facilitate a uniform spread of the slope by visual inspection.
3. It shall be manufactured in such a manner that after addition and agitation in slurry tanks with fertilizers, grass seeds, water, and other additives, the

fibers in the material will become uniformly suspended to form a homogenous slurry; and that when hydraulically sprayed on the ground, the material will form a blotter like ground cover impregnated uniformly with grass seed.

4. All such mixtures shall be used with eight (8) hours from time of mixing.

2.4 EROSION-CONTROL MATERIALS

A. Erosion Control Blankets or Netting: Blankets or netting shall meet the requirements of ALDOT Specification Section 860.11.

B. Contractor shall meet all other erosion control measures as described elsewhere in the Contract Documents.

PART 3 - EXECUTION

3.1 GENERAL

A. Permanent grass seeding and mulching, or sodding, should be provided in all disturbed areas upon completion of grading and other construction activities.

B. Examine areas to receive lawns and grass for compliance with requirements and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.

D. Protect adjacent and adjoining areas from hydroseeding overspray.

E. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways in accordance with Division 2 Section “Site Clearing”.

3.2 SUBGRADE PREPARATION

A. Before placement of topsoil the subgrade shall be prepared as follows:

1. Shall be loosened to depth of not less than four (4) inches but not greater than eight (8) inches;
2. The surfaces shall be cleared of all rock one (1) inch or larger in size, all construction debris, or other objectionable material.

B. Limit lawn subgrade preparation to areas to be planted.

3.3 TOPSOIL PLACEMENT

A. The topsoil, previously removed and stored, shall then be placed over the prepared subgrade.

B. The depth of the topsoil shall be sufficient to allow for natural settlement, so that after such settlement has taken place the surface of the topsoil layer will conform to the finished elevations and contours shown on the Drawings.

C. After placement of topsoil the surface shall be raked to remove clods, stones over one (1) inch in diameter, brush, roots, construction debris, or other objectionable material.

D. Should the stockpile of topsoil accumulated from the trenching operations not be adequate for supplying the quantities of topsoil required for preparation of the areas described herein above, the Contractor shall furnish, at his expense, topsoil from other sources to meet any deficiencies.

E. The Contractor shall not proceed with grassing work until receipt of written approval of topsoil preparation and confirmation of topsoil depth by Engineer. All rocks and debris must be removed from topsoil prior to beginning grassing work.

3.4 TOPSOIL PREPARATION

A. Topsoil preparation shall be performed immediately prior to seeding, and shall consist of the following:

1. Loosening of the topsoil by discing, harrowing or other approved methods.
2. On areas having a slope of 3:1 or flatter, the topsoil shall be loosened to a depth of approximately three (3) inches;
3. On slopes steeper than 3:1, the topsoil shall be merely roughened to a depth of approximately one (1) inch.
4. All clods and other foreign materials which are larger than one (1) inch in any dimension shall be removed.
5. All rocks ½ inch or larger shall be removed.
6. All gullies and washes that develop in the loosened topsoil prior to seeding shall be repaired.
7. Seeding shall immediately follow soil preparation so as to avoid both compaction and/or wash by heavy rainfall and crust formation by sunbaking.
8. Seeding will not be permitted on hard or crusted topsoil surfaces.

B. Unchanged Subgrades: If lawns are to be planted in areas unaltered or undisturbed by excavating, grading, or surface soil stripping operations, prepare surface soil as follows:

1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.
2. Loosen surface soil to a depth of at least of 6 inches. Prepare soil as described for topsoil in Part 2 of this specification.

3. Till soil to a homogeneous mixture of fine texture.
4. Remove stones larger than 1 inch in any dimension and remove sticks, roots, trash, and other extraneous matter.
5. Legally dispose of waste material, including grass, vegetation, and turf, off of Owner's property unless specific written permission is received from Owner for on-site disposal.

C. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

D. Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

E. Restore areas if eroded or otherwise disturbed after finish grading and before planting.

3.5 SEEDING

A. Seeding: Seeding shall meet the requirements of ALDOT Specification Section 652.

3.6 HYDROSEEDING

A. Hydroseeding: Hydroseeding shall meet requirements of ALDOT Specification Section 658.

B. Hydroseeding shall be accomplished with approved equipment, and all mixtures shall be constantly agitated from the time that they are mixed until they are finally applied to the seed bed.

C. Nozzles or sprays shall not be directed toward the ground in such a manner as to cause erosion or runoff.

D. One-step Process: Apply slurry uniformly to all areas to be seeded. Apply mulch at a minimum rate of 1500-lb/acre dry weight but not less than the rate required to obtain specified seed-sowing rate.

E. Two-step Process: Apply slurry uniformly to all areas to be seeded. Apply first slurry application at a minimum rate of 500-lb/acre dry weight but not less than the rate required to obtain specified seed-sowing rate. Apply slurry cover coat of fiber mulch at a rate of 1000 lb/acre.

3.7 MULCHING

A. Mulching: Mulching shall meet the requirements of ALDOT Specification Section 656.

B. When hay or straw is used for mulch, it shall conform to the following requirements:

1. It shall be spread over all seeded areas at the rate of approximately two (2) tons per acre.
2. It shall be applied to a uniform depth by an approved method, and in such a manner that not more than ten (10) percent of the soil surface is exposed.
3. The use of wet hay or straw will not be permitted.
4. Mulch shall be applied within 48 hours after the seeding operation.
5. Mulch shall be anchored to the seeded surface by discing or punching the mulch partially into the soil, by use of approved netting, or by use of other methods or materials approved by the Engineer.

3.8 FERTILIZING

A. Thoroughly blend planting soil mix off-site before spreading or spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil mix.

1. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.
2. Mix lime with dry soil before mixing fertilizer.

B. Fertilizer shall be uniformly applied to the designated area at the time of seeding; and rate of application shall be 900 lbs. of 13-13-13 per acre.

C. Fertilizer shall be applied using any approved method.

1. If liquid fertilizer should be used, it shall be kept agitated during application and shall be applied in amounts sufficient to provide the same value of nutrients per acre as that specified for dry fertilizer.
2. Should the Contractor elect to use liquid fertilizer in a hydroseeder, the materials shall be applied on a poundage basis, mixed with the same volume of water that would be used with dry fertilizer.

3.9 TEMPORARY GRASSING

A. Areas, sections, or portions of the work site within which construction work has been completed prior to beginning of final grading and grassing, shall be protected from erosion by employment of temporary control measures such as seeding and mulching or seeding and netting. Temporary grass seeding and mulching is required in disturbed areas that are unused for extended periods of time.

B. All temporary erosion control and pollution control features installed by the Contractor shall be maintained by the Contractor until the site is ready for final grading and grassing.

C. Temporary grassing required to be removed so as to permit the performance of final grading and grassing work shall be removed and ground preparation for final grassing shall be undertaken immediately after the removal of temporary grassing or other temporary erosion control measures.

D. The Contractor must maintain temporary grassing under all circumstances until the installation of permanent grassing.

3.10 LAWN RENOVATION

A. Renovate existing lawn(s) including lawns damaged by Contractor's operations, such as storage of materials or equipment and movement of vehicles.

1. Reestablish lawn where settlement or washouts occur or where minor regrading is required.
2. Remove sod and vegetation from diseased or unsatisfactory lawn areas; do not bury in soil.
3. Remove topsoil containing foreign materials resulting from Contractor's operations, including oil drippings, fuel spills, stone, gravel, and other construction materials, and replace with new topsoil.
4. Mow, dethatch, core aerate, and rake existing lawn.
5. Remove weeds before seeding. Where weeds are extensive, apply selective herbicides as required. Do not use pre-emergence herbicides.
6. Remove waste and foreign materials, including weeds, soil cores, grass, vegetation, and turf, and legally dispose of them off Owner's property.
7. Till stripped, bare, and compacted areas thoroughly to a soil depth of 6 inches.
8. Apply soil amendments and initial fertilizers required for establishing new lawns and mix thoroughly into top 4 inches of existing soil. Provide new planting soil to fill low spots and meet finish grades.

B. Where existing lawns consist of bermuda, zoysia, centipede or other types of lawn grasses, the top soil shall be dressed and fertilized, and the top of the trench shall be covered with sod of the same type as that removed.

C. Other areas such as raw land, undeveloped areas, pastureland, grassed areas, etc., shall be seeded and mulched.

D. Water newly planted areas and keep moist until new lawn is established.

3.11 LAWN MAINTENANCE

A. Begin maintenance immediately after each area is planted and continue until acceptable lawn is established, but for not less than the following periods:

1. Seeded Lawns: 60 days from date of Substantial Completion; When full maintenance period has not elapsed before end of planting season, or if

lawn is not fully established, continue maintenance during next planting season.

B. Maintain and establish lawn by watering, fertilizing, weeding, mowing, trimming, replanting, and other operations. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth lawn.

C. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch. Anchor as required to prevent displacement.

D. Watering: Provide and maintain temporary piping, hoses, and lawn-watering equipment to convey water from sources and to keep lawn uniformly moist to a depth of 4 inches. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.

E. Water lawn at a minimum rate of 1 inch per week.

F. Mow lawn as soon as grass blades reach 4 inches in length, or as appropriate for specific types of grass. Repeat mowing to maintain specified height without cutting more than 40 percent of grass height until project is accepted by Owner. Remove no more than 40 percent of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet.

G. Lawn Postfertilization: Apply fertilizer after initial mowing and when grass is dry. Use fertilizer that will provide actual nitrogen of at least 1 lb per 1,000 sq. ft. to lawn area.

3.12 SATISFACTORY LAWNS

A. Satisfactory Seeded Lawn: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of rocks, weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. and bare spots not exceeding 5 by 5 inches.

B. Satisfactory Sodded Lawn: At end of maintenance period, a healthy, well-rooted, even-colored, viable lawn has been established, free of rocks, weeds, open joints, bare areas, and surface irregularities.

C. Reestablish lawns that do not comply with requirements and continue maintenance until lawns are satisfactory.

3.13 CLEANUP AND PROTECTION

A. Promptly remove soil and debris created by lawn work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Erect barricades and warning signs as required to protect newly planted areas from traffic. Maintain barricades throughout maintenance period and remove after lawn is established.

C. Remove erosion-control measures after grass establishment period.

END OF SECTION 32 92 00

`SECTION 33 05 13.10 - CROSSING INSTALLATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes utility crossings and materials and methods related to the crossing. This section includes the following:

1. Stream crossings
2. Highway Crossings
3. Crossing installation - boring and jacking method
4. Crossing installation - open-cut method
5. Crossing installation - horizontal directional boring
6. Installation of carrier pipe inside casing

1.2 SUBMITTALS

A. Product Data: For the following:

1. Casing pipe.
2. Support assemblies for supporting carrier pipe inside of casing pipe.

1.3 QUALITY ASSURANCE

A. The Contractor shall carefully examine all pipe and piping materials before placing them in the work. If any materials are found to be defective, the Contractor shall promptly notify the Engineer and discard such pipe and materials.

B. Piping materials shall be of the types, classes and sizes shown on the Drawings or as specified in the piping schedule.

C. Regulatory Requirements:

1. Comply with requirements of utility company.
2. Comply with standards of authorities having jurisdiction for natural gas piping, potable-water-service piping, sanitary sewer piping, and/or other utilities including materials, installation, testing, and disinfection.
3. Comply with City, County and/or State Department of Transportation requirements.
4. The Contractor is reminded that all work involved in the making of the crossings is subject to the "Safety and Health Regulations for Construction" of the Occupational Safety and Health Administration as set forth in the

Federal Register, latest revision, and to the Rules and Regulations of the U.S. Bureau of Mines, as applicable.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Unloading of Pipe

1. The Contractor shall provide the proper equipment, tools and facilities necessary for the efficient prosecution of the work.
2. Materials damaged in unloading, handling or installation shall be promptly discarded and removed from the area of the work.
3. No pipe shall be unloaded or moved by allowing the pipe to roll, slide or fall to the ground or to cushions placed on the ground.
4. No pipe shall be unloaded by inserting loader blades, teeth, etc., into the pipe interior.

B. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.

PART 2 - PRODUCTS

2.1 CROSSINGS

A. Stream Crossings

1. The crossings may vary in composition of protective features because of the varying conditions at each particular location.
2. For certain types of pipe the quantity of crushed stone bedding required will be increased when the pipe is installed at a stream crossing for the reason that the elevation of top bedding will be raised in order to provide support for the concrete encasement.
3. The work at each crossing shall include furnishing and installing the pipeline with bedding materials, concrete encasement, and reinforced concrete headwalls (where called for).

B. Highway Crossings

1. The Owner will have, prior to commencement of work on the project, secured from the Alabama Department of Transportation and other County or City authorities, such Permits as may have been required to undertake the construction of the crossings, and will have posted such Bonds as may have been required to ensure the faithful performance of the work in accordance with the terms and conditions of the Permits.
2. The Contractor shall assume the obligations of the Owner with respect to performance of the work as specified under these Permits.

