A.L. FRANKS ENGINEERING

319 West Oak Street
El Dorado, AR 71730
PHONE 870.444.5160 • FAX 870.444.5161

ADDENDUM NO. 1

TO: ALL PLAN HOLDERS

RE: Sewer Collection Improvements: McGehee Water and Sewer Commission
McGehee, Arkansas MCG-02-26

ADDENDUM DATE: March 20, 2026

The Plans, Specifications and Contract Documents for the above-referenced project are hereby modified as follows:

1. **Updated P&S Book Including Plan Sheets:**
   Please remove and replace all with attached.

2. **Bid Opening Date has been changed to Thursday, March 26, 2026 at 2:00pm. Opening will still be at 901 Holly Street, McGehee, Arkansas 71654.**

ADDENDUM NO. 1 ISSUED BY:

A.L. FRANKS ENGINEERING

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CODY J. STRINGER
3/20/26

Cody Stringer, P.E.
Project Engineer/Vice President-El Dorado Operations

MCGEHEE WATER AND SEWER COMMISSION
MCGEHEE, ARKANSAS

SEWER COLLECTION IMPROVEMENTS

A.L. FRANKS ENGINEERING
JOB NO: MCG-02-26

FINAL

COMPLETED FOR BID OR CONSTRUCTION PURPOSES
(PLANS / SPECIFICATIONS NOT BEARING THIS NOTE MAY HAVE REVISIONS AND SHOULD NOT BE USED FOR BIDDING OR CONSTRUCTION PURPOSES)

3/11/2026
PROJECT ENGINEER / DATE

CERTIFICATE OF AUTHORIZATION
A.L. Franks Engineering, Inc.
No. 1681
ARKANSAS

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CODY J. STRINGER
3/11/26

A.L. FRANKS ENGINEERING

319 W Oak
El Dorado, AR 71730
870-444-5160

Revised Copy per Addendum 1

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GENERAL CONDITIONS

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NOTICE TO BIDDERS OF THE INTENTION OF THE MCGEHEE WATER AND SEWER COMMISSION, MCGEHEE ARKANSAS, TO LET CONTRACT FOR CONSTRUCTION OF SEWER COLLECTION IMPROVEMENTS.

SEALED PROPOSALS addressed to McGehee Water and Sewer Commission Chairman, Bob Lucky, 901 Holly Street, McGehee, Arkansas 71654 will be received until **2:00 P.M., on Tuesday, March 26, 2026** for furnishing all labor, equipment, materials, supplies, and supervision necessary for the replacement of water mains of various sizes throughout the city of McGehee as described in the plans and specifications. Bids will be opened and read aloud at such time at City Hall.

PLANS AND SPECIFICATIONS may be examined without charge at the office of A.L. Franks Engineering, 319 W Oak, El Dorado, Arkansas 71730, or at City Hall, 901 Holly Street, McGehee, Arkansas 71654. One hard copy of each set of documents may be purchased from A.L. Franks Engineering at www.alfranksengineering.com for $100.00. You may also request a digital set of plans and specifications, at no charge via pdf document through email, from the website www.alfranksengineering.com. No refunds will be made.

A CERTIFIED OR CASHIER'S CHECK, or an acceptable bid bond in an amount not less than five percent (5%) of the total bid shall accompany each bid as a guaranty that, if awarded the contract, the bidder will promptly enter into contract with the McGehee Water and Sewer Commission and furnish bonds on the forms provided.

THE SUCCESSFUL BIDDER OR BIDDERS will be required to furnish a Performance and Payment Bond, each in the amount of the contract, written by a responsible surety company authorized to do business in the State of Arkansas that is satisfactory to the Owner.

BIDDERS ARE expected to inspect the site of the work and to inform themselves of all local conditions. The time of completion shall be **180 calendar days** including Saturdays, Sundays and legal holidays.

An Arkansas Contractor's License is not required to bid the job, however at the time the contract is signed, the Contractor must be licensed.

THE SUCCESSFUL BIDDER will be required to furnish evidence of registration with the State Department of Finance and Administration in compliance with Act 125 of 1965 prior to engaging in the performance of this Contract.

NO BID may be withdrawn after the scheduled closing time for receipt of bids for at least 60 calendar days.

IN CASE of ambiguity or lack of clearness stating the price in the bids, the McGehee Water and Sewer Commission reserves the right to consider the most advantageous construction thereof, or to reject the bid.

McGehee Water and Sewer Commission reserves the right to reject any or all bids, waive any or all informalities, and to award the contract to the bidder or bidders who, in the opinion of the Owner, offers the proposal to the best interest of same. Award of the contract may be denied if the Statement of Qualifications is not appropriately completed.

CONTRACTORS are cautioned that qualified bids will be subject to rejection.

CONTRACTORS are specifically advised that any person, firm, or other party to whom it is proposed to award a subcontract under this contract must be acceptable to the Owner.

McGehee Water and Sewer Commission hereby notifies all bidders that this contract is subject to applicable labor laws, non-discrimination provisions, wage rate laws and other federal laws including the Fair Labor Standards Acts of 1938. The Work Hours Act of 1962 and Title VI of the Civil Rights Act of 1964 also apply.

McGehee Water and Sewer Commission

Bob Lucky, Chairman

STATEMENT OF QUALIFICATIONS: _____
Bidder

_____
Address

Similar Projects Completed by Bidder:

1. NAME OF PROJECT: _____

   OWNER: _____ADDRESS:_____

   DATE STARTED:_____DATE COMPLETED:_____

   APPROX. QUANTITIES OF MAJOR ITEMS:_____

   _____

   VALUE OF CONTRACT: _____

2. NAME OF PROJECT: _____

   OWNER: _____ADDRESS:_____

   DATE STARTED:_____DATE COMPLETED:_____

   APPROX. QUANTITIES OF MAJOR ITEMS:_____

   _____

   VALUE OF CONTRACT: _____

3. NAME OF PROJECT: _____

   OWNER: _____ADDRESS:_____

   DATE STARTED: _____DATE COMPLETED:_____

   APPROX. QUANTITIES OF MAJOR ITEMS: _____

   _____

   VALUE OF CONTRACT: _____

4. OTHER PROJECT REFERENCES: _____

   _____

   _____

PROPOSAL

TO: Chairman, Bob Lucky
McGehee Water and Sewer Commission

FOR: Sewer Collection Improvements

The undersigned, as bidder, declares that the only person or parties interested in this proposal as principals are those named herein; that this proposal is made without collusion with any other person, firm, or corporation; that he has carefully examined the form of Contract, Notice to Bidders, and Specifications therein referred to, and has carefully examined the locations, conditions and classes of materials of the proposed work; and agrees that he will provide all the necessary labor, machinery, tools, apparatus, and other items incidental to construction, and will do all the work and furnish all the materials called for in the Contract and Specifications in the manner prescribed therein and according to the requirements of the Engineer as therein set forth.

It is further agreed that the quantities of work to be done at unit prices and materials to be furnished may be increased or diminished as may be considered necessary, in the opinion of the Engineer, to complete the work fully as planned and contemplated, and that all quantities of work, whether increased or decreased, are to be performed at the unit prices set forth below except as provided for in the Specifications.

It is further agreed that lump sum prices may be increased to cover additional work ordered by the Engineer, but not required by the Specifications, in accordance with the provisions of the General Conditions. Similarly, they may be decreased to cover deletion of work so ordered.

It is understood and agreed that the work is to be completed in full within **180 calendar days** beginning on the date stated in the work order on which work is to be commenced. McGehee Water and Sewer Commission shall withhold, permanently from the Contractor's total compensation, the sum of Five Hundred Dollars ($500.00) per calendar day for liquidated damages.

Accompanying this proposal is a certified or cashier's check or bid bond, payable to the McGehee Water and Sewer Commission for

_____Dollars ($_____).

The bid security accompanying this proposal shall be returned to the bidder, unless in case of the acceptance of the proposal the bidder shall fail to execute a Contract and to file a performance and payment bonds within fifteen days after its acceptance, in which case the bid security shall become the property of the McGehee Water and Sewer Commission, and shall be considered as payment for damages due to delay and other inconveniences suffered by the Owner on account of such failure of the bidder. It is understood that the McGehee Water and Sewer Commission reserves the right to reject any and all bids and to waive any informalities in the bidding.

CITY OF MCGEHEE, ARKANSAS

WASTEWATER COLLECTION IMPROVEMENTS- MCG-02-26

BID PROPOSAL- MARCH 26, 2026 2:00 P.M.

ITEM	QTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
1	1589	L.F.	Furnish & Install 8" SDR -26 PVC Sanitary Sewer Main, 0-6' deep per plans and specifications for the unit price of	$ _____	$ _____
			_____ Dollars and _____ Cents/L.F.		
2	518	L.F.	Furnish & Install 8" SDR-26 PVC Sanitary Sewer Main, 6-8' deep per plans and specifications for the unit price of	$ _____	$ _____
			_____ Dollars and _____ Cents/L.F.		

ITEM	QTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
3	478	L.F.	Furnish & Install 10” SDR-26 PVC Sanitary Sewer Main, 6-8’ deep per plans and specifications for the unit price of	$ _____	$ _____
			_____ Dollars and _____ Cents/L.F.		
4	900	CY	Provide Gravel Pipe Foundation (3x3) material for unsuitable subgrade materials (use as directed by Engineer) per plans and specifications for the unit price of	$ _____	$ _____
			_____ Dollars and _____ Cents/CY		

ITEM	QTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
5	17	EA	Furnish and Install Standard 4' Dia. Concrete Manholes per plans and specifications for the unit price of	$ _____	$ _____
			_____ Dollars and _____ Cents/EA		
6	32	VF	Furnish and Install Extra Depth Manholes per plans and specifications for the unit price of	$ _____	$ _____
			_____ Dollars and _____ Cents/VF		

BID PROPOSAL CONTINUED

ITEM	QTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
7	550	L.F.	Open Cut and Repair Asphalt Surface per plans and specifications for the unit price of	$ _____	$ _____

_____ Dollars and
_____ Cents/L.F

8	62	EA	Reconnect Existing Long Side ServiCe to new main per plans and specifications for the unit price of	_____	_____

_____ Dollars and
_____ Cents/EA

ITEM	QTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
9	500	L.F.	Open Cut and Repair 6" Reinforced Concrete Drive including sawcutting per plans and specifications for the unit price of	$ _____	$ _____

_____ Dollars and
_____ Cents/L.F.

10	1	L.S.	Provide Trench Safety per plans and specifications for the lump sum price of	$ _____	$ _____

_____ Dollars and
_____ Cents/L.S.

ITEM	QTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
11	1	L.S.	Provide all equipment and material for Testing Sewer Mains and Manholes per plans and specifications for the lump sum price of _____ Dollars and _____ Cents/L.S.	$ _____	$ _____
12	1	L.S.	Furnish and Install all equipment, materials and labor to clear, grub and remove all brush, trees, etc. inside of existing right of way, including removal of any and all fencing and portable structures or any other obstructions preventing the installation of proposed sewer main as shown per plans and specifications for the lump sum price of _____ Dollars and _____ Cents/L.S.	$ _____	$ _____

BID PROPOSAL CONTINUED

ITEM	QTY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
13	17	L.F.	Remove and dispose of existing manholes per plans and specifications for the unit price of		
				$ _____	$ _____
			_____ Dollars and _____ Cents/L.F.		
14	1	L.S.	Mobilization including preparatory work and operations, including but not limited to, movement of personnel, equipment, supplies, and incidentals to the project site for the lump sum price of	$ _____	$ _____
			_____ Dollars and _____ Cents/L.S.		
					_____
			TOTAL OF ALL ITEMS (1-14)	$ _____	

NOTES

Method to Determine Lowest Bid.

The lowest bid shall be the lowest bid price on the base contract, depending upon available funds.

Miscellaneous items, directed work, connections, etc., not specifically listed but required to complete the proposed sewer main line work to a complete and operational system shall be included in the Bid under the most appropriate Bid Item.

1) Contractor is to verify all pipe sizes and flow line elevations prior to ordering manholes.
2) Time required to complete base bid work shall be **180** calendar days.
   Contractor shall complete work by December 1, 2026 or Liquidated Damages will be imposed and the completion of project will be soely at the expense of the Contractor.
3) Contractor is solely responsible for the complete abandonment of all existing mains unless otherwise noted.

In the event of the award of a Contract to the undersigned, the undersigned will furnish a Performance and Payment Bond each for the full amount of the Contract to secure proper compliance with the terms and provisions of the Contract, to insure and guarantee the work until final completion and acceptance, and to guarantee Payment of all lawful claims for labor performed and materials furnished in the fulfillment of the Contract.

The undersigned certifies that the bid prices contained in this proposal have been carefully checked and are submitted as correct and final.

NOTE:--Unit and lump sum prices must be shown in words and in figures for each item listed in this Proposal, and in the event of discrepancy, the words shall control. Should bid prices on any items be omitted, the right is reserved to apply the lowest prices submitted under this Proposal. In the event of discrepancies, the Owner reserves the right to accept or reject informalities.

Receipt is hereby acknowledged of the following addenda to the Contract Documents:

Addendum No. 1 dated_____Rec. via mail_____ Rec. via fax_____
Addendum No. 2 dated_____Rec. via mail_____ Rec. via fax_____
Addendum No. 3 dated_____Rec. via mail_____ Rec. via fax_____
Addendum No. 4 dated_____Rec. via mail_____ Rec. via fax_____
Addendum No. 5 dated_____Rec. via mail_____ Rec. via fax_____

CONTRACTOR:_____

BY:_____

NAME:_____

TITLE:_____

ADDRESS:_____
(Street Address or Physical Address)

MAILING ADDRESS:_____
(P. O. Box)

CITY & STATE:_____

ZIP:_____

TELEPHONE:_____

FAX TELEPHONE:_____

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned, _____, as Principal, and _____ as Surety, are hereby held and firmly bound unto _____, as OWNER in the penal sum of _____ for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, successors and assigns. Signed, this _____ day of _____, 20_____. The Condition of the above obligation is such that whereas the Principal has 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

(b) If said BID shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attachment hereto (properly completed in accordance with said BID) and shall furnish a BOND for faithful performance of said contract, and for the payment of all persons performing labor 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.

_____
Principal

_____
Surety

By:_____

IMPORTANT - Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized in accordance with Section 22 of the General Conditions to transact business in the State of Texas.

NOTICE OF AWARD

TO: _____
_____
_____

Project Description:

McGehee Water and Sewer Commission-SEWER COLLECTION IMPROVEMENTS

The Owner considered the Bid submitted by you for the above-described Work in response to its Advertisement for Bids, dated _____.

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

You are required by the Information for Bidders to execute the Agreement and furnish the required Contractor's Performance Bond, Payment Bond and certificates of insurance within ten (10) calendar days from the date of this Notice to you.

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

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

Dated: _____

McGEHEE WATER AND SEWER COMMISSION

Owner

By: _____
BOB LUCKY

Title: _____CHAIRMAN_____

Acceptance of Notice

Receipt of the above Notice of Award is hereby acknowledged by :

By: _____

Title: _____

CONTRACT

THIS AGREEMENT, made this _____ day of _____, 2026 by and between the

McGEHEE WATER AND SEWER COMMISSION, herein called "Owner",
(Corporation Name of Owner)

acting herein through its CHAIRMAN and
(Title of Authorized Official)

_____.

STRIKE OUT (a corporation) (~~a partnership~~)
INAPPLICABLE (an individual doing business as _____)
TERMS

of _____ hereinafter called "Contractor."

WITNESSETH: That for and in consideration of the payments and agreements hereinafter mentioned, to be made and performed by the OWNER, the CONTRACTOR hereby agrees with the OWNER to commence and complete the construction described as follows:

McGehee Water and Sewer Commission-SEWER IMPROVEMENTS
JOB NO. MCG-02-26

hereinafter called the project, for the sum of _____

_____ **($_____)** and all extra work in connection therewith, under the terms as stated in the General and Special Conditions of the Contract; and at his (its or their) own proper cost and expense to furnish all the materials, supplies, machinery, equipment, tools, superintendence, labor, insurance, and other accessories and services necessary to complete the said project in accordance with the conditions and prices stated in the Proposal, the General Conditions, Supplemental General Conditions and Special Conditions of the Contract, the plans, which include all maps, plats, blue prints, and other drawings and printed or written explanatory matter thereof, the specifications and contract documents therefore as prepared by **A.L. FRANKS ENGINEERING**, herein entitled the Architect/Engineer, and as enumerated in Paragraph 2 of the Supplemental Special Conditions, all of which are made a part hereof and collectively evidence and constitute the contract.