3. Highway crossings and road crossings shall be made using trenchless excavation methods unless express permission has been received from the Alabama Department of Transportation, or other Authority having jurisdiction over a particular road, to utilize the open-cut method at a specified location.
4. The Contractor shall notify the Engineer, the Alabama Department of Transportation, or other Authority having jurisdiction, of the date on which the Contractor expects to begin work on a particular crossing.
5. The testing of that section of the pipeline within the limits given for a particular crossing shall be performed separately from the testing of other sections of the pipeline. For pipeline work and testing work refer to applicable sections of these Specifications.

2.2 CASING PIPE

A. Casing pipe shall be smooth wall steel pipe meeting the requirements of ASTMA139, latest revision, or of ASTM A 252, latest revision, as indicated on the Drawings.

B. Wall thicknesses of casing pipe shall be as indicated.

C. Protective Coatings:

1. Interior Primer/Exterior Asphaltic Coating:

    a. Both the exterior and interior surfaces of the casing pipe shall be given one coat of rust-inhibitive primer, Koppers or Indurall or equivalent, to dry film thickness of not less than 1.5 mils.
    b. The exterior surfaces of the casing pipe shall be given an asphaltic or coal-tar coating, Koppers or Indurall or equivalent, to dry film thickness of not less than 8.0 mils; and the primer and the finish coat shall be compatible.

2. Interior and Exterior Water Based Coatings:

    a. Internal and external surfaces of casing pipe shall receive one coat of corrosion resistant water based asphaltine resin emulsion coating to a dry film thickness of at least 3 mils.
    b. Asphalt emulsion coating shall have asphalt solids content of 55 to 65 percent in accordance with ASTM D244 and VOC content of not more than 6 percent according to ASTM D402.
    c. Asphalt emulsion coating shall be Molecular Pipe & Fitting Coating (MPFC) as manufactured by Molecular Coating Specialist, Inc. of DeSoto, Texas, or equivalent.

D. The Contractor may elect to provide casing with an additional 1/16 inch corrosion allowance to the wall thickness of the casing in which case the internal coating requirements maybe waived.

E. Casing pipe having pitted or corroded surfaces shall not be installed.

PART 3 - EXECUTION

3.1 CROSSING INSTALLATION - BORING AND JACKING METHOD

A. The boring-and-jacking method of installation of casing for the carrier pipe shall be a "dry" operation without use of hydraulic jetting to soften, loosen or sluice away the material to be excavated.

1. Boring shall be prosecuted from work pit located in the open-cut section of the pipeline.

    a. The pit shall be of sufficient length and width to accommodate the boring/jacking machine and length of section of casing pipe to be jacked, and also shall be such size as will provide ample and safe working area around the machine.
    b. Depth of pit shall be required to make the bore at the elevation shown.
    c. The floor of the work pit shall be stabilized so as to provide a firm and stable foundation for the support frame for the machine.

2. The boring of the hole for the casing and the advancement of the casing in the hole shall be an integrated operation.

    a. The hole shall be mechanically bored by a cutting head mounted on a continuous-flight auger rotating inside of the casing.
    b. Power source for rotation of auger and advancement of casing shall be a hydraulic power-pack mounted on the boring/jacking machine.
    c. The machine shall be mounted on a frame designed to support the weight of the machine and the weight of the incremental length of auger and casing to be advanced.
    d. Elevation (grade) control shall be provided by a suitable hydraulic device and hydraulic line mounted on the casing.
    e. The Contractor shall select casing of such diameter as will permit him to install the carrier pipe at the elevation or grade shown, but diameters of casings shall not be less than those shown.

B. Material discharged from the auger shall be removed from the work pit but shall be separately stored apart from those materials excavated from the work pit until the Engineer has had the opportunity to examine the materials removed by the auger.

C. Successive sections of casing pipe shall be welded to the casing in place as the boring operation and advancement of casing continues. All welding shall be performed in accordance with applicable American Welding Society Standards and recommended procedures.

D. After the boring and jacking has been completed the casing shall be cleaned by means of a plug or pipe cleaning pig mounted on the boring shaft.

E. Casing for crossings shall be as described here within.

F. Carrier pipe shall be installed inside the casing and ends of casing sealed as described herein.

3.2 INSTALLATION OF CARRIER PIPE INSIDE CASING

A. The carrier pipe of size and type as indicated shall be threaded through the casing pipe.

B. The carrier pipe shall be stabilized within the casing by use of methods as described below:

1. Support assemblies of diameter not less than the diameter of the casing minus one-half inch. Support assemblies or spiders shall be molded or hard rubber or high density polyethylene, shall be placed at approximately ten (10) foot intervals, and shall be similar and equivalent to manufacture of T.D. Williamson Co. or Maloney Co.
2. Pea Gravel blown-in from each end of the casing until the space between exterior of the pipe and interior wall of the casing has been filled.
3. Other Methods as may be proposed by the Contractor and as may be acceptable to the Engineer.

C. The ends of the casing shall be sealed by masonry bulkhead constructed across the open faces of the casing and fully around the casing.

1. Bulkheads shall extend not less than 8" back from the ends of the casing; not less than 8" out from the ends of the casing, and not less than 8" above the top and below the bottom if the casing.
2. If constructed of masonry units, the bulkheads shall be cross-bonded by headers laid parallel to the longitudinal axis of the casing.
3. A drain pipe of either hot-dipped galvanized steel or cast iron soil pipe, 2" in diameter, shall be installed through the bulkhead at the lower end of the casing, and the invert of the drain pipe shall be set at the invert of the casing.

D. The Contractor, at his option, may elect to furnish and install manufactured end seals for closing the ends of the casing

END OF SECTION 33 05 13.10

SECTION 33 31 14.10 - METAL PIPE AND FITTINGS FOR SEWERAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes requirements for Metal pipe and fittings including the following:

1. Ductile Iron pipe and fittings.
2. Mechanical couplings.
3. Gripper glands.

1.3 DELIVERY, STORAGE AND HANDLING

A. The Contractor shall provide the proper equipment, tools and facilities necessary for the efficient prosecution of the work.

1. Materials damaged in unloading, handling or installation shall be promptly discarded and removed from the area of the work.
2. No pipe shall be unloaded or moved by allowing the pipe to roll, slide or fall to the ground or to cushions placed on the ground.
3. No pipe, fittings, valves, etc., shall be unloaded by inserting loader blades, teeth, etc., into the pipe interior.

B. Pipe shall be stored on racks or timbers in such a manner that pipe ends are above the ground surface.

1. When pipe is to be moved it shall not be dragged or rolled but shall be lifted by use of a sling designed to prevent damage to the pipe coatings.
2. Should an intermediate placement of the pipe along the side of the trench be required, the pipe shall be placed on racks or timbers along the side of the trench in manner as specified hereinabove.

C. Each length or section of pipe shall be cleaned immediately before being placed in the trench and joined.

1. Cleaning shall be accomplished by use of a tight swab or other suitable cleaning device.
2. If necessary a brush pig shall be run through the section of pipe prior to

final swabbing.
3. Pipe ends shall be wiped clean before the pipe is joined.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Ductile Iron Pipe:

1. McWane
2. American
3. U.S. Pipe and Foundry Company

B. Ductile Iron Fittings:

1. American
2. U.S. Pipe and Foundry Company
3. Tyler Union

C. Restraining Gaskets:

1. Field-lok gaskets as manufactured by U.S. Pipe and Foundry Company
2. Fast-grip gaskets as manufactured by American Cast Iron Pipe Company
3. Pre-Approved Equivalent.

D. Gripper (Restraining) Glands

1. "MJ gripper gland" manufactured by U.S. Pipe and Foundry Company
2. "MegaLug" manufactured by Ebaa Iron, Inc.
3. Pre-Approved Equivalent

2.2 PIPE MATERIALS AND FITTINGS

A. The Contractor shall carefully examine all pipe and piping materials before placing them in the work.

1. If any such pipe or materials should be found to be defective, the Contractor shall promptly notify the Engineer and discard such pipe and materials.

B. The interior of all pipe, fittings, valves and accessories shall be kept free from dirt and foreign material.

1. Suitable bulkheads shall be used to block or plug ends of piping at the close of each work day and when work on a particular section of piping is temporarily discontinued.
2. Should dirt, mud, concrete, latence, paint or other foreign materials be allowed to enter the piping or any section of piping, such piping or section

of piping shall immediately be cleaned.

C. Piping materials shall be of the types, classes and sizes as shown or as specified in the piping schedule.

2.3 DUCTILE IRON PIPE AND FITTINGS

A. Ductile Iron pipe shall be manufactured in accordance with requirements of ANSI A21.51 / AWWA C151.

B. Where ductile iron pipe and fittings are equipped with push-on joints, such joints shall conform to the requirements of ANSI A21.11 / AWWA C111 latest revision.

C. Where ductile iron pipe and fittings are equipped with mechanical joints, such joints shall conform to the requirements of ANSI A21.11 / AWWA C111 latest revision.

D. All pipe and fittings shall be furnished new from the manufacturer. No recoated or reconditioned pipe will be acceptable.

E. Gaskets

1. Gaskets for flanged, mechanical joint restrained joint, and push-on ductile iron pipe shall meet the requirements of ANSI/AWWA Specification ANSI A21.11/AWWA C111 latest revision.
2. Gasket materials for various service conditions shall be as follows:

    a. Wastewater Service - Styrene Butadine Copolymer (SBR)

F. Pipe

1. In general, ductile iron pipe shall be furnished with push-on joints for buried applications and flanged joints for exposed, above grade applications, unless otherwise shown on Drawings.
2. Ductile iron flanged pipe shall conform to the following requirements:

    a. Shall be manufactured in accordance with the requirements of ANSI A21.15 AWWA C115 latest revision.
    b. Barrels of flanged pipe shall be ductile iron ANSI A21.51/AWWA C151.
    c. Flanges shall be in accordance with ANSI A21.15/AWWA C115 latest revision, and shall have chemical and physical properties specified for ductile-iron fittings under ANSI A21.10/AWWA C110 latest revision.
    d. Pipe and threaded flanges shall meet the requirements of ANSI A21.15 /AWWA C150, latest revision.
    e. Where flanges are cast on ductile-iron pipe they shall conform to ANSI A21.10/AWWA C110 latest revision and shall be ductile-iron as

specified for threaded flanges.

f. All flanges shall be rated for 250 psi working pressure; and the bolt circle and bolt holes shall match those of ANSI B16.1 Class 125 flanges and ANSI B16.5 Class 150 flanges.

g. Flanged piping connecting to equipment shall have flanges that are compatible with the particular items of equipment to which they are attached.

G. Fittings

1. In general, fittings for use with push-on joint pipe shall be push-on joint unless otherwise shown on the Drawings.
2. All fittings shall be new. No reconditioned or recoated fittings shall be acceptable.
3. Fittings for use with push-on pipe or mechanical joint pipe shall conform to the requirements of ANSI A21.10/AWWA C110, latest revision. Fittings shall be ductile iron, according to working pressure conditions in the pipeline. Where working pressure does not exceed 250 psi, fittings may be either ductile iron or gray iron; where working pressure exceeds 250 psi, fittings shall be ductile iron.

H. Coatings

1. All ductile iron pipe and fittings shall be furnished with interior lining.
2. The types of lining required for the various conditions of service are listed herein below.

    a. Wastewater service - Cement lining in accordance with ANSI A21.4/AWWA C104 latest revision; standard thickness with asphaltic seal coat.

3. Ductile iron pipe to be installed underground shall be furnished with outside asphaltic coating of 1 mil thickness per ANSI A21.51 / AWWA C151.

I. Quality Control

1. All testing work specified in this section shall be performed by the supplier.
2. The manufacturer shall perform all tests in house as part of their quality assurance/quality control.
3. Test results shall be submitted to the Engineer in accordance with requirements of this section.
4. All pipe shall receive a hydrostatic proof test of 500 psi for a minimum duration of 10 seconds.

    a. Each test cycle shall be recorded on a strip chart.
    b. Each test cycle for pipe 18 inches and greater shall be marked by pipe number.
    c. Each pipe shall be inspected for leaks and pipes which contain

evidence of hydrostatic leak shall be scrapped.

d. Repair welding of hydrostatic leaks is not permitted.

5. Tensile test specimens shall be cut from the midsection of the pipe wall.

   a. These specimens shall be machined and tested at least every three hours in accordance with ASTM E-8, and ASTM A-370 where applicable, using the halt of pointer or 0.2% offset method.
   b. Pipe failing to meet the minimum requirements of these standards shall be rejected.
   c. Adjacent test samples shall be made available to the Owner's independent testing laboratory upon the Owner's request.

6. Charpy impact samples shall be taken during each hour of production. Samples shall be selected to properly represent extremes of pipe diameters and wall thickness.

7. Impact tests shall be conducted in accordance with ASTM E-23.

   a. Impact strengths on samples shall be 7 ft.-lb minimum for tests conducted at 70°±10.
   b. In addition, adjacent specimens shall be taken and made available to the Owner's laboratory for independent testing upon the Owner's request.