The Contractor hereby agrees to commence work under this contract on or before a date to be specified in a written "Notice to Proceed" of the Owner and to fully complete the project within **180 consecutive calendar days** thereafter. The Contractor further agrees to pay, as liquidated damages, the sum of **$500.00** for each consecutive calendar day thereafter as hereinafter provided in Section 9 of the Special Conditions.

The OWNER agrees to pay the CONTRACTOR in current funds for the performance of the contract, subject to additions and deductions, as provided in the General Conditions of the Contract, and to make payments on account thereof as provided in Section 5, "Measurement and Payment," of the General Conditions.

IN WITNESS WHEREOF, the parties to these presents have executed this contract in six (6) counterparts, each of which shall be deemed an original, in the year and day first above mentioned.

(Seal) McGEHEE WATER AND SEWER COMMISSION
(Owner)

ATTEST:

_____ By _____
(Secretary)

_____ CHAIRMAN
(Witness) (Title)

(Seal) _____
(Contractor)

_____ By _____
(Secretary)

_____ President
(Witness) (Title)

_____
(Address and Zip Code)

NOTE: Secretary of the Owner should attest. If Contractor is a corporation, Secretary should attest.

ARKANSAS STATUTORY PERFORMANCE BOND

We_____

_____

as Principal, hereinafter called Principal, and _____, a corporation organized and existing under the law of the State of _____ and authorized to do business in the State of Arkansas, as Surety, are held and firmly bound unto _____ as Obligee, hereinafter called Owner, in the amount of _____

_____

Dollars ($_____), for the payment whereof Principal and Surety bind themselves, their heirs, personal representatives, successors and assigns, jointly and severally, firmly by these presents.

Principal has by written agreement dated _____ entered into a contract with Owner for

McGehee Water and Sewer Commission-SEWER COLLECTION IMPROVEMENTS
JOB NO. MCG-02-26

which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

THE CONDITION OF THIS OBLIGATION is such that if the Principal shall faithfully perform the Contract on his part and shall fully indemnify and save harmless the Owner from all cost and damage which he may suffer by reason of failure so to do and shall fully reimburse and repay the Owner all outlay and expense which the Owner may incur in making good any such default, and, further, that if the Principal shall pay all persons all indebtedness for labor or materials furnished or performed under said Contract, failing which such persons shall have a direct right of action against the Principal and Surety,

jointly and severally, under this obligation, subject to the Owner's priority, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

No suit, action or proceeding shall be brought on this bond outside the State of Arkansas. No suit, action or proceeding shall be brought on this bond except by the Owner after six months from the date final payment is made on the Contract, nor shall any suit, action or proceeding be brought by the Owner after two years from the date on which the final payment under the Contract falls due.

Any alterations which may be made in the terms of the Contract, or in the work to be done under it, or the giving by the Owner of any extension of time for the performance of the Contract, or any other forbearance on the part of either the Owner or the Principal to the other shall not in any way release the Principal and the Surety or Sureties, or either or any of them, their heirs, personal representatives, successors or assigns from their liability hereunder, notice to the Surety or Sureties of any such alteration, extension or forbearance being hereby waived.

In no event shall the aggregate liability of the Surety exceed the sum set out herein.

Executed on this _____ day of _____, 20___

_____
Principal

By _____

_____
Surety

By _____
Attorney-in-Fact

ARKANSAS STATUTORY PAYMENT BOND

We_____

_____

as Principal, hereinafter called Principal, and _____, a corporation organized and existing under the law of the State of _____ and authorized to do business in the State of Arkansas, as Surety, are held and firmly bound unto _____ as Obligee, hereinafter called Owner, in the amount of _____ Dollars ($_____), for the payment whereof Principal and Surety bind themselves, their heirs, personal representatives, successors and assigns, jointly and severally, firmly by these presents.

Principal has by written agreement dated _____ entered into a contract with Owner for

McGehee Water and Sewer Commission-SEWER COLLECTION IMPROVEMENTS
JOB NO. MCG-02-26

which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

THE CONDITION OF THIS OBLIGATION is such that if the Principal shall faithfully perform the Contract on his part and shall fully indemnify and save harmless the Owner from all cost and damage which he may suffer by reason of failure so to do and shall fully reimburse and repay the Owner all outlay and expense which the Owner may incur in making good any such default, and, further, that if the Principal shall pay all persons all indebtedness for labor or materials furnished or performed under said Contract, failing which such persons shall have a direct right of action against the Principal and Surety,

jointly and severally, under this obligation, subject to the Owner's priority, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

No suit, action or proceeding shall be brought on this bond outside the State of Arkansas. No suit, action or proceeding shall be brought on this bond except by the Owner after six months from the date final payment is made on the Contract, nor shall any suit, action or proceeding be brought by the Owner after two years from the date on which the final payment under the Contract falls due.

Any alterations which may be made in the terms of the Contract, or in the work to be done under it, or the giving by the Owner of any extension of time for the performance of the Contract, or any other forbearance on the part of either the Owner or the Principal to the other shall not in any way release the Principal and the Surety or Sureties, or either or any of them, their heirs, personal representatives, successors or assigns from their liability hereunder, notice to the Surety or Sureties of any such alteration, extension or forbearance being hereby waived.

In no event shall the aggregate liability of the Surety exceed the sum set out herein.

Executed on this _____ day of _____, 20___

_____
Principal

By _____

_____
Surety

By _____
Attorney-in-Fact

CERTIFICATE OF INSURANCE

TO: Date_____

_____ Project No. _____
Owner

_____ Type of Project_____
Address

THIS IS TO CERTIFY THAT

_____
(Name and address of insured)

is at the date of this certificate, insured by this Company with respect to the business operations hereinafter described, for the types of Insurance and in accordance with the provisions of the standard policies used by this Company, and further hereinafter described. Exceptions to standard policy noted on reverse side hereof.

TYPE OF INSURANCE

	Policy No.	Effective	Expires	Limits of Liability
Workmen's Compensation				
Public Liability				1 Person $ _____ 1 Accident $ _____
Contingent Liability				1 Person $ _____ 1 Accident $ _____
Property Damage				
Builder`s Risk				
Automobile				
Other				

The foregoing Policies (do) (do not) cover all sub-contractors.

Locations Covered: _____

Descriptions of Operations Covered: _____

The above policies either in the body thereof or by appropriate endorsement provide that they may not be changed or cancelled by the insurer in less than five days after the insured has received written notice of such change or cancellation.

Where applicable local laws or regulations require more than five days actual notice of change or cancellation to the assured, the above policies contain such special requirements, either in the body thereof or by appropriate endorsement thereto attached.

_____
(Name of Insurer)

By _____

Title _____

NOTICE TO PROCEED

To: _____
_____
_____

Date: _____
Project: Sewer Collection Improvements

You are hereby notified to commence Work in accordance with the Agreement dated _____, on or before _____ and you are to complete the Work within 180 consecutive calendar days thereafter. The date of completion of all Work is therefore _____.

McGehee Water and Sewer Commission
Owner

By:_____

Title: _____Chairman_____

Acceptance of Notice

Receipt of the above Notice to Proceed

is hereby acknowledged by _____

By: _____

Title: _____

SUBSTANTIAL COMPLETION CERTIFICATE

OWNER'S Project No.: ENGINEER'S Project No.: MCG-02-26

PROJECT: **McGehee Water and Sewer Commission-SEWER COLLECTION IMPROVEMENTS**

CONTRACTOR:

CONTRACT: $ CONTRACT DATE:

This Certificate of Substantial Completion applies to all work under the Contract Documents orto the following specified parts thereof:

To: (Owner)

And To: (Contractor)

The work to which this Certificate applies has been inspected by authorized representatives of OWNER, CONTRACTOR and ENGINEER, and that WORK is hereby declared to be substantially complete in accordance with the Contract Documents on

_____

Date of Completion

A tentative list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include an item in it does not alter the responsibility of the CONTRACTOR to complete all the Work in accordance with the Contract Documents. When this Certificate applies to a specified part of the Work the items in the tentative list shall be completed or corrected by CONTRACTOR within _____calendar days of the above date ofSubstantial Completion.