8. Each end of each pipe (each pipe socket and pipe spigot) shall be measured and shall conform to the standard dimensions of ANSI A-21.51 (AWWA C-151).

   a. In addition, each socket and spigot shall be inspected in a well lighted area for injurious defects which could affect joint performance.
   b. Such defects may be removed by cutting off pipe ends.
   c. Pipe with injurious defects in the bell must be scrapped.

9. The Owner or his designated inspection agency shall have access to all areas of the pipe manufacturer's plant during production, inspection, and shipping and shall have the opportunity to witness all tests associated with production and inspection of pipe and fittings for any given pipe order. Reasonable facilities shall be provided for this purpose.

10. The Contractor shall provide manufacturers' certifications that all ductile iron pipe and fittings meet provisions of this section and meet requirements of ANSI A21.51 (AWWA C-151).

    a. Product certification shall include tensile and Charpy test results which shall be traceable to pipe numbers and testing periods.
    b. For pipe sizes 18 inches and greater, hydrostatic test charts including pipe numbers for each test cycle shall be furnished as part of the

certification test reports.

c. Chemical analysis shall be furnished for each ladle of iron which will cover each pipe cast and must correlate with the mechanical test results.
d. For pipe sizes 18 inches and greater, complete traceability is required throughout the certification process and must be clearly legible on each pipe at the point of installation.

11. The Contractor shall provide certifications that all pipe joints have been tested and meet requirements of ANSI A21.11 (AWWA C-151).

J. Restrained Joint Pipe.

1. The following types of restrained joint pipe will be acceptable:

a. Restrained joints for horizontally directional drilled pipe segments shall be of type as recommended by each individual pipe manufacturer for the intended application. Deflection of chosen joint type shall be acceptable for intended vertical curve.
b. Flexible, restrained push-on type where joints incorporate ductile iron locking segments, inserted through slots in the bell face, providing a positive axial lock between the bell interior surface and a retainer weldment on the spigot end of the pipe.
c. Restraining gaskets for push-on pipe and fittings 4" through 12" diameter. Restraining gaskets shall contain stainless steel locking segments vulcanized into the gasket which shall in all other respects meet the requirements of standard push-on gaskets in ANSI/AWWA C111/A21.11. Restraining gaskets shall be UL listed for a minimum working pressure of 250 psi.
d. Gripper glands may be used with mechanical joint fittings. Joint restraint shall be provided by a follower gland with mechanism that grips pipe with teeth which are wedged tighter as pressure is applied to the pipeline. Gripper glands shall have a working pressure rating of at least 350 psi up to 16" size and at least 250 psi up to 48" size. Gland shall conform to mechanical joint (ANSI/AWWA a21.11) and be suitable for use with tee-head bolts (ANSI/AWWA c153/a21.5).

2. Maximum allowable deflections shall be per manufacturer's published recommendation.
3. Use of set screws bearing on the pipe wall will not be acceptable except where retainer glands are to be used.

K. Markings

1. Each length or piece of pipe shall be bar coded and clearly marked as to type and class with different colors being used to distinguish between classes.
2. Where the drawings indicate that between specified stations a particular

class of pipe will be required, the Contractor will not be permitted to store or string pipe of other classes than that specified for the particular section of the transmission mains.

2.4 MECHANICAL COUPLINGS

A. Pipe couplings shall be threaded, push-on mechanical joint, or bolted as specified herein or as indicated.

B. Harness bolts, where required on lines under pressure where shown shall be one of the following:

1. Joint restraint system as manufactured by Star National Products.
2. Standard system of the pipe manufacturer.
3. Approved equivalent.

C. Mechanical couplings shall be carefully installed in accordance with the manufacturer's recommendations.

1. A space of at least ¼ inch and not more than one inch shall be left between the pipe ends.
2. Pipe and coupling surfaces which contact gaskets shall be clean and free from dirt and other foreign matter during assembly.
3. All assembly bolts shall be uniformly tightened so that the coupling is free from leaks and all parts of the coupling are square and symmetrical with the pipe.
4. Following installation of the coupling, damage areas of shop coatings on the pipe and coupling shall be repaired to the satisfaction of the Engineer.
5. The interior surfaces of the middle rings shall be prepared for painting in accordance with instructions of the paint manufacturer and shall then be coated with liquid epoxy in accordance with AWWA C210.
6. The remaining components shall be cleaned and shop primed with the manufacturer's standard rust-inhibitive primer.

2.5 GRIPPER GLANDS

A. Where gripper glands are indicated for use with mechanical joint fittings, joint restraint shall be provided by a follower gland with a mechanism that grips the pipe with teeth which are wedged tighter as pressure is applied to the pipeline.

B. Gripper gland shall have a working pressure rating of at least 350 psi up to 16" size and at least 250 psi up to 48" size.

C. Gland shall conform to mechanical joint (ANSI/AWWA A21.11) and be suitable for use with tee-head bolts (ANSI/AWWA C153/A21.53).

D. Gripper gland shall be one of the following:

1. "MJ Gripper Gland" manufactured by U.S. Pipe and Foundry Company.
2. "Mega Lug" manufactured by EBAA Iron, Inc.
3. Approved equivalent.

PART 3 - EXECUTION

3.1 INSTALLATION OF DUCTILE IRON PIPE

A. The Contractor will not be permitted to cut nipples from ungauged pipe in order to make connections.

1. If the Contractor desires to cut lengths in the field to make up the line, he shall make such cuts from lengths of pipe having exterior of barrel fully gauged to fit bell of pipe of that class.

B. The permissible depth of cover over a pipe of particular size and class is based upon the following:

1. The trench excavation work being performed by the Contractor in accordance with the requirements of these Specifications.
2. The bedding and backfill materials being furnished by the Contractor in accordance with the requirements of these Specifications.
3. The placement of bedding and backfill material being performed by the Contractor in accordance with the requirements of these Specifications.

C. Should the Contractor fail to perform the trench excavation work, or the furnishing and placement of bedding and backfill, or the pipelaying work in accordance with the requirements of these Specifications, he/she will be required to remedy the work by furnishing and placing or installing other materials as may be determined by the Engineer as being necessary to remedy that work not performed in accordance with these Specifications and thereby secure work of the quality specified.

D. Buried ductile iron pipe for all applications shall be furnished and installed in trenches in various locations along the pipeline(s) as indicated and described herein. Pipe thickness and/or class shall meet requirements and recommendations of the manufacturer and ANSI/AWWA C151/A21.51 for depth of cover, working pressure and laying conditions when classes of pipe and depths of cut are not indicated elsewhere.

3.2 JOINING OF PIPE

A. Pipe joining procedure shall be in accordance with these Specifications and in accordance with the recommendations of the manufacturer of the particular type of joint.

B. Ductile Iron Pipe

1. Mechanical Joint Pipe

a. The joining of mechanical joint pipe shall be performed in accordance with AWWA standard for installation of Cast Iron Water Mains C600.
b. The ends of the two pieces of pipe to be joined shall first be thoroughly cleaned to remove oil, grit, excess coating, and other foreign matter, and then lubricated prior to joining glands shall be slipped on the spigot end of the pipe with the lip extension of the gland toward the socket end.
c. The rubber gasket shall be lubricated and placed on the spigot end with the thick edge toward the gland.
d. The entire section of the pipe shall be pushed forward to seat the spigot end in the bell.
e. The gasket shall then be pressed in place within the bell, care being taken to locate the gasket evenly around the entire joint.
f. The cast iron gland shall be moved along the pipe into position for bolting; all the bolts shall be inserted, and hard tightened.
g. All nuts shall then be tightened with a suitable torque-limiting wrench.
h. The torque for various sizes of bolts shall be per the manufacturer's recommendations.
i. Nuts spaced 100 to 180 degrees apart shall be tightened alternately in order to produce an equal pressure on all parts of the gland.

2. Push-On Joint Pipe

a. The joining of Push-on joint pipe shall be performed in accordance with the AWWA Standard for Installation of Cast Iron Water Mains C600 and in accordance with the manufacturer's instructions and/or recommendations for the particular joint furnished.
b. The inside of the bell and the outside of the spigot end shall be thoroughly cleaned to remove oil, grit, excess coating and other foreign matter.
c. The circular rubber gasket shall be flexed inward and inserted in the gasket recess of the socket.
d. A thin coat of gasket lubricant shall be applied to either the inside surface of the gasket or outside surface of the spigot, or both.
e. Gasket lubricant shall be as supplied by the particular manufacturer and reviewed by the Engineer.
f. The spigot end of the pipe shall be carefully inserted in the socket so that the joining surfaces will not come in contact with the ground, trench bed or trench sides.
g. The joint shall then be completed by forcing the spigot end to the

bottom of socket by methods as recommended by the particular manufacturer and concurred with by the Engineer.

h. All pipe shall be furnished with a depth mark to indicate a 'full-home' assembly.
i. The Contractor shall provide special transition sleeves or transition pieces of pipe for connecting pipe of different classes; and those special pieces shall be clearly identified with suitable marking.
j. If the Contractor desires to cut lengths in the field to make closures, he shall have on hand an adequate number of lengths of pipe of the various classes having the exterior of the barrel gauged to fit the socket of pipe.

3. Restrained Joint Pipe

a. Joints and pipe ends for restrained joint pipe shall be prepared and installed in accordance with the pipe manufacturer's recommendations

4. Flanged Pipe

a. The joining of flanged ductile iron pipe shall be in accordance with the requirements of ANSI B31.1.0.
b. All bolt holes shall so match as to permit free insertion of bolts without binding.
c. Faces of flanges shall match fully and shall be true both horizontally and vertically before the bolts are tightened.
d. Any misalignment or vertical deviation from a true match shall not be corrected by tightening the bolts but shall be remedied by adjustment of the piping.
e. The same requirements shall apply for connection of flanged pipe to flanged equipment.
f. Gaskets shall be suitable for the particular class of flanges with which the pipe is equipped, and the entire piping system shall be leak-proof.

3.3 PIPE JOINT CONSTRUCTION AND INSTALLATION

A. General: Join and install pipe and fittings according to installations indicated.

B. Ductile-Iron Sewer Pipe with Ductile-Iron Fittings: According to AWWA C600.

C. Join piping made of different materials or dimensions with couplings made for this application. Use couplings that are compatible with and that fit both systems' materials and dimensions.

END OF SECTION 33 31 14.10

SECTION 33 39 13 - MANHOLES AND APPURTENANCES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes requirements for manholes and appurtenances, including the following:

1. Precast concrete wet wells.
2. Precast concrete manholes.
3. Manhole castings.
4. Manhole steps.
5. Flexible joints for manhole-sewer connections.
6. Manhole testing.

1.2 SUBMITTALS

A. Shop Drawings:

1. Include plans, elevations, details, and attachments for the following:

a. Precast concrete manholes.
b. Manhole frames and covers.

1.3 DELIVERY, STORAGE, AND HANDLINGHandle precast concrete manholes and other structures according to manufacturer's written rigging instructions.

PART 2 - PRODUCTS

2.1 PRECAST CONCRETE WET WELL AND MANHOLES

A. Precast concrete manholes shall be of the following types and sizes:

1. Standard Manholes: Manhole barrel diameter 4'-0" for use on sewers less than 24 inches in diameter.
2. Type I Manhole: Manhole barrel diameter 5'-0" for use on sewers 24 inches through 36 inches in diameter.
3. Type IA Manhole: Manhole barrel diameter 6'-0" for use on sewers 42 inches through 48 inches in diameter.

B. The precast reinforced concrete manholes shall be constructed in accordance with ASTM Standard Requirements for Precast Reinforced Concrete Manholes, ASTM Designation C-478, latest revision.

1. Concrete: Shall have a minimum compressive strength of 4,000 psi at 28 days.
2. Cement: Shall be Type II with C3A content of 5.5% or less.
3. Manhole Surfaces: The interior and exterior surfaces of the manholes shall have smooth hard finish; and shall be free from cracks, chips and spalls.
4. Coatings:

    a. The interior surfaces of the manhole shall be coated with a high-build glass-flake Cementitious epoxy coating to dry film thickness of not less than 20 mils. Cementitious epoxy coating shall be PCS-9043 Type II Coating as manufactured by Permite Coatings, or equivalent.

5. Ballast: Increase thickness of precast concrete sections or add concrete to base section, if required to prevent flotation.
6. Base Section:

    a. 6-inch minimum thickness for floor slab.
    b. 4-inch minimum thickness for walls and base riser section.
    c. Having base section with integral floor.
    d. For installation on existing storm sewers, having no floor and vertically slotted openings. This base section configuration is commonly referred to as “doghouse”.
    e. Shall be fabricated with two non-penetrating lifting inserts.

        1) Lifting inserts shall be Manhole Lifting System inserts as manufactured by Press-Seal GASKET Corporation or equivalent.
        2) Lifting eye bolts manufactured by the insert manufacturer shall be supplied to the Contractor.

7. Riser Sections:

    a. 4-inch minimum thickness.
    b. Risers shall be furnished in suitable increments to an elevation (for the particular manhole) not more than 12 inches below the base of the cast iron frame and cover to be set on that particular manhole.
    c. Maximum elevation of riser shall be that which will permit setting top of manhole frame at the appropriate finished grade.
    d. Shall be fabricated with two non-penetrating lifting inserts.

        1) Lifting inserts shall be Manhole Lifting System inserts as manufactured by Press-Seal GASKET Corporation or equivalent.
        2) Lifting eye bolts manufactured by the insert manufacturer shall be supplied to the Contractor.

8. Top Section:

    a. May be eccentric-cone type.

b. Shall be suitable for mounting cast iron manhole frames and covers described in these Specifications.
c. Shall be fabricated with two non-penetrating lifting inserts.

1) Lifting inserts shall be Manhole Lifting System inserts as manufactured by Press-Seal GASKET Corporation or equivalent.
2) Lifting eye bolts manufactured by the insert manufacturer shall be supplied to the Contractor.

9. Drop Inlets:

a. Install drop inlet assemblies at manholes in which difference of flow lines is more than 24 inches. For differences of flow lines less than 24 inches, slope manhole invert to connect grades.

1) Drop Inlet Assemblies: Stacks placed adjacent to manhole supported by poured concrete, as shown on Standard Drawings.
2) Valve boxes shall be cast iron, screw type, with cast iron extension pieces as required to make up length of box to ground surface.
3) Valve boxes shall be manufactured of cast iron in accordance with the requirements of ASTM A48, Class 35.
4) Covers shall be marked "SEWER".
5) Finishes: All parts of valve boxes, bases, and covers shall be shop coated by dipping in asphalt varnish.

10. Joints between manhole sections:

a. Joints between manhole sections shall be offset tongue and groove type.
b. Joints shall be installed using a prelubricated manhole gasket which shall conform to the following requirements:

1) Gasket shall consist of a compression section and a serrated mantel section which slides over the compression section as the manhole sections are placed together.
2) Gasket shall meet the requirements of ASTM C 443.
3) The manhole gasket shall be Tylox Super-Seal manufactured by Hamilton Kent, Ltd. of Canada, or Engineer-approved equivalent.

11. Grade Rings:

a. Include two or three reinforced-concrete rings.
b. Rings shall be 6- to 9-inch total thickness.
c. Rings shall match cast iron manhole frames and covers described in these Specifications.

2.2 MANHOLE CASTINGS

A. Manhole frames and covers shall be cast from gray iron meeting the requirements of ANSI/ASTM A 48-83, not less than Class 30.

B. Manhole frames and covers shall conform to the following requirements:

1. All castings shall be free from scale, lumps, blisters, sand holes and other defects that would render them unfit for the service for which they are intended.
2. Manhole covers shall be of the solid indented pattern, and shall be lettered as indicated.
3. Bearing surfaces of frames and covers shall be machined to secure a solid bearing and to prevent rocking, and the fit of the cover in the frame shall be tight (close) so as to prevent flipping.
4. Castings having uneven bearing between cover and frame or loose-fitting covers shall be rejected.
5. The Contractor shall submit for review by the Engineer, pattern drawings of manhole castings.
6. Frames and covers installed on manholes located in open areas shall weigh not less than 290#, and frames and covers installed on manholes in locations subject to traffic shall weight not less than 375#.
7. All manhole covers (lids) shall be self-sealing type and shall have no through pick-holes.
8. Manholes frames and covers shall be equivalent in quality to manufacturer of Neenah Foundry Company or Barry Pattern & Foundry Company.

C. Where indicated, waterproof (watertight) manhole frames and covers shall be furnished and installed and shall conform to the following requirements:

1. Waterproof manhole frames and covers shall have bolted-on covers with round rubber gaskets for watertight sealing under sub-aqueous service.
2. Waterproof manhole frames and covers shall be similar and equivalent to Neenah Catalog No. R-1916-E, or similar product of Barry Pattern & Foundry Company or equivalent.
3. Bottom flanges of manhole frames shall have three (3) ¾" diameter holes bored and spaced at 120° around flange for anchor bolts when manholes are set in such locations requiring anchorage of covers as specified in the preceding paragraph.

D. In order for each manhole to be correctly assembled to suit construction conditions existing at particular locations, all components of each manhole shall be clearly marked.

2.3 MANHOLE STEPS

A. Manhole steps shall conform to the following requirements:

1. All steps shall meet the requirements of the Occupational Safety and Health Standards, U.S. Department of Labor.
2. All types of steps shall be specially designed and suitable for use in precast concrete manholes.

B. Types of steps shall be as follows:

1. Copolymer polypropylene plastic meeting the requirements of ASTM D 2146.

a. Shall be reinforced with ½" diameter deformed bar meeting the requirements of ASTM A 615, with inserted ends corrugated for bond, and integrally cast in barrels of manholes.

2.4 OPENINGS FOR SEWER PIPES

A. Openings for sewer pipes shall be provided in the manhole sections at positions as required by alignment and elevations.

B. Openings may be cast into the manhole wall or mechanically cored.

C. Sewer pipes that do not require flexible joints shall be sealed into the manhole wall with mortar.

D. Such openings in manhole walls shall be large enough to permit variations in both vertical and horizontal position as field conditions may dictate.

E. Mortar for sealing pipelines into manhole shall be one part Portland cement (Type II) and two parts sand by volume.

F. Enough water shall be used in the mixture to produce a stiff workable mix but shall not exceed five and one-half gallons per sack of cement.

2.5 FLEXIBLE JOINTS FOR MANHOLE-SEWER CONNECTIONS

A. Flexible joints or flexible connectors, for connection of sewers smaller than 24 inches in diameter to manholes shall be either of the two following types:

1. Complete joint with insert piece pre-cast into wall of manhole and comprised of the following components:

a. Cast iron insert ring, ASTM A48, Class 20, tapped ½ inch to receive draw bolts
b. Cast iron compression flange, ASTM A48, Class 20
c. Corten draw bolts with washers and nuts
d. Rubber "O" -ring gasket, ASTM C443

2. Complete joint with seal assembly inserted in hole cored in manhole wall

and comprised of the following components:

a. Rubber or neoprene boot.
b. Stainless steel seal band.
c. Stainless steel pipe clamp.

PART 3 - EXECUTION

3.1 MANHOLE INSTALLATION

A. General: Install manholes, complete with appurtenances and accessories indicated.

B. Form continuous concrete channels and benches between inlets and outlet.

C. Set tops of frames and covers flush with finished surface of manholes that occur in pavements. Set tops 3 inches above finished surface elsewhere, unless otherwise indicated.

D. Install precast concrete manhole sections with gaskets according to ASTM C 891.

E. All precast concrete manholes shall be set on foundation bed of compacted crusher run stone, choked with fines, 12 inch minimum thickness, and covering the entire bottom of the excavation for the manhole.

3.2 MANHOLE TESTING

A. All new manholes shall be tested by the Contractor using the vacuum test method, following the manufacturer's recommendations for proper and safe procedures.

B. Any leakage in the manhole or structure, before, during, or after the test shall be repaired.

C. All pipes for vacuum testing entering the manhole shall be installed at the top access point of the manhole.

D. A vacuum of 10 inches of mercury (Hg) (5.0 psi) shall be drawn on the manhole, and the time shall be measured for the vacuum to drop to 9 inches of mercury (Hg) (4.5).

E. Manholes will be considered to have failed the vacuum test if the time to drop 1 inch of mercury is less than what is shown in the following table:

VACUUM TEST TIMETABLE

	Manhole Diameter			
Depth (ft.)	48 inches	60 inches	72 inches	96 inches
4	10 sec.	13 sec.	16 sec.	19 sec.
8	20 sec.	26 sec.	32 sec.	38 sec.
12	30 sec	39 sec.	48 sec.	57 sec.
16	40 sec.	52 sec.	64 sec.	76 sec.
20	50 sec.	65 sec.	80 sec.	95 sec.
+ Each 2 ft.	+ 5 sec.	+ 6.5 sec.	+ 8 sec.	+9.5 sec.

F. Manhole depths shall be rounded to the nearest foot.

G. Intermediate values shall be interpolated.

H. For depths above 20 feet, add the values listed in the last line of the table for every 2 feet of additional depth.

I. If the manhole or structure fails the vacuum test, the Contractor shall perform additional repairs and repeat the test procedures until satisfactory results are obtained.

END OF SECTION 33 39 13

APPENDIX A

ALDOT PERMIT

ALABAMA DEPARTMENT OF TRANSPORTATION

East Central Region
Alexander City Area
Anniston - District 2
1545 U.S. HWY 431 N
ANNISTON, AL 36206
Telephone: (256) 820-3131
Fax: (256) 820-1715

Kay Ivey
Governor

John R. Cooper
Transportation Director

March 16, 2020

The Water Works & Sewer Board
of The City of Anniston
931 Noble Street, Suite 200
Anniston, AL 36201

Attn: Mr. Cameron Fortenberry

RE: Permit No. 4-2-10380
AL 0021; MP 259.85
Calhoun County

Dear Mr. Fortenberry:

Attached you will find the above referenced original permit and one copy which has been approved as redlined. A copy of this permit must be on site at all times while work is being performed on State right of way. It is extremely important to maintain all applicable BMPs and traffic control devices in an efficient and timely manner until construction is complete and vegetation is established. **Please be sure to dress, seed, and mulch all areas that are disturbed on ALDOT ROW.** I have also attached two letters which you shall complete and return to this office via mail, email, or fax indicating the beginning and end of work. Please remember to contact this office 24 hours prior to beginning work on State right of way.

If any additional information is needed, please advise.

Sincerely,

D. Shane Brown
District Two Administrator

DSB/rkf
Attachments
Cc: Mr. John R. Moon, P.E.
Mr. Bryan Orange
File

ALABAMA DEPARTMENT OF TRANSPORTATION
PERMIT AGREEMENT FOR THE ACCOMMODATION OF UTILITY FACILITIES ON PUBLIC RIGHT-OF-WAY

County Calhoun

Route Number 21

Milepost 259.85

FOR OFFICIAL USE ONLY
DATE RECEIVED FROM APPLICANT: 7/7/20
PERMIT NUMBER: 4-2-10380

Bonding Agency The Ohio Casualty Ins. Company Bond Number LSF000354

Associated Permits and/or Documents _____

THIS AGREEMENT is entered into this the 7th day of July, 20 20, by and between the Alabama Department of Transportation acting by and through its Transportation Director hereinafter referred to as ALDOT and Anniston Water Works & Sewer Board, a Utility hereinafter referred to as the APPLICANT.

WITNESSETH

WHEREAS, the APPLICANT desires to have its facilities accommodated on public highway right-of-way in Calhoun County, Alabama consisting approximately of the following:

Bored crossing of Highway 21 in Anniston, Alabama consisting of approximately ~~235~~ 245 feet of a 12-inch ductile iron gravity sewer encased in 24-inch I.D ASTM A252 welded steel casing pipe.

installed by dry bore 08-AL-0021-MU-051-A

33.7266°N 85.8067°W 33.7274°N 85.8068°W; and

WHEREAS, ALDOT hereby grants to the APPLICANT approval to cross or locate its facilities on the public right-of-way at the location and in the manner hereinafter set forth:

NOW, THEREFORE, it is agreed by and between the parties hereto as follows:

1. The APPLICANT will install its facilities on public right-of-way in accordance with plans and specifications of the APPLICANT as approved by ALDOT which plans and specifications are hereby made a part of this permit by reference.

2. In the installation of facilities and performing work under this agreement, the APPLICANT will conform to the provisions of the latest edition of the Alabama Department of Transportation Utility Manual, which manual is of record in ALDOT and is hereby made a part of this permit by reference.

3. The national Manual on Uniform Traffic Control Devices, ALDOT approved edition, is hereby made a part of this permit by reference and will be conformed to as the provisions thereof are applicable to such work. Such Manual is of record in ALDOT at the execution of this Agreement.

4. The Federal Water Pollution Control Act, The Federal Insecticide, Fungicide, and Rodenticide Act, The Alabama Water Pollution Control Act, The Alabama Environmental Management Act, The Clean Water Act (1987), and the Alabama Nonpoint Source Management Program (1989) are hereby made a part of this permit by reference.

5. The APPLICANT will conform to the regulations of the Environmental Protection Agency (EPA) and of the Alabama Department of Environmental Management (ADEM), latest edition, for both installation and maintenance of such facilities.

The APPLICANT will provide proof of applicable permit coverage and conform to the above referenced regulations for both the facility installation and maintenance of permitted facilities and areas of rights-of-way. The APPLICANT must provide a copy of the Notice of Intent (NOI) issued by ADEM. This will assure compliance with Phase II of storm-water construction requirements. In the event a NOI is not required, APPLICANT must submit to ALDOT a Best Management Practices (BMP) plan to control sediment run-off.

6. In the event that ALDOT is issued a citation or any other enforcement document by ADEM/EPA for failure to comply with applicable requirements, it shall be the responsibility of the APPLICANT to bring all BMPs into compliance and to pay for any fines, assessments, etc. that may be issued to ALDOT by ADEM/EPA.