The date of Substantial Completion is the date upon which all guarantees and warrantiesbegin, except as follows:

The responsibilities between OWNER and CONTRACTOR for security, operation, safety,maintenance, heat, utilities and insurance shall be as follows:

RESPONSIBILITIES:

OWNER:

_____

_____

_____

_____

CONTRACTOR:

_____

_____

_____

_____

_____

The following documents are attached to and made part of this Certificate:

_____

EXECUTED by ENGINEER this ____ day of _____, 20___.

A.L. FRANKS ENGINEERING, INC

_____
Project Engineer

The CONTRACTOR accepts this Substantial Completion Certificate on this _____ day of _____, 20____.

_____
CONTRACTOR Name

_____
Contractor Signature

GENERAL CONDITIONS

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FOR

GENERAL CONDITIONS OF AGREEMENT

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GENERAL CONDITIONS

1. DEFINITIONS OF TERMS

1.01 OWNER, CONTRACTOR AND ENGINEER. The OWNER, the CONTRACTOR and the ENGINEER are those persons or organizations identified as such in the Agreement and are referred to throughout the Contract Documents as if singular in number and masculine in gender. The term ENGINEER means the ENGINEER or his duly authorized representative. The ENGINEER shall be understood to be the ENGINEER of the OWNER, and nothing contained in the Contract Documents shall create any contractual or agency relationship between the ENGINEER and the CONTRACTOR.

1.02 CONTRACT DOCUMENTS. The Contract Documents shall consist of the Notice to Contractors (Advertisement), Special Conditions (Instructions to Bidders), Proposal, signed Agreement, Performance and Payment Bonds (when required), General Conditions of the Agreement, Technical Specifications, Plans, and all modifications thereof incorporated in any of the documents before the execution of the agreement.

The Contract Documents are complementary, and what is called for by any one shall be as binding as if called for by all. In case of conflict between any of the Contract Documents, priority of interpretation shall be in the following order: Signed Agreement, Performance and Payment Bonds, Special Bonds (if any), Proposal, Special Conditions of Agreement, Notice to Contractors, Technical Specifications, Plans, and General Conditions of Agreement.

1.03 SUB-CONTRACTOR. The term Sub-Contractor, as employed herein, includes only those having a direct contract with the CONTRACTOR and it includes one who furnished material worked to a special design according to the plans or specifications of this work, but does not include one who merely furnishes material not so worked.

1.04 WRITTEN NOTICE. Written notice shall be deemed to have been duly served if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered mail to the last business address known to him who gives the notice.

1.05 WORK. The CONTRACTOR shall provide and pay for all materials, supplies, machinery, equipment, tools, superintendence, labor, services, insurance, and all water, light, power, fuel, transportation and other facilities necessary for the execution and completion of the work covered by the Contract Documents. Unless otherwise specified, all materials shall be new and both workmanship and materials shall be of a good quality. The CONTRACTOR shall

if required, furnish satisfactory evidence as to the kind and quality of materials. Materials or work described in words which so applied have a well known technical or trade meaning shall be held to refer to such recognized standards.

1.06 EXTRA WORK. The term "Extra Work" as used in this contract shall be understood to mean and include all work that may be required by the ENGINEER or OWNER to be done by the CONTRACTOR to accomplish any change, alteration or addition to the work shown upon the plans, or reasonably implied by the specifications, and not covered by the CONTRACTOR'S Proposal, except as provided under "Changes and Alterations", herein.

1.07 WORKING DAY. A "Working Day" is defined as any day not including Saturdays, Sundays or legal holidays, in which weather or other conditions, not under the control of the CONTRACTOR, will permit construction of the principal units of the work for a period of not less than seven (7) hours between 7:00 a.m. and 6:00 p.m.

1.08 CALENDAR DAY. "Calendar Day" is any day of the week or month, no days being excepted.

1.09 SUBSTANTIALLY COMPLETED. By the term "substantially completed" is meant that the structure has been made suitable for use or occupancy or the facility is in condition to serve its intended purpose, but still may require minor miscellaneous work and adjustment.

1.10 CONFLICTS. Any conflict which occurs between these General Conditions and the attached General Conditions supplied by the Arkansas Soil and Water Conservation Commission (ASWCC), the ASWCC General Conditions shall govern.

2. RESPONSIBILITIES OF THE ENGINEER AND THE CONTRACTOR

2.01 OWNER-ENGINEER RELATIONSHIP. The ENGINEER will be the OWNER'S representative during construction. The duties, responsibilities and limitations of authority of the ENGINEER as the OWNER'S representative during construction are as set forth in the Contract Documents and shall not be extended or limited without written consent of the OWNER and ENGINEER. The ENGINEER will advise and consult with the OWNER, and all of OWNER'S instructions to the CONTRACTOR shall be issued through the ENGINEER.

2.02 PROFESSIONAL INSPECTION BY ENGINEER. The ENGINEER shall make periodic visits to the site to familiarize himself generally with the progress of the executed work and to determine if such work generally meets the essential performance and design features and the technical and functional engineering requirements of the Contract Documents; provided and except, however, that the ENGINEER shall not be responsible for making any detailed, exhaustive, comprehensive or continuous on-site inspection of the quality or

quantity of the work or be in any way responsible, directly or indirectly, for the construction means, methods, techniques, sequences, quality, procedures, programs, safety precautions or lack of same incident thereto or in connection therewith. Notwithstanding any other provision of this agreement or any other Contract Document, the ENGINEER shall not be in any way responsible or liable for any acts, errors, omissions or negligence of the CONTRACTOR, any subcontractor or any of the CONTRACTOR'S or subcontractor's agents, servants or employees or any other person, firm or corporation performing or attempting to perform any of the work.

2.03 PAYMENTS FOR WORK. The ENGINEER shall review CONTRACTOR'S applications for payment and supporting data, determine the amount owed to the CONTRACTOR and approve in writing, payment to CONTRACTOR in such amounts; such approval of payment to CONTRACTOR constitutes a representation to the OWNER of ENGINEER`S professional judgment that the work has progressed to the point indicated to the best of his knowledge, information and belief, but such approval of an application for payment to CONTRACTOR shall not be deemed as a representation by ENGINEER that ENGINEER has made any examination to determine how or for what purpose CONTRACTOR has used the moneys paid on account of the Contract price.

2.04 INITIAL DETERMINATIONS. The ENGINEER initially shall determine all claims, disputes and other matters in question between the CONTRACTOR and the OWNER relating to the execution or progress of the work or the interpretation of the Contract Documents and the ENGINEER`S decision shall be rendered in writing within a reasonable time. Should the ENGINEER fail to make such decision within a reasonable time, appeal to arbitration may be taken as if his decision had been rendered against the party appealing.

2.05 OBJECTIONS. In the event the ENGINEER renders any decision which, in the opinion of either party hereto, is not in accordance with the meaning and intent of this contract, either party may file with the ENGINEER within thirty days his written objection to the decision, and by such action may reserve the right to submit the question so raised to arbitration as hereinafter provided.

2.06 LINES AND GRADES. Unless otherwise specified, all lines and grades shall be furnished by the ENGINEER or his representative. Whenever necessary, construction work shall be suspended to permit performance of this work, but such suspension will be as brief as practicable and the CONTRACTOR shall be allowed no extra compensation therefor. The CONTRACTOR shall give the ENGINEER ample notice of the time and place where line and grades will be needed. All stakes, marks, etc., shall be carefully preserved by the CONTRACTOR, and in case of careless destruction or removal by or his employees, such stakes, marks, etc., shall be replaced at the CONTRACTOR'S expense

2.07 CONTRACTOR'S DUTY AND SUPERINTENDENCE. The CONTRACTOR shall give adequate attention to the faithful prosecution and completion of this contract and shall keep on the work, during its progress, a competent superintendent and any necessary assistants. The superintendent shall represent the CONTRACTOR in his absence and all directions given to him shall be as binding as if given to the CONTRACTOR.