7. Underground Damage Prevention Legislation, Alabama Act 94-487, is hereby made a part of this permit by reference. The APPLICANT will conform to the above referenced regulations for both the facility installation and maintenance of permitted facilities and areas of rights-of-way. Should the permitted work require a locate request ticket, no work shall begin until a copy of such ticket is obtained and the APPLICANT shall keep a copy of such ticket at the site of work.

8. If hazardous materials, wastes, substances, or as otherwise defined by Code of Alabama § 6-5-332.1(a)(2) (1993 Repl. Vol.) are encountered in the execution of this Agreement it will be the responsibility of the APPLICANT to notify the proper agency responsible for said hazardous materials and to comply with any and all environmental regulations as established by the Environmental Protection Agency (EPA), Alabama Department of Environmental Management (ADEM), and of the Occupational Safety and Health Administration (OSHA) in the proper disposition of the hazardous materials encountered.

9. This permit is valid for the contract period which is defined as follows: All proposed work as described and submitted in the permit documents must be completed within one year from the approved date of the permit and for a period covering one year from ALDOT acceptance of proposed work.

10. The APPLICANT will perform or cause to be performed the work applied for in this permit contract and will restore the highway in the work area in as good condition as the same was prior to the work and will maintain the accomplished work and highway work area in a condition satisfactory to ALDOT. Should the APPLICANT not maintain the work or create an unsafe condition during the contract period, ALDOT reserves the right to remove any work and restore the ROW to a safe condition at the expense of the APPLICANT and the APPLICANT agrees to pay ALDOT all such costs as a result.

11. Once work is begun, the APPLICANT shall pursue the work continuously and diligently until completion. Should the APPLICANT feel that the work cannot be completed in a one year period, they shall submit in writing (30 days prior to the termination date) to ALDOT the reasons for an extension of time. ALDOT will determine whether an extension may be approved.

12. The APPLICANT will file with ALDOT an acceptable certified check or bond in the penal amount of $ 20,000 (Bond Number: LSF000354) to guarantee the faithful performance of this permit contract in its entirety during the contract period as defined in item 9. Upon satisfactory completion and acceptance of all work provided for in this permit contract, the check or bond, as applicable, will be returned to the APPLICANT; otherwise, the proceeds from the check, or any amount received by ALDOT as a result of the bond, will be applied to complete and fulfill the permit contract terms. In the instance that ALDOT determines a bond on record is necessary, the APPLICANT shall provide such bond to ALDOT. The bond amount shall be determined by ALDOT.

13. Indemnification Provisions. Please check the appropriate type of applicant:

By entering into this agreement, the APPLICANT is not an agent of the State, its officers, employees, agents or assigns. The APPLICANT is an independent entity from the State and nothing in this agreement creates an agency relationship between the parties.

☒ If the applicant is an incorporated municipality or gas district then:

Subject to the limitations on damages applicable to municipal corporations under Ala. Code § 11-47-190 (1975), the APPLICANT shall defend, indemnify, and hold harmless the State of Alabama, ALDOT, its officers, officials, agents, servants, and employees, in both their official and individual capacities, from and against (1) claims, damages, losses, and expenses, including but not limited to attorneys' fees arising out of, connected with, resulting from or related to the work performed by the APPLICANT, or its officers, employees, contracts, agents or assigns (2) the provision of any services or expenditure of funds required, authorized, or undertaken by the APPLICANT pursuant to the terms of this Agreement, or (3) any damage, loss, expense, bodily injury, or death, or injury or destruction of tangible property (other than the work itself), including loss of use therefrom, and including but not limited to attorneys' fees, caused by the negligent, careless or unskillful acts of the APPLICANT its agents, servants, representatives or employees, or the misuse, misappropriation, misapplication, or misexpenditure of any source of funding, compensation or reimbursement by the APPLICANT, its agents, servants, representatives or employees, or anyone for whose acts the APPLICANT may be liable.

☐ If the applicant is county government then:

The APPLICANT shall be responsible at all times for all of the work performed under this agreement and, as provided in Ala. Code § 11-93-2 (1975), the APPLICANT shall protect, defend, indemnify and hold harmless the State of Alabama, The Alabama Department of Transportation, its officials, officers, servants, and employees, in both their official and individual capacities, and their agents and/or assigns.

For all claims not subject to Ala. Code § 11-93-2 (1975), the APPLICANT shall indemnify and hold harmless the State of Alabama, the Alabama Department of Transportation, the officials, officers, servants, and employees, in both their official and individual capacities, and their agents and/or assigns from and against any and all action, damages, claims, loss, liabilities, attorney's fees or expense whatsoever or any amount paid in compromise thereof arising out of, connected with, or related to the (1) work performed under this Agreement, (2) the provision of any services or expenditure of funds required, authorized, or undertaken by the APPLICANT pursuant to the terms of this agreement, or (3) misuse, misappropriation, misapplication, or misexpenditure of any source of funding, compensation or reimbursement by the APPLICANT, its agents, servants, representatives, employees or assigns.

☐ If the applicant is a state governmental agency or institution then:

The APPLICANT shall be responsible for damage to life and property due to activities of the APPLICANT of employees of APPLICANT in connection with the work or services under this Agreement. The APPLICANT agrees that its contractors, subcontractors, agents, servants, vendors or employees of APPLICANT shall possess the experience, knowledge and skill necessary to perform the particular duties required or necessary under this Agreement. The APPLICANT is a state institution and is limited by the Alabama Constitution in its ability to indemnify and hold harmless another entity. The APPLICANT maintains self-insurance coverage applicable to the negligent acts and omissions of its officers and employees, which occur within the scope of their employment by the APPLICANT. The APPLICANT has no insurance coverage applicable to third-party acts, omissions or claims, and can undertake no obligation that might create a debt on the State Treasury. The APPLICANT agrees ALDOT shall not be responsible for the willful, deliberate, wanton or negligent acts of the APPLICANT, or its officials, employees, agents, servants, vendors, contractors or subcontractors. The APPLICANT shall require, its contractors and its subcontractors, agents, servants or vendors, as a term or its contract with the APPLICANT, to include ALDOT as an additional insured in any insurance policy providing coverage for the work to be performed pursuant to and under this Agreement and to provide the APPLICANT a copy of the insurance policy declaration sheet confirming the addition of ALDOT thereto.

☐ If the applicant is not a county, incorporated municipality, or state governmental agency or institution then:

The APPLICANT will protect, defend, indemnify and hold harmless the State of Alabama, ALDOT, the officials, officers, and employees, in both their official and individual capacities, and their agents and/or assigns, from and against any and all actions, damages, claims, loss, liabilities, attorney's fees or expense whatsoever or any amount paid in compromise thereof arising out of or connected with the work performed under this Permit, and/or the APPLICANT's failure to comply with all applicable laws or regulations.

14. The APPLICANT will be obligated for the payment of damages occasioned to private property, public utilities or the general public, caused by the legal liability (in accordance with Alabama and/or Federal law) of the APPLICANT, its agents, servants, employees or facilities.

15. ALDOT in executing this Agreement does not in any way assume the responsibility for the maintenance of the facilities of the APPLICANT, nor the responsibility for any damage to the facilities caused by third parties.

16. The APPLICANT will have a copy of this Agreement on the project site at all times while said work is being performed.

17. Nothing contained in this Permit Agreement, nor the issuance or receipt thereof, shall be construed to alter or affect the title of ALDOT to the public right-of-way nor to increase, decrease or modify in any way the rights of the APPLICANT provided by law with respect to the construction, operation or maintenance of its facilities on the public right-of-way.

18. Reimbursement for future relocations of the APPLICANT'S facilities will be in accordance with State law in effect at the time such relocations are made.

19. The APPLICANT stipulates that the specific use of these facilities located upon public right-of-way is **to upgrade sanitary sewer system.**
The APPLICANT further stipulates that should this specific use change at any time in the future that the APPLICANT will notify ALDOT immediately of the change.

This Agreement is deemed to be executed on the date hereinabove set forth by the parties hereto in their respective names by those persons and officials thereunto duly authorized. Witness our hands and seals, this the 7th day of July, 2020.

WITNESS:

Anniston Water Works and Sewer Board
Legal Name of Applicant

By: [signature], Engineering Tech.
Authorize Signature and Title for Applicant

Cameron Fortenberry, Engineering Technician
Typed or Printed Name of Signee

931 Noble Street, Suite 200, PO Box 2268
Address Line 1

Anniston, AL 36201 (36202-2268)
Address Line 2

256-241-2000
Telephone Number

ALDOT - RECEIVED
JUL - 7 2020
ECR-ALEX CITY-D2

FOR OFFICIAL USE ONLY

RECOMMENDED FOR APPROVAL:

	Printed Name	Signature	Date
DISTRICT:	Shane Brown	[signature]	7/7/20
AREA:			
REGION:			

ALDOT
JUL 16 2020
RECEIVED
MAINTENANCE

APPROVED:
ALABAMA DEPARTMENT OF TRANSPORTATION
ACTING BY AND THROUGH ITS TRANSPORTATION DIRECTOR

(PLEASE CHECK APPROPRIATE BOX)

- ☐ CENTRAL OFFICE
- ☐ REGION
- ☒ AREA
- ☐ DISTRICT

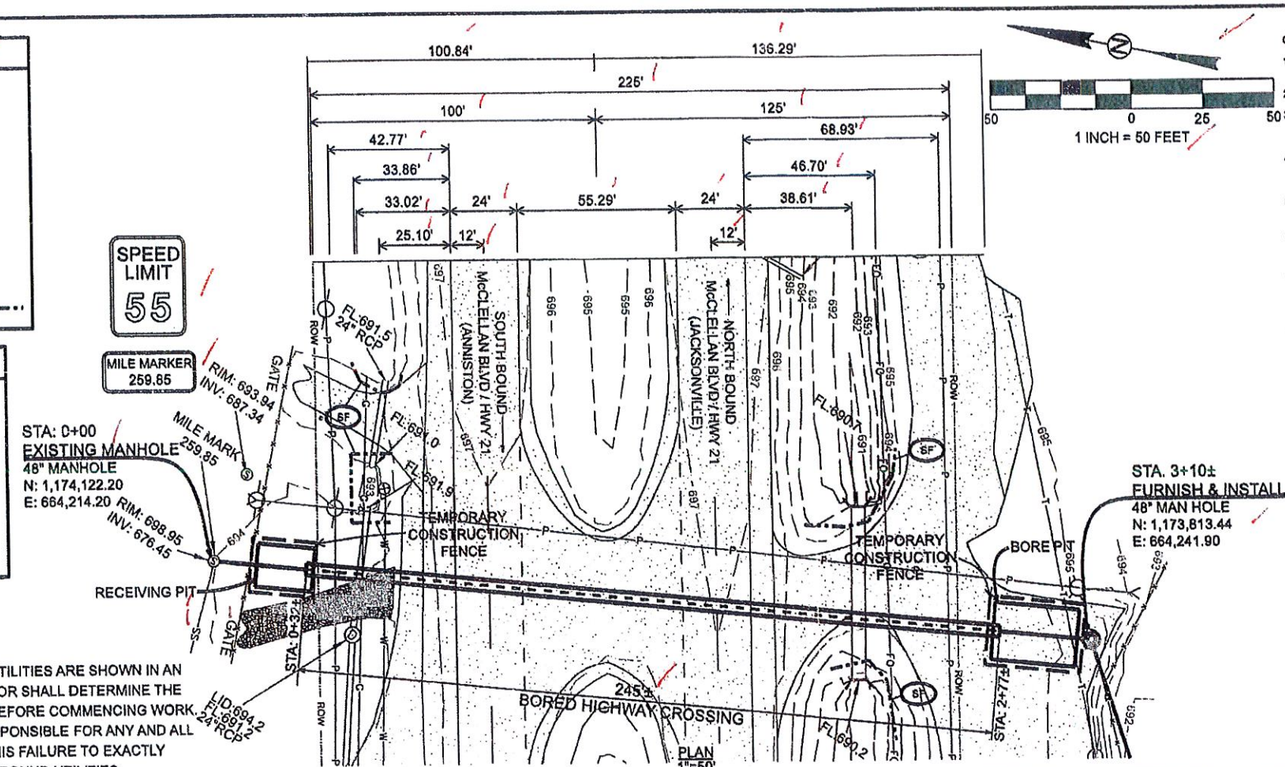
	Printed Name	Signature	Date
By:	Shannon T. Jones	[signature]	7/13/2020


Permit 4-2-10380
Receiving Pit
Bore Pit
Cave Rd
Scott St
1st Ave
Ave B
Ave A
Bellwood Ave
Rice Rd
Hillside Dr
Red Oak Dr
Cedar Ct
Meadowlark Dr
Cedar Ln
Spruce Dr
Main St
Brookwood Dr
Lenlock Dr
Glade Rd E
Baltzell Gate Rd
Galloway Gate Rd
14th Band Rd
Littlebrant Dr
Avery Dr
Morton Rd
Shipley Rd
Foxley Rd
Williams Rd
Powers A
Google Earth
© 2020 Google
2000 ft
N