The CONTRACTOR is and at all times shall remain an independent contractor, solely responsible for the manner and method of completing his work under this contract, with full power and authority to select the means, method and manner of performing such work, so long a such methods do not adversely affect the completed improvements, the OWNER and ENGINEER being interested only in the result obtained and conformity of such completed improvements to the plans, specifications and contract.

Likewise, the CONTRACTOR shall be solely responsible for the safety of himself, his employees and other persons, as well as for the protection of the safety of the improvements being erected and the property of himself or any other person, as a result of his operations hereunder. Engineering construction drawings and specifications as well as any additional information concerning the work to be performed passing from or through the ENGINEER shall not be interpreted as requiring or allowing CONTRACTOR to deviate from the plans and specifications, the intent of such drawings, specifications and any other such instructions being to define with particularity the agreement of the parties as to the work the CONTRACTOR is to perform. CONTRACTOR shall be fully and completely liable, at his own expense, for design, construction, installation and use, or non-use, of all items and methods incident to performance of the contract, and for all loss, damage or injury incident thereto, either to person or property, including, without limitation, the adequacy of all temporary supports, shoring, bracing, scaffolding, machinery or equipment, safety precautions or devices, and similar items or devices used by him during construction.

Any review of work in process, or any visit or observation during construction, or any clarification of plans and specifications, by the ENGINEER, or any agent, employee, or representative of either of them whether through personal observation on the project site or by means of approval of shop drawings for temporary construction or construction processes, or by other means or method, is agreed by the CONTRACTOR to be for the purpose of observing the extent and nature of work completed or being performed, as measured against the drawings and specifications constituting the contract, or for the purpose of enabling CONTRACTOR to more fully understand the plans and specifications so that the completed construction work will conform thereto, and shall in no way relieve the CONTRACTOR from full and complete responsibility for the proper performance of his work on the project, including but without limitation the propriety of means and methods of the CONTRACTOR in performing said contract, and the adequacy of any designs, plans or other

facilities for accomplishing such performance. Deviation by the CONTRACTOR from plans and specifications that may have been in evidence during any such visitation or observation by the ENGINEER, or any of his representatives, whether called to the CONTRACTOR'S attention or not shall in no way relieve CONTRACTOR from his responsibility to complete all work in accordance with said plans and specifications.

2.08 CONTRACTOR`S UNDERSTANDING. It is understood and agreed that the CONTRACTOR has, by careful examination, satisfied himself as to the nature and location of the work, the conformation of the ground, the character, quality and quantity of the materials to be encountered, the character of equipment and facilities needed preliminary to and during the prosecution of the work, the general and local conditions, and all other matters which can in any way affect the work under this contract. No verbal agreement or conversation with any officer, agent or employee of the OWNER or ENGINEER either before or after the execution of this contract, shall affect or modify any of the terms or obligations herein contained.

2.09 CHARACTER OF WORKMEN. The CONTRACTOR agrees to employ only orderly and competent men, skillful in the performance of the type of work required under this contract, to do the work; and agrees that whenever the ENGINEER shall inform him in writing that any man or men on the work are, in his opinion, incompetent, unfaithful or disorderly, such man or men shall be discharged from the work and shall not again be employed on the work without the ENGINEER'S written consent.

2.10 CONTRACTOR'S BUILDING. The building of structures for housing men, or the erection of tents or other forms of protection, will be permitted only at such places as the ENGINEER shall direct, and the sanitary conditions of the grounds in or about such structures shall at all times be maintained in a manner satisfactory to the ENGINEER.

2.11 SANITATION. Necessary sanitation conveniences for the use of laborers on the work, properly secluded from public observation, shall be constructed and maintained by the CONTRACTOR in such manner and at such points as shall be approved by the ENGINEER, and their use shall be strictly enforced.

2.12 SHOP DRAWINGS. The CONTRACTOR shall submit to the ENGINEER, with such promptness as to cause no delay in his own work or in that of any other Contractor, four checked copies, unless otherwise specified, of all shop and/or setting drawings and schedules required for the work of the various trades, and the ENGINEER shall pass upon them with reasonable promptness, making desired corrections. The CONTRACTOR shall make any corrections required by the ENGINEER, file with him two corrected copies and furnish such other copies as may be needed. The ENGINEER'S approval of such drawings or schedules shall not relieve the CONTRACTOR from responsibility for deviations from drawings or specifications, unless he has in

writing called the ENGINEER'S attention to such deviations at the time of submission, nor shall it relieve him from responsibility for errors of any sort in shop drawings or schedules. It shall be the CONTRACTOR'S responsibility to fully and completely review all shop drawings to ascertain their effect on his ability to perform the required contract work in accordance with the plans and specifications and within the contract time.

Such review by the ENGINEER shall be for the sole purpose of determining the sufficiency of said drawings or schedules to result in finished improvements in conformity with the plans and specifications, and shall not relieve the CONTRACTOR of his duty as an independent contractor as previously set forth, it being expressly understood and agreed that the ENGINEER does not assume any duty to pass upon the propriety or adequacy of such drawings or schedules, or any means or methods reflected thereby, in relation to the safety of either person or property during CONTRACTOR'S performance hereunder.

2.13 PRELIMINARY APPROVAL. The ENGINEER shall not have the power to waive the obligations of this contract for furnishing by the CONTRACTOR of good material, and of his performing good work as herein described, and in full accordance with the plans and specifications. No failure or omission of the ENGINEER to discover, object to or condemn any defective work or material shall release the CONTRACTOR from the obligation to at once tear out, remove and properly replace the same at any time prior to final acceptance upon the discovery of said defective work or material; provided, however, that the ENGINEER shall, upon request of the CONTRACTOR, inspect and accept or reject any material furnished, and in event the material has been once accepted by the ENGINEER, such acceptance shall be binding on the OWNER, unless it can be clearly shown that such material furnished does not meet the specifications for this work.

Any questioned work may be ordered taken up or removed for re-examination, by the ENGINEER, prior to final acceptance, and if found not in accordance with the specifications for said work, all expense of removing, re-examination and replacement shall be borne by the CONTRACTOR, otherwise the expense thus incurred shall be allowed as EXTRA WORK, and shall be paid for by the OWNER; provided that, where inspection or approval is specifically required by the specifications prior to performance of certain work, should the CONTRACTOR proceed with such work without requesting prior inspection or approval he shall bear all expense of taking up, removing, and replacing this work if so directed by the ENGINEER.

2.14 DEFECTS AND THEIR REMEDIES. It is further agreed that if the work or any part thereof, or any material brought on the site of the work for use in the work or selected for the same, shall be deemed by the ENGINEER as unsuitable or not in conformity with the specifications, the CONTRACTOR shall, after receipt of written notice thereof from the ENGINEER, forthwith remove such

material and rebuild or otherwise remedy such work so that it shall be in full accordance with this contract.

2.15 CHANGES AND ALTERATIONS. The CONTRACTOR further agrees that the OWNER may make such changes and alterations as the OWNER may see fit, in the line, grade, form, dimensions, plans or materials for the work herein contemplated, or any part thereof, either before or after the beginning of the construction, without affecting the validity of this contract and the accompanying Performance and Payment Bonds.

If such changes or alterations diminish the quantity of the work to be done, they shall not constitute the basis for a claim for damages, or anticipated profits on the work that may be dispensed with, except as provided for unit price items under Section 5 "Measurement and Payment." If the amount of work is increased, and the work can fairly be classified under the specifications, such increase shall be paid for according to the quantity actually done and at the unit price, if any, established for such work under this contract, except as provided for unit price items under Section 5 "Measurement and Payment;" otherwise, such additional work shall be paid for as provided under Extra Work. In case the OWNER shall make such changes or alterations as shall make useless any work already done or material already furnished or used in said work, then the OWNER shall recompense the CONTRACTOR for any material or labor so used, and for any actual loss occasioned by such change, due to actual expenses incurred in preparation for the work as originally planned.