APPLY TO ALL DISTURBED AREAS	
DC	DUST CONTROL
PSM	PERMANENT SEEDING & MULCHING
DC	DUST CONTROL
OP	OUTLET PROTECTION
CIP	CULVERT INLET PROTECTION
GIP	GRATE INLET PROTECTION
SF	SILT FENCE

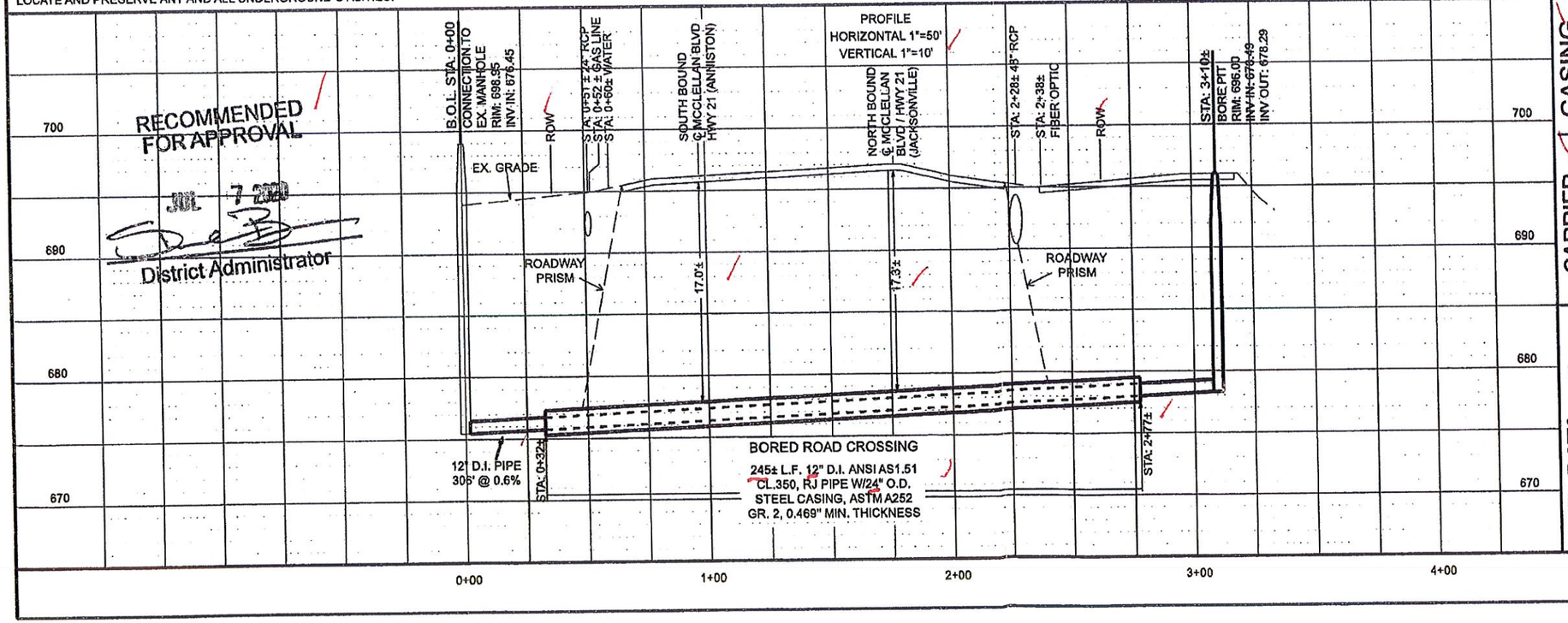
UTILITY LEGEND	
WATER LINE	W
SANITARY SEWER	SS
GAS LINE	G
POWER (OVERHEAD)	P
TELEPHONE (OVERHEAD)	T
FIBER OPTIC	FO

NOTE:
THE LOCATION OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE MANNER ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. THE CONTRACTORS AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.



GENERAL NOTES

1. ALL MANHOLES, VALVE BOXES, AND HANDHOLES SHALL BE MOUNTED FLUSH WITH GROUND.
2. ALL WATER AND GAS METERS SHALL BE INSTALLED OUTSIDE OF ALDOT ROW.
3. TRAFFIC CONTROL DEVICES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES LATEST EDITION.
4. EROSION CONTROL DEVICES SHALL BE INSTALLED AND MAINTAINED DURING THE WORK AND SHOULD MEET THE REQUIREMENTS OF ALDOT AND ADEM REGULATIONS.
5. ALL MATERIALS USED ON ALDOT ROW WILL CONFORM TO ALDOT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION LATEST EDITION.
6. ANY DAMAGE OCCURRED DURING CONSTRUCTION OF THE PROJECT TO ANYTHING WITHIN ROW WILL BE REPAIRED BY THE APPLICANT PER ALDOT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION LATEST EDITION.
7. PRIOR TO ANY TRAFFIC CONTROL DEVICES BEING INSTALLED ON ROW, THE CONTRACTOR RESPONSIBLE FOR TRAFFIC CONTROL SHALL CONTACT THE ALDOT OFFICE AT (256)820-3131 AT LEAST 24 HOURS IN ADVANCE OF THE FIRST INSTALLATION.
8. ALL BORE PITS SHALL BE CLOSED AND DRESSED THE SAME DAY OR THERE IS TO BE CONSTRUCTION FENCE OR JERSEY BARRIERS INSTALLED ALONG WITH EROSION CONTROL MEASURES TAKEN (HAY BALES AND SILT FENCE).
9. APPLICANTS WILL NEED A QUALIFIED CREDENTIAL INSPECTOR FOR THE PROJECT AND THIS PERSON'S NAME AND CONTACT INFORMATION SHOULD BE MADE AVAILABLE TO THE ALDOT OFFICE AT (256)820-3131. A PRELIMINARY REVIEW SHALL BE DONE ON SITE PRIOR TO WORK ON ROW WITH ALDOT AND REVIEWS SHALL BE DONE IN ACCORDANCE TO ADEM REGULATIONS. THE QCI SHALL INSPECT BMPS AFTER EACH ½" RAIN AND EACH WEEK. THE REPORTS GENERATED FROM THESE INSPECTIONS SHALL BE SENT TO THE DISTRICT OFFICE WEEKLY.
10. ALDOT MUST BE NOTIFIED AT LEAST 24 HOURS PRIOR TO WORK BEGINNING ON ROW.
11. ALL AREAS ON ROW SHALL BE NEATLY GRADED, DRESSED, GRASSED, AND MULCHED IN A MANNER TO ESTABLISH POSITIVE FLOW AND A HEALTHY STAND OF GRASS.
12. APPLICANTS MUST PROVIDE CERTIFICATION THAT ALL EROSION CONTROL PRODUCTS AND HAY IS COGONGRASS FREE.
13. APPLICANTS MUST REMOVE OR FILL ABANDONED LINES WITH GROUT.
14. THE LOCATION OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE MANNER ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. THE CONTRACTOR AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.
15. ALL PIPING SHALL BE CLASS 350 UNLESS NOTED OTHERWISE.
16. THE EROSION CONTROL MEASURES SHOWN ARE A REQUIRED MINIMUM. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PREVENTION OF SEDIMENT TRANSPORT FROM ALL LOCATIONS OF WORK IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS DURING CONSTRUCTION. THE CONTRACTOR SHALL INSTALL AND ADDITIONAL DEVICES AND IMPLEMENT ADDITIONAL PRACTICES IF WARRANTED BY FIELD CONDITIONS.



RECOMMENDED FOR APPROVAL
JUL 7 2020
District Administrator

PIPE DATA	CARRIER	CASING
COMMODITY OF CARRIER	WASTEWATER	
I.D. & O.D./DIAMETER	12.64"/13.20"	24"/24.75"
TYPE OF PIPE	DUCTILE IRON	STEEL
SPEC. & GRADE	ANSI A21.51	ASTM A252, GR.2
WALL THICKNESS	0.28"	.375"
MAX. WORKING PRESSURE	350 PSI	
TYPE OF JOINT	RESTRAINED	WELDED
O.D. OF JOINT	16.33"	
METHOD OF INSTALLATION	INSERT	DRY BORING

ANNISTON WATER WORKS AND SEWER BOARD

BALTZELL LS ELIMINATION

SHEET TITLE: GRAVITY SEWER PLAN AND PROFILE

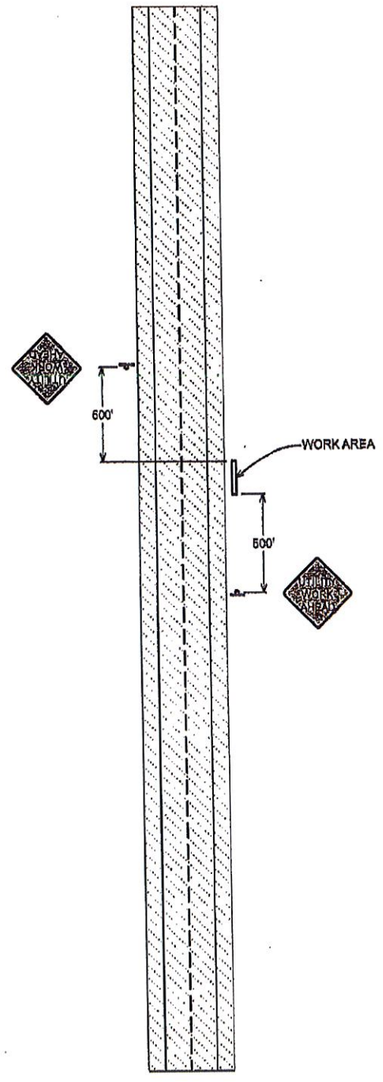
ISSUE DATE:	07/07/2020
DRAWN BY:	CF
CHECKED BY:	CO
DESIGNED BY:	CF

WO NUMBER: 6496

SHEET NUMBER: GS-01

ANNISTON WATER WORKS AND SEWER BOARD
931 NOBLE STREET
ANNISTON, ALABAMA 36201
256-241-2000
WWW.AWWSB.ORG

TRAFFIC CONTROL:

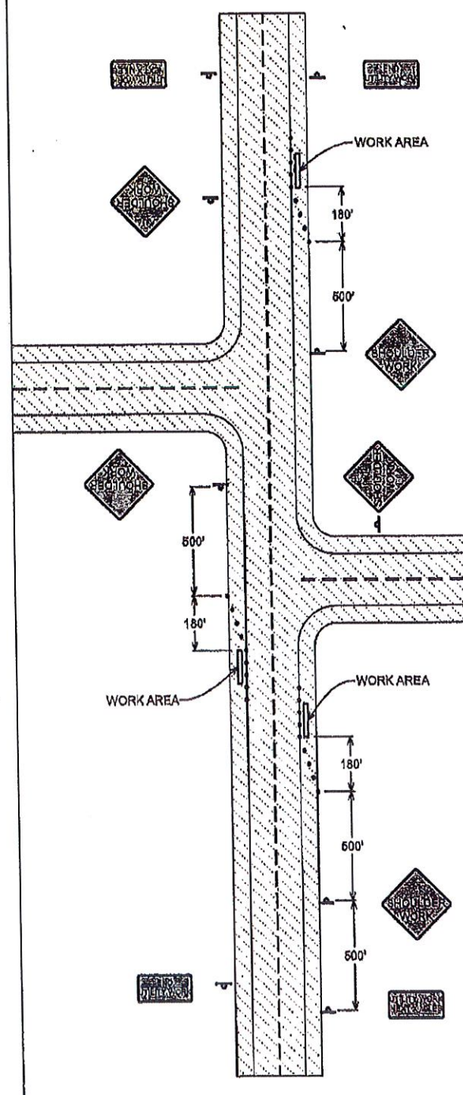


NOTES:

1. THE ROAD WORK AHEAD SIGN MAY BE OMITTED WHERE THE WORK SPACE IS BEHIND A BARRIER, MORE THAN 24" BEHIND THE CURB, OR 15 FEET OR MORE FROM THE EDGE OF ANY ROAD

NOT TO SCALE

WORK BEYOND THE SHOULDER

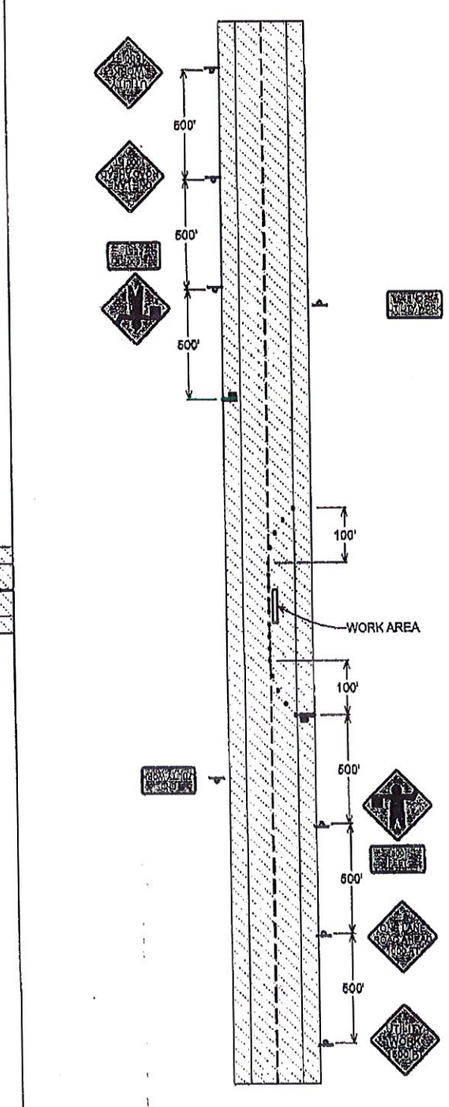


NOTES:

1. A SHOULDER WORK SIGN SHOULD BE PLACED ON THE LEFT SIDE OF THE ROADWAY FOR A DIVIDED OR ONE WAY STREET ONLY IF THE LEFT SHOULDER IS AFFECTED.
2. THE WORKERS SYMBOL SIGNS MAY BE USED INSTEAD OF SHOULDER WORK SIGNS.
3. THE SHOULDER WORK AHEAD SIGN ON AN INTERSECTING ROADWAY MAY BE OMITTED WHERE DRIVERS EMERGING FROM THAT ROADWAY WILL ENCOUNTER ANOTH ADVANCE WARNING SIGN PRIOR THIS ACTIVITY AREA.
4. WHEN PAVED SHOULDER HAVING WIDTH OF 8 FEET OR MORE ARE CLOSED, AT LEAST ONE ADVANCE WARNING SIGN SHALL BE USED. IN ADDITION, CHANNELIZING DEVICES SHALL BE USED TO CLOSE THE SHOULDER IN ADVANCE TO DELINATE THE BEGINNING OF WORK SPACE AND DIRECT VEHICULAR TRAFFIC TO REMAIN WITHIN THE TRAVELED WAY.

NOT TO SCALE

WORK ON SHOULDERS

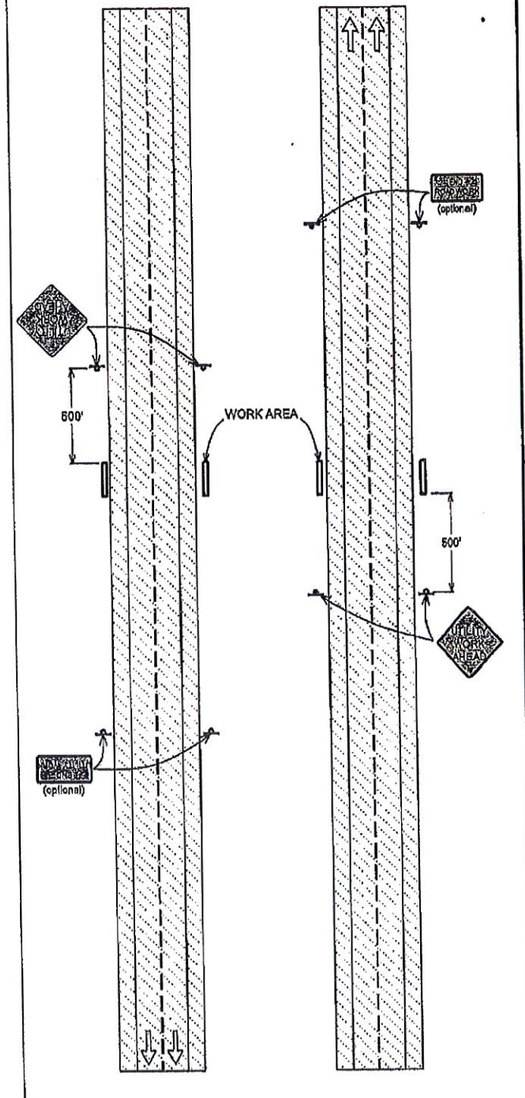


NOTES:

1. FOR LOW VOLUME SITUATION WITH SHORT WORK ZONES ON STRAIGHT ROADWAYS WHERE THE FLAGGER IS VISIBLE TO THE ROAD USERS APPROACHING FROM BOTH DIRECTIONS, A SINGLE FLAGGER, POSITIONED TO BE VISIBLE TO THE ROAD USERS APPROACHING FROM BOTH DIRECTIONS, MAY BE USED.
2. THE ROAD WORK AHEAD AND THE END ROAD WORK SIGN MAY BE OMITTED FOR SHORT-DURATION OPERATIONS.
3. THE BUFFER SPACE SHOULD BE EXTENDED SO THAT THE TWO WAY TRAFFIC TAPPER IS PLACED BEFORE A HORIZONTAL (OR CHEST VERTICAL) CURVE TO PROVIDE ADEQUATE SIGHT DISTANCE FOR THE FLAGGER AND QUE OF STOPPED VEHICLES.

NOT TO SCALE

LANE CLOSURE ON TWO LANE ROAD USING FLAGGERS



NOTES:

1. THE ROAD WORK AHEAD SIGN MAY BE OMITTED WHERE THE WORK SPACE IS BEHIND A BARRIER, MORE THAN 24" BEHIND THE CURB, OR 15 FEET OR MORE FROM THE EDGE OF ANY ROAD

WORK BEYOND THE SHOULDER ON DIVIDED TWO LANE ROAD

ANNISTON WATER WORKS AND SEWER BOARD

BALTZELL LS ELIMINATION

TRAFFIC CONTROL DETAILS	
ISSUE DATE:	07/01/2020
DRAWN BY:	CF
CHECKED BY:	CO
DESIGNED BY:	CF
SHEET TITLE:	
WO NUMBER:	6496
SHEET NUMBER:	TC-01

ANNISTON WATER WORKS AND SEWER BOARD
931 NOBLE STREET
ANNISTON, ALABAMA 36201
256-241-2000
WWW.AWWSB.ORG

A. GENERAL:

1. THE CONTRACTOR SHALL UTILIZE EROSION CONTROL BEST MANAGEMENT PRACTICES (BMP'S) TO PREVENT THE DISCHARGE OF SEDIMENT-BEARING WATER RUNOFF OR AIRBORNE DUST FROM THE PROJECT SITE IN ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL REGULATIONS DURING CONSTRUCTION.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AN NPDES PERMIT FOR STORMWATER DISCHARGE FROM THE CONSTRUCTION SITE(S) FOR ALL WORK DESCRIBED IN THESE SPECIFICATIONS AND SHOWN ON THE DRAWINGS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO MEET ALL REQUIREMENTS AND OBLIGATIONS OF THE PERMIT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH MAKING APPLICATION FOR THE PERMIT AND FOR MEETING THE REQUIREMENTS OF THE PERMIT.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE INSPECTION AND MAINTENANCE OF ALL BMP'S IN ACCORDANCE WITH THE REQUIREMENTS OF THE PERMITTING AUTHORITY.
4. THE CONTRACTOR SHALL ENSURE THAT ALL DOWNSLOPE BMP'S ARE INSTALLED AND FUNCTIONAL BEFORE ANY LAND DISTURBING ACTIVITY IS COMMENCED ON ANY PORTION OF THE SITE.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE INSTALLATION AND MAINTENANCE OF ADDITIONAL BMP'S IF REQUIRED BY FIELD CONDITIONS, THE ENGINEER OR A PERMITTING AUTHORITY HAVING JURISDICTION OVER THE SITE.

B. SILT FENCE:

1. THE INSTALLATION OF SILT FENCES SHALL BE IN CONFORMANCE WITH THE SILT FENCE MANUFACTURER'S RECOMMENDATIONS. PARTICULAR CARE SHALL BE EXERCISED TO ENSURE THAT ALL SILT FENCING IS PROPERLY KEYED INTO THE EARTH AT THE TOE.
2. THE CONTRACTOR SHALL MAINTAIN, CLEAN, REPAIR OR REPLACE SILT FENCE AS MAY BE REQUIRED DURING THE CONSTRUCTION PERIOD. IF A LINE OF SILT FENCING EXCEEDS ITS CAPACITY TO FUNCTION PROPERLY AND THE NEED FOR A BACKUP FENCE BECOMES EVIDENT, THE CONTRACTOR SHALL INSTALL A SECONDARY LINE OF SILT FENCE AT THE AFFECTED AREAS AS REQUIRED AND AUTHORIZED BY THE ENGINEER. FAILURE TO MAINTAIN A SILT FENCE SHALL NOT BE CAUSE FOR THE CONTRACTOR TO CLAIM ADDITIONAL COMPENSATION.

C. AFTER STABILIZATION OF THE DISTURBED AREA HAS BEEN ACHIEVED, THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL TEMPORARY BMP'S AND DRESS OUT THOSE AREAS TO THE PROPER LINE AND GRADE.

BEST MANAGEMENT PRACTICES

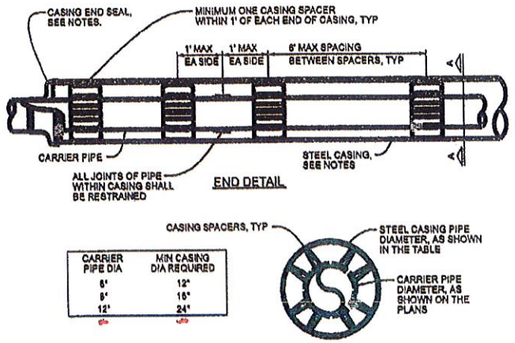
1. THE EROSION CONTROL MEASURES SHOWN ARE A REQUIRED MINIMUM. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PREVENTION OF SEDIMENT TRANSPORT FROM THIS PROPERTY IN ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL REGULATIONS DURING CONSTRUCTION. THE CONTRACTOR SHALL INSTALL ADDITIONAL DEVICES AND IMPLEMENT ADDITIONAL PRACTICES IF WARRANTED BY FIELD CONDITIONS.
2. PRIOR TO CONSTRUCTION ACTIVITIES, THE CONTRACTOR SHALL INSTALL ALL SILT FENCING AND SEDIMENT TRAPS, SEDIMENT BASINS, AS SHOWN.
3. THE CONTRACTOR SHALL INSPECT AND MAINTAIN ALL EROSION CONTROL DEVICES AND PRACTICES. INSPECTIONS SHALL BE PERFORMED AT LEAST ONCE EVERY 7 CALENDAR DAYS AND WITHIN 24 HOURS OF THE END OF A RAINFALL EVENT OF 1/2 " OR GREATER.
4. THE CONTRACTOR SHALL BEGIN STABILIZATION MEASURES IN PORTIONS OF THE DISTURBED AREA AS SOON AS PRACTICABLE. HOWEVER, STABILIZATION MEASURES MUST BE INITIATED WITHIN 14 CALENDAR DAYS ON PORTIONS WHERE CONSTRUCTION ACTIVITY HAS PERMANENTLY CEASED. ADDITIONALLY, STABILIZATION MEASURES MUST BE INITIATED WITHIN 21 CALENDAR DAYS ON PORTIONS WHERE CONSTRUCTION ACTIVITY HAS TEMPORARILY CEASED.
5. ALL DISTURBED AREAS NOT ENCOMPASSED BY STRUCTURES, PAVEMENT OR CALLED OUT FOR OTHER SURFACE TREATMENT SHALL BE, AT A MINIMUM, TOP SOILED, SEEDED AND MULCHED IN ACCORDANCE WITH THE SPECIFICATIONS.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OF ALL EROSION CONTROL MEASURES EXCEPT CHANNEL LINING AND OUTLET PROTECTION AFTER SITE STABILIZATION. THE CONTRACTOR SHALL DRESS ALL AREAS TO THE LINE AND GRADE SHOWN ON THESE PLANS.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING AND/OR FLUSHING SEDIMENT FROM EXISTING STORM DRAINS IF AN EXCESSIVE AMOUNT IS COLLECTED DURING CONSTRUCTION ACTIVITIES.
8. CONSTRUCTION ENTRANCES SHALL BE ESTABLISHED AND MAINTAINED FOR ENTIRE PROJECT TO PREVENT TRACKING OF MUD/DIRT OR DEBRIS ONTO THE PUBLIC RIGHT-OF-WAY AND ALL ADJACENT PROPERTIES. ANY MUD/DIRT OR DEBRIS THAT IS INADVERTENTLY TRACKED ONTO TO PUBLIC RIGHT-OF-WAY AND ADJACENT PROPERTIES SHALL BE REMOVED IMMEDIATELY.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PREVENTION OF WIND-BORNE SEDIMENT FROM LEAVING THE PROPERTY. THE CONTRACTOR SHALL SPRINKLE WATER ON BARE SOIL AREAS AS REQUIRED TO WET THE SURFACE. THE CONTRACTOR SHALL ADJUST THE FREQUENCY OF THESE SPRINKLINGS TO MATCH FIELD CONDITIONS.