3. GENERAL OBLIGATIONS AND RESPONSIBILITIES

3.01 KEEPING OF PLANS AND SPECIFICATIONS ACCESSIBLE. The ENGINEER shall furnish the CONTRACTOR with an adequate and reasonable number of copies of all plans and specifications without expense to him, and the CONTRACTOR shall keep one copy of the same constantly accessible on the work, with the latest revisions noted thereon.

3.02 OWNERSHIP OF DRAWINGS. All drawings, specifications and copies thereof furnished by the ENGINEER shall not be reused on other work, and, with the exception of the signed contract sets, are to be returned to him on request, at the completion of the work. All models are the property of the OWNER.

3.03 ADEQUACY OF DESIGN. It is understood that the OWNER believes it has employed competent engineer and designers. It is, therefore, agreed that the OWNER shall be responsible for the adequacy of the design, sufficiency of the Contract Documents, the safety of the structure and the practicability of the operations of the completed project; provided the CONTRACTOR has complied with the requirements of the said Contract Documents, all approved modifications thereof, and additions and alterations thereto approved in writing by the 0WNER. The burden of proof of such compliance shall be upon the CONTRACTOR to show that he has complied with

the said requirements of the Contract Documents, approved modifications thereof and all approved additions and alterations thereto.

3.04 RIGHT OF ENTRY. The OWNER reserves the right to enter the property or location on which the works herein contracted for are to be constructed or installed, by such agent or agents as he may elect, for the purpose of inspecting the work, or for the purpose of constructing or installing such collateral work as said OWNER may desire.

3.05 COLLATERAL CONTRACTS. The OWNER agrees to provide by separate contract or otherwise, all labor and material essential to the completion of the work specifically excluded from this contract, in such manner as not to delay the progress of the work, or damage said CONTRACTOR, except where such delays are specifically mentioned elsewhere in the Contract Documents.

3.06 DISCREPANCIES AND OMISSIONS. It is further agreed that it is the intent of this contract that all work must be done and all material must be furnished in accordance with the generally accepted practice, and in the event of any discrepancies between the separate contract documents, the priority of interpretation defined under "Contract Documents" shall govern. In the event that there is still any doubt as to the meaning and intent of any portion of the contract, specifications or drawings, the ENGINEER shall define which is intended to apply to the work.

3.07 EQUIPMENT, MATERIALS AND CONSTRUCTION PLANT. The CONTRACTOR shall be responsible for the care, preservation, conservation, and protection of all materials, supplies, machinery, equipment, tools, apparatus, accessories, facilities, all means of construction, and any and all parts of the work, whether the CONTRACTOR has been paid, partially paid, or not paid for such work, until the entire work is completed and accepted.

3.08 DAMAGES. In the event the CONTRACTOR is damaged in the course of the completion of the work by the act, neglect, omission, mistake or default of the OWNER, or of the ENGINEER, or of any other CONTRACTOR employed by the OWNER upon the work, thereby causing loss to the CONTRACTOR, the OWNER agrees to reimburse the CONTRACTOR for such loss. In the event the OWNER is damaged in the course of the work by the act, negligence, omission, mistake or default of the CONTRACTOR, or should the CONTRACTOR unreasonably delay the progress of the work being done by others on the job so as to cause loss for which the OWNER becomes liable, then the CONTRACTOR shall reimburse the OWNER for such loss.

3.09 PROTECTION AGAINST ACCIDENT TO EMPLOYEES AND THE PUBLIC. The CONTRACTOR shall at all times exercise reasonable precautions for the safety of employees and others on or near the work and shall comply with all applicable provisions of Federal, State, and Municipal safety laws and building and construction codes. All machinery and equipment and other physical hazards shall be guarded in accordance with the "Manual of Accident Prevention

in Construction" of the Associated General Contractors of America except where incompatible with Federal, State, or Municipal laws or regulations. The CONTRACTOR shall provide such machinery guards, safe walkways, ladders, bridges, gangplanks, and other safety devices. The safety precautions actually taken and their adequacy shall be the sole responsibility of the CONTRACTOR, acting at his discretion as an independent contractor.

3.10 PERFORMANCE AND PAYMENT BONDS. Unless otherwise specified, it is further agreed by the parties to this Contract that the CONTRACTOR will execute separate performance and payment bonds, each in the sum of one hundred (100) percent of the total contract price, in standard forms for this purpose, guaranteeing faithful performance of the work and the fulfillment of any guarantees required, and further guaranteeing payment to all persons supplying labor and materials or furnishing him any equipment in the execution of the Contract, and it is agreed that this Contract shall not be in effect until such performance and payment bonds are furnished and approved by the OWNER.

Unless otherwise approved in writing by the OWNER, the surety company underwriting the bonds shall be acceptable according to the latest list of companies holding certificates of authority from the Secretary of the Treasury of the United States.

Unless otherwise specified, the cost of the premium for the performance and payment bonds shall be included in the CONTRACTOR'S proposal.

3.11 LOSSES FROM NATURAL CAUSES. Unless otherwise specified, all loss or damage to the CONTRACTOR arising out of the nature of the work to be done, or from the action of the elements, or from any unforeseen circumstance in the prosecution of the same, or from unusual obstructions or difficulties which may be encountered in the prosecution of the work, shall be sustained and borne by the CONTRACTOR at his own cost and expense.

3.12 PROTECTION OF ADJOINING PROPERTY. The said CONTRACTOR shall take proper means to protect the adjacent or adjoining property or properties in any way encountered, which might be injured or seriously affected by any process of construction to undertaken under this Agreement, from any damage or injury by reason of said process of construction; and he shall be liable for any and all claims for such damage on account of his failure to fully protect all adjoining property. The CONTRACTOR agrees to idemnify, save and hold harmless the OWNER and ENGINEER against any claim or claims for damages due to any injury to any adjacent or adjoining property, arising or growing out of the performance of the contract; but any such indemnity shall not apply to any claim of any kind arising out of the existence or character of the work.

3.13 PROTECTION AGAINST CLAIMS OF SUB-CONTRACTORS, LABORERS, MATERIALMEN AND FURNISHERS OF MACHINERY,

EQUIPMENT AND SUPPLIES. The CONTRACTOR agrees that he will indemnify and save the OWNER and ENGINEER harmless from all claims growing out of the lawful demands of sub-contractors, laborers, workmen, mechanics, materialmen and furnishers of machinery and parts thereof, equipment, power tools, and all supplies, including commissary, incurred in the furtherance of the performance of this contract. When so desired by the OWNER, the CONTRACTOR shall furnish satisfactory evidence that all obligations of the nature hereinabove designated have been paid, discharged or waived. If the CONTRACTOR fails so to do, then the OWNER may at the option of the CONTRACTOR either pay directly any unpaid bills, of which the OWNER has written notice, or withhold from the CONTRACTOR'S unpaid compensation a sum of money deemed reasonably sufficient to liquidate any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged, whereupon payments to the CONTRACTOR shall be resumed in full, in accordance with the terms of this contract, but in no event shall the provisions of this sentence be construed to impose any obligation upon the OWNER by either the CONTRACTOR or his Surety.

3.14 PROTECTION AGAINST ROYALTIES OR PATENTED INVENTION. The CONTRACTOR shall pay all royalties and license fees, and shall provide for the use of any design, device, material or process covered by letters patent or copyright by suitable legal agreement with the patentee or owner. The CONTRACTOR shall defend all suits or claims for infringement of any patent or copyright rights and shall indemnify and save the OWNER and ENGINEER harmless from any loss on account thereof, except that the OWNER shall defend all such suits and claims and shall be responsible for all such loss when a particular design, device, material or process or the product of a particular manufacturer or manufacturers is specified or required by the OWNER; provided, however, if choice of alternate design, device, material or process is allowed to the CONTRACTOR, then CONTRACTOR shall indemnify and save OWNER harmless from any loss on account thereof. If the material or process specified or required by the OWNER is an infringement, the CONTRACTOR shall be responsible for such loss unless he promptly gives such information to the OWNER.

3.15 LAWS AND ORDINANCES. The CONTRACTOR shall at all times observe and comply with all Federal, State and local laws, ordinances and regulations, which in any manner affect the contract or the work, and shall indemnify and save harmless the OWNER and ENGINEER against any claim arising from the violation of any such laws, ordinances, and regulations whether by the CONTRACTOR or his employees, except where such violations are called for by the provisions of the Contract Documents. If the CONTRACTOR observes that the plans and specifications are at variance therewith, he shall promptly notify the ENGINEER in writing, and any necessary changes shall be adjusted as provided in the contract for changes in the work. If the CONTRACTOR performs any work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the ENGINEER, he shall bear all costs arising therefrom. In case the OWNER is a body politic and corporate, the law

from which it derives its powers, insofar as the same regulates the objects for which, or the manner in which, or the conditions under which the same regulates the objects for which, or the manner in which, or the conditions under which the OWNER may enter into contract, shall be controlling, and shall be considered as part of this contract, to the same effect as though embodied herein.

3.16 ASSIGNMENT AND SUBLETTING. The CONTRACTOR further agrees that he will retain personal control and will give his personal attention to the fulfillment of this contract and that he will not assign by Power of Attorney, or otherwise, or sublet said contract without the written consent of the ENGINEER, and that no part or feature of the work will be sublet to anyone objectionable to the ENGINEER or the OWNER. The CONTRACTOR further agrees that the subletting of any portion or feature of the work, or materials required in the performance of this contract, shall not relieve the CONTRACTOR from his full obligations to the OWNER, as provided by this Agreement.

3.17 INDEMNIFICATION. The CONTRACTOR shall defend, indemnify and hold harmless the OWNER and the ENGINEER and their respective officers, agents and employees, from and against all damages, claims, losses, demands, suits, judgments and costs, including reasonable attorneys' fees and expenses, arising out of or resulting from the performance of the work, provided that any such damages, claim, loss, demand, suit, judgment, cost or expense:

(1) Is attributable to bodily injury, sickness, disease or death or to injury to or destruction of tangible property (other than the work itself) including the loss of use resulting therefrom; and,

(2) Is caused in whole or in part by any negligent act or omission of the Contractor, any Subcontractor, anyone directly or indirectly employed by any one of them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder.

The obligation of the CONTRACTOR under this Paragraph shall not extend to the liability of the ENGINEER, his agents or employees arising out of the preparation or approval of maps, drawings, reports, surveys, Change Orders, designs or specifications, or the giving of or the failure to give directions or instructions by the ENGINEER, his agents or employees, provided such giving or failure to give is the primary cause of the injury or damage.

3.18 CERTIFICATE OF INSURANCE. Before commencing any of the work, CONTRACTOR shall file with the OWNER valid Certificates of Insurance acceptable to the OWNER and the ENGINEER. Such Certificates shall contain a provision that coverages afforded under the policies will not be cancelled until at least fifteen days' prior written notice has been given to the OWNER.

The CONTRACTOR shall also file with the OWNER valid Certificates of Insurance covering all sub-contractors.

4. PROSECUTION AND PROGRESS

4.01 TIME AND ORDER OF COMPLETION. It is the meaning and intent of this contract, unless otherwise herein specifically provided, that the CONTRACTOR shall be allowed to prosecute his work at such times and seasons, in such order of precedence, and in such manner as shall be most conducive to economy of construction: provided, however, that the order and the time of prosecution shall be such that the work shall be substantially completed as a whole and in part, in accordance with this contract, the plans and specifications, and within the time of completion designated in the Proposal; provided, also, that when the OWNER is having other work done, either by contract or by his own force, the ENGINEER may direct the time and manner of constructing the work done under this contract, so that conflict will be avoided and the construction of the various works being done for the OWNER shall be harmonized.

The CONTRACTOR shall submit, at such times as may reasonably be requested by the ENGINEER, schedules which shall show the order in which the CONTRACTOR proposes to carry on the work, with dates at which the CONTRACTOR will start the several parts of the work, and estimated dates of completion of the several parts.

4.02 EXTENSION OF TIME. Should the CONTRACTOR be delayed in the completion of the work by any act or neglect of the OWNER or ENGINEER, or of any employee of either, or by other contractors employed by the OWNER, or by changes ordered in the work, or by strikes, lockouts, fires, and unusual delays by common carriers, or unavoidable cause or causes beyond the CONTRACTOR'S control, or by any cause which the ENGINEER shall decide justifies the delay, then an extension of time shall be allowed for completing the work, sufficient to compensate for the delay, the amount of the extension to be determined by the ENGINEER, provided, however, that the CONTRACTOR shall give the ENGINEER prompt notice in writing of the cause of such delay.

4.03 HINDRANCES AND DELAYS. No claims shall be made by the CONTRACTOR for damages resulting from hindrances or delays from any cause (except where the work is stopped by order of the OWNER) during the progress of any portion of the work embraced in this contract. In case said work shall be stopped by the act of the OWNER, then such expense as in the judgment of the ENGINEER is caused by such stoppage of said work shall be paid by the OWNER to the CONTRACTOR.

5. MEASUREMENT AND PAYMENT

5.01 QUANTITIES AND MEASUREMENTS. No extra or customary measurements of any kind will be allowed, but the actual measured and/or

computed length, area, solid contents, number and weight only shall be considered, unless otherwise specifically provided.

5.02 ESTIMATED QUANTITIES. This agreement, including the specifications, plans and estimate, is intended to show clearly all work to be done and material to be furnished hereunder. Where the estimated quantities are shown for the various classes of work to be done and material to be furnished under this contract, they are approximate and are to be used only as a basis for estimating the probable cost of the work and for comparing the proposals offered for the work. It is understood and agreed that the actual amount of work to be done and material to be furnished under this contract may differ somewhat from these estimates, and that where the basis for payment under this contract is the unit price method, payment shall be for the actual amount of such work done and the material furnished.

Where payment is based on the unit price method, the CONTRACTOR agrees that he will make no claim for damages, anticipated profits or otherwise on account of any differences which may be found between the quantities of work actually done, the material actually furnished under this contract and the estimated quantities contemplated and contained in the proposal; provided, however, that in case the actual quantity of any major item should become as much as 20% more than, or 20% less than the estimated or contemplated quantity for such items, then either party to this Agreement, upon demand, shall be entitled to a revised consideration upon the portion of the work above or below 20% of the estimated quantity.

A "Major Item" shall be construed to be any individual bid item incurred in the proposal that has a total cost equal to or greater than five (5) per cent of the total contract cost, computed on the basis of the proposal quantities and the contract unit prices.

Any revised consideration is to be determined by agreement between parties, otherwise by the terms of this Agreement, as provided under "Extra Work."

5.03 PRICE OF WORK. In consideration of the furnishing of all the necessary labor, equipment and material, and the completion of all work by the CONTRACTOR, and on the completion of all work and of the delivery of all material embraced in this Contract in Full conformity with the specifications and speculations herein contained, the OWNER agrees to pay the CONTRACTOR the prices set forth in the Proposal hereto attached, which has been made a part of this contract. The CONTRACTOR hereby agrees to receive such prices in full for furnishing all material and all labor required for aforesaid work, also for all expense incurred by him, and for well and truly performing the same and the whole thereof in the manner and according to this Agreement.

5.04 PARTIAL PAYMENTS. On or before the 10th day of each month, the CONTRACTOR shall prepare and submit to the ENGINEER for approval or

modification a statement showing as completely as practicable the total value of the work done by the CONTRACTOR up to and including the last day of the preceding month; said statement shall also include the value of all sound materials delivered on the site of the work that are to be fabricated into the work.

The OWNER shall then pay the CONTRACTOR on or before the 15th day of the current month the total amount of the approved statement, less 10 per cent of the amount thereof, which 10 per cent shall be retained until final payment, and further less all previous payments and all further sums that may be retained by the OWNER under the terms of this Agreement. It is understood, however, that in case the whole work be near to completion and some unexpected and unusual delay occurs due to no fault or neglect on the part of the CONTRACTOR, the OWNER may upon written recommendation of the ENGINEER pay a reasonable and equitable portion of the retained percentage to the CONTRACTOR, or the CONTRACTOR at the OWNER'S option, may be relieved of the obligation to fully complete the work and, thereupon, the CONTRACTOR shall receive payment of the balance due him under the contract subject only to conditions stated under "Final Payment."