EROSION CONTROL NOTES

NOTES:

1. ALL MANHOLES, VALVE BOXES, AND HANDHOLES SHALL BE MOUNTED FLUSH WITH GROUND.
2. ALL WATER AND GAS METERS SHALL BE INSTALLED OFF OF ALDOT ROW.
3. TRAFFIC CONTROL DEVICES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES LATEST EDITION.
4. EROSION CONTROL DEVICES SHALL BE INSTALLED AND MAINTAINED DURING THE WORK AND SHOULD MEET THE REQUIREMENTS OF ALDOT AND ADEM REGULATIONS.
5. ALL MATERIALS USED ON ALDOT ROW WILL CONFORM WITH ALDOT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION LATEST EDITION.
6. ANY DAMAGE OCCURRED DURING CONSTRUCTION OF THE PROJECT TO ANYTHING WITHIN ROW WILL BE REPAIRED BY THE APPLICANT BY ALDOT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION LATEST EDITION.
7. PRIOR TO ANY TRAFFIC CONTROL DEVICES BEING INSTALLED ON ROW, SOMEONE WITH THE RESPONSIBILITY OF TRAFFIC CONTROL SHALL CONTACT THE ALDOT OFFICE AT (256)820-3131 AT LEAST 24 HOURS IN ADVANCE OF THE FIRST INSTALLATION.
8. ALL BORE PITS SHALL BE CLOSED AND DRESSED THE SAME DAY OR THERE IS TO BE CONSTRUCTION FENCE INSTALLED ALONG WITH EROSION CONTROL MEASURES TAKEN (HAY BALES AND SILT FENCE).
9. APPLICANTS WILL NEED A QUALIFIED CREDENTIAL INSPECTOR FOR THE PROJECT AND THIS PERSON'S NAME AND CONTACT INFORMATION SHOULD BE MADE AVAILABLE TO THE ALDOT OFFICE AT (256)820-3131. A PRELIMINARY REVIEW SHALL BE DONE ON SITE PRIOR TO WORK ON ROW WITH ALDOT AND REVIEWS SHALL BE DONE IN ACCORDANCE TO ADEM REGULATIONS. THE QCI SHALL INSPECT BMPS AFTER EACH ½" RAIN AND EACH WEEK. THE REPORTS GENERATED FROM THESE INSPECTIONS SHALL BE SENT TO THE DISTRICT OFFICE WEEKLY.
10. ALDOT MUST BE NOTIFIED AT LEAST 24 HOURS PRIOR TO WORK BEGINNING ON ROW.
11. ALL AREAS ON ROW SHALL BE NEATLY GRADED, DRESSED, GRASSED, AND MULCHED IN A MANNER TO ESTABLISH POSITIVE FLOW AND A HEALTHY STAND OF GRASS.
12. APPLICANTS MUST PROVIDE CERTIFICATION THAT ALL EROSION CONTROL PRODUCTS AND HAY IS COGONGRASS FREE.
13. APPLICANTS MUST REMOVE OR FILL ABANDONED LINES WITH GROUT.
    ALL AREAS ON ROW SHALL BE GRADED, DRESSED AND MULCHED IN A MANNER TO HAVE HEALTHY GRASS AND A POSITIVE FLOW FOR RUN OFF.
14. ALL DRIVEWAYS SHALL BE RESTORED TO ORIGINAL CONDITION OF BETTER.
15. ANY DAMAGES CAUSE BY THE CONTRACTOR DURING THE CONSTRUCTION PROCESS SHALL BE FIXED OR REPLACED AS IT WAS ORIGINALLY OR GREAT.
16. NO TRENCHES OR PITS SHALL BE LEFT OPEN WITHOUT SUPERVISION AND SHALL BE COVERED WITH STEEL ROAD PLATES IN THE MATTER OF NO SUPERVISION.
17. IN THE MATER OF A PAVEMENT REPLACEMENT THE CONTRACTOR IS RESPONSIBLE FPR KEEPING A LEVEL GRADE PRIOR TO THE PAVING PROCESS AND ALL TRENCHES WITHIN PAVEMENT SHALL BE BACKFILED WITH CRUSHED STONE.

NOTES

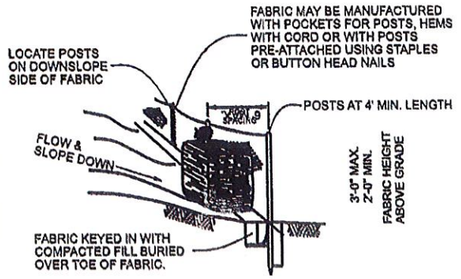


CARRIER PIPE DIA	MIN CASING DIA REQUIRED
6"	12"
8"	16"
12"	24"

NOTES:

1. BORING SHALL BE AT 90 DEGREES TO ALL CROSSINGS UNLESS OTHERWISE APPROVED. THE BORING OF THE HOLE AND INSTALLATION OF THE CASING PIPE SHALL BE SIMULTANEOUS. BORE HOLE DIAMETER SHALL ESSENTIALLY BE THE SAME AS THE OUTSIDE DIAMETER OF THE CASING PIPE TO BE INSTALLED.
2. JOINTS SHALL CONFORM TO THE REQUIREMENTS OF AWWA C206. JOINTS BETWEEN CASING SECTIONS SHALL BE COMPLETELY WELDED TO THE PRECEDING SECTIONS. PRIOR TO WELDING JOINTS, THE CONTRACTOR SHALL ENSURE THAT BOTH ENDS OF THE CASING SECTIONS BEING WELDED ARE SQUARE.
3. STEEL PIPE CASING WALL THICKNESS SHALL BE AS INDICATED ON PLANS. VERIFY CASING SIZES PRIOR TO ORDERING AND SIZING CASING INSULATORS.
4. CASING SPACERS SHALL BE RESTRAINED-TYPE BOLTED SPACERS AND SHALL HAVE A MAXIMUM SPACING AS SHOWN, OR AS RECOMMENDED BY MANUFACTURER, WHICHEVER IS CLOSER. PIPE CASING SPACERS SHALL BE AS MANUFACTURED BY PIPELINE SEAL AND INSULATOR, INC., ADVANCE PRODUCTS AND SYSTEMS, INC., OR APPROVED EQUAL.
5. CASING END SEALS FOR AERIAL OR EXPOSED ENDS SHALL BE SYNTHETIC NEOPRENE RUBBER PULL-ON TYPE END SEALS WITH STAINLESS STEEL BANDS AS MANUFACTURED BY THE ABOVE MANUFACTURERS, OR APPROVED EQUAL. CASING END SEALS FOR BURIED APPLICATIONS SHALL BE MASONRY BULKHEADS.

TYPICAL PIPE CASING DETAIL

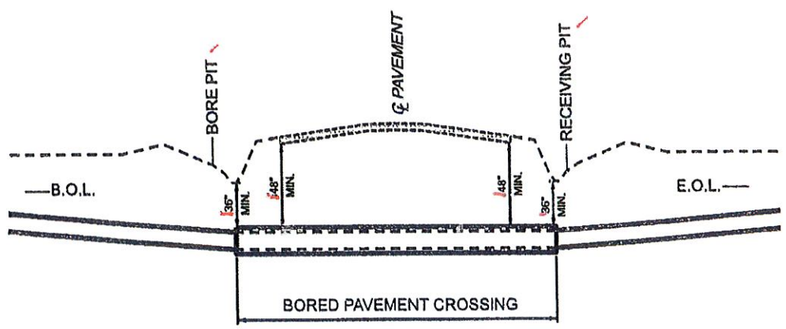


SILT FENCE NOTES:

1. FABRIC SHALL BE SELECTED FROM ALDOT LIST II-3, GEOTEXTILES FOR USE AS SILT FENCE.
2. POSTS MAY BE:
   A. HARDWOOD - 1.5"x1.5" MIN
   B. SOFTWOOD - 3" DIAMETER MIN ROUND OR NOM 2"x4" STRAIGHT ENOUGH TO PREVENT FENCE MISALIGNMENT
   C. STEEL - ROUND, UT OR C SHAPE WITH A MIN WEIGHT OF 1.3 LBS PER FOOT

SE

SILT FENCE DETAIL



TYPICAL CROSSING PIPE

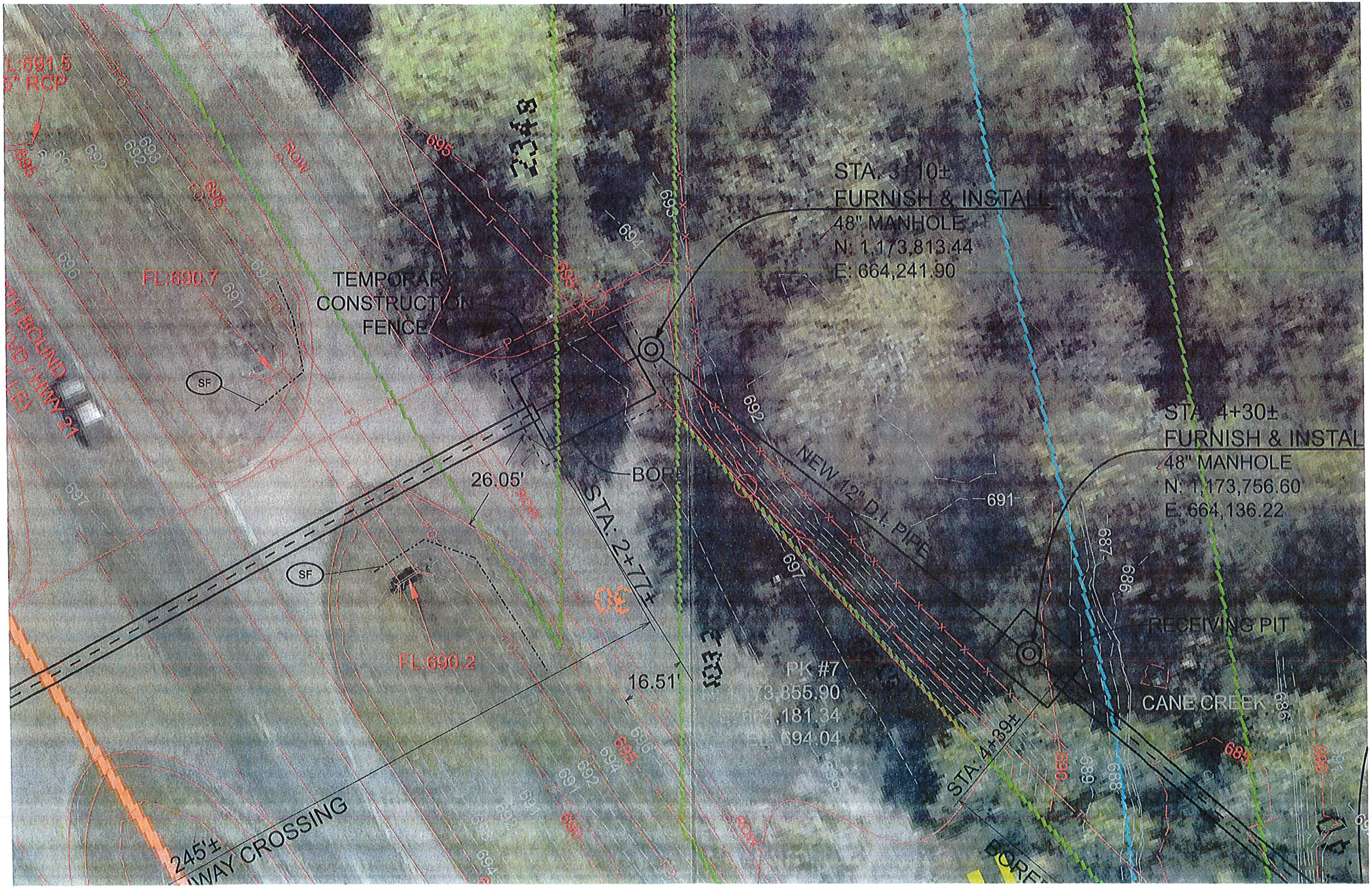
ANNISTON WATER WORKS AND SEWER BOARD

BALTZELL LS ELIMINATION

Erosion Control & Miscellanous Details

ISSUE DATE:	07/01/2020
DRAWN BY:	CF
CHECKED BY:	CO
DESIGNED BY:	CF
WO NUMBER:	6496
SHEET NUMBER:	G-03

ANNISTON WATER WORKS AND SEWER BOARD
931 NOBLE STREET
ANNISTON, ALABAMA 36201
256-241-2000
WWW.AWWSB.ORG



STA. 3+10±
FURNISH & INSTALL
48" MANHOLE
N: 1,173,813.44
E: 664,241.90
TEMPORARY
CONSTRUCTION
FENCE
FL:690.7
FL:690.2
SF
26.05'
BORE PIT
STA. 2+77±
NEW 12" D.I. PIPE
STA. 4+30±
FURNISH & INSTALL
48" MANHOLE
N: 1,173,756.60
E: 664,136.22
RECEIVING PIT
CANE CREEK
16.51'
STA. 4+39±
245±
WAY CROSSING
ROW