5.05 USE OF COMPLETED PORTIONS. The OWNER shall have the right to take possession of and use any completed or partially completed portions of the work, notwithstanding the time for completing the entire work or such portions may not have expired but such taking possession and use shall not be deemed an acceptance of any work not completed in accordance with the Contract Documents. If such prior use increases the cost of or delays the work, the CONTRACTOR shall be entitled to such extra compensation, or extension of time, or both, as the ENGINEER may determine.

The CONTRACTOR shall notify the ENGINEER when, in the CONTRACTOR'S opinion, the contract is "substantially completed" and when so notifying the ENGINEER, the CONTRACTOR shall furnish to the ENGINEER in writing a detailed list of unfinished work. The ENGINEER will review the CONTRACTOR'S list of unfinished work and will add thereto such items as the CONTRACTOR has failed to include. The "substantial completion" of the structure or facility shall not excuse the CONTRACTOR from performing all of the work undertaken, whether of a minor or major nature, and thereby completing the structure or facility in accordance with the Contract Documents.

5.06. FINAL COMPLETION AND ACCEPTANCE. Within ten (10) days after the CONTRACTOR has given the ENGINEER written notice that the work has been completed, or substantially completed, the ENGINEER and the OWNER shall inspect the work and within said time, if the work be found to be completed or substantially completed in accordance with the Contract Documents, the ENGINEER shall issue to the OWNER and the CONTRACTOR his Certificate of Completion, and thereupon it shall be the duty of the OWNER within ten (10) days to issue a Certificate of Acceptance of the work to the CONTRACTOR or to advise the CONTRACTOR in writing of the reason for non-acceptance.

5.07 FINAL PAYMENT. Upon the issuance of the Certificate of Completion, the ENGINEER shall proceed to make final measurements and prepare final statement of the value of all work performed and materials furnished under the terms of the Agreement and shall certify same to the OWNER, who shall pay to the CONTRACTOR on or before the 30th day, and before the 35th day, after the date of the Certificate of Completion, the balance due the CONTRACTOR under the terms of this Agreement, provided he has fully performed his contractual obligations under the terms of this contract; and said payment shall become due in any event upon said performance by the CONTRACTOR. Neither the Certificate of Acceptance nor the final payment, nor any provision in the Contract Documents, shall relieve the CONTRACTOR of the obligation for fulfillment of any warranty which may be required.

5.08 PAYMENTS WITHHELD. The OWNER may, on account of subsequently discovered evidence, withhold or nullify the whole or part of any certificate to such extent as may be necessary to protect himself from loss on account of:

(a) Defective work not remedied.

(b) Claims filed or reasonable evidence indicating probable filing of claims.

(c) Failure of the CONTRACTOR to make payments properly to subcontractors or for material or labor.

(d) Damage to another contractor.

(e) Reasonable doubt that the work can be completed for the unpaid balance of the contract amount.

(f) Reasonable indication that the work will not be completed within the contract time.

When the above grounds are removed or the CONTRACTOR provides a Surety Bond satisfactory to the OWNER, which will protect the OWNER in the amount withheld, payment shall be made for amounts withheld because of them.

5.09 DELAYED PAYMENTS. Should the OWNER fail to make payment to the CONTRACTOR of the sum named in any partial or final statement, when payment is due, then the OWNER shall pay to the CONTRACTOR, in addition to the sum shown as due by such statement, interest thereon at the rate of six (6) per cent per annum, unless otherwise specified, from date due as provided under "Partial Payments" and "Final Payments," until fully paid, which shall fully liquidate any injury to the CONTRACTOR growing out of such delay in payment, but the right is expressly reserved to the CONTRACTOR in the event payments be not promptly made, as provided under "Partial Payments," to at any time

thereafter treat the contract as abandoned by the OWNER and recover compensation, as provided under "Abandonment of Contract," unless such payments are withheld in accordance with the provisions of "Payments Withheld."

6. EXTRA WORK AND CLAIMS

6.01 CHANGE ORDERS: Without invalidating this Agreement, the OWNER may, at any time or from time to time, order deletions or revisions to the work; such changes will be authorized by Change Order to be prepared by the ENGINEER for execution by the OWNER and the CONTRACTOR. The Change Order shall set forth the basis for any change in contract price, as hereinafter set forth for Extra Work, and any change in contract time which may result from the change.

In the event the CONTRACTOR shall refuse to execute a Change Order which has been prepared by the ENGINEER and executed by the OWNER, the ENGINEER may in writing instruct the CONTRACTOR to proceed with the work as set forth in the Change Order and the CONTRACTOR may make claim against the OWNER for Extra Work involved therein, as hereinafter provided.

6.02 MINOR CHANGES: The ENGINEER may authorize minor changes in the work not inconsistent with the overall intent of the Contract Documents and not involving an increase in Contract Price. If the CONTRACTOR believes that any minor change or alteration authorized by the ENGINEER involves Extra Work and entitles him to an increase in the Contract Price, the Contractor shall make written request to the ENGINEER for a written Field Order.

In such case, the CONTRACTOR by copy of his communication to the ENGINEER or otherwise in writing shall advise the OWNER of his request to the ENGINEER for a written Field Order and that the work involved may result in an increase in the Contract Price.

Any request by the CONTRACTOR for a change in Contract Price shall be made prior to beginning the work covered by the proposed change.

6.03 EXTRA WORK: It is agreed that the basis of compensation to the CONTRACTOR for work either added or deleted by a Change Order or for which a claim for Extra Work is made shall be determined by one or more of the following methods:

Method (A) - By agreed unit prices; or
Method (B) - By agreed lump sum; or
Method (C) - If neither Method (A) nor Method (B) be agreed upon before the Extra Work is commenced, then the

CONTRACTOR shall be paid the "actual field cost" of the work, plus fifteen (15) percent.

In the event said Extra Work be performed and paid for under Method (C), then the provisions of this paragraph shall apply and the "actual field cost" is hereby defined to include the cost to the CONTRACTOR of all workmen, such as foreman, timekeepers, mechanics and laborers, and materials, supplies, teams, trucks, rentals on machinery and equipment, for the time actually employed or used on such Extra Work, plus actual transportation charges necessarily incurred, together with all power, fuel, lubricants, water and similar operating expenses, also all necessary incidental expenses incurred directly on account of such Extra Work, including Social Security, Old Age Benefits and other payroll taxes, and, a rateable proportion of premiums on Performance and Payment Bonds and Maintenance Bonds, Public Liability and Property Damage and Workmen`s Compensation, and all other insurance as may be required by any law or ordinance, or directed by the OWNER, or by them agreed to. The ENGINEER may direct the form in which accounts of the "actual field cost" shall be kept and the records of these accounts shall be made available to the ENGINEER. The ENGINEER or OWNER may also specify in writing, before the work commences, the method of doing the work and the type and kind of machinery and equipment to be used; otherwise these matters shall be determined by the CONTRACTOR. Unless otherwise agreed upon, the prices for the use of machinery and equipment shall be determined by using 100 per cent, unless otherwise specified, of the latest schedule of Equipment Ownership Expense adopted by the Associated General Contractors of America. Where practicable the terms and prices for the use of machinery and equipment shall be incorporated in the Written Extra Work Order. The fifteen (15%) per cent of the "actual field cost" to be paid the CONTRACTOR shall cover and compensate him for his profit, overhead, general superintendence and field office expense, and all other elements of cost and expense not embraced within the "actual field cost" as herein defined, save that where the CONTRACTOR'S Camp or Field Office must be maintained primarily on account of such Extra Work; then the cost to maintain and operate the same shall be included in the "actual field cost."

No claim for Extra Work of any kind will be allowed unless ordered in writing by the ENGINEER. In case any orders or instructions, either oral or written, appear to the CONTRACTOR to involve Extra Work for which he should receive compensation or an adjustment in the construction time, he shall make written request to the ENGINEER for written order authorizing such Extra Work. Should a difference of opinion arise as to what does not constitute Extra Work, or as to the payment therefore, and the ENGINEER insists upon its performance, the CONTRACTOR shall proceed with the work after making written request for written order and shall keep an accurate account of the "actual field cost" thereof, as provided under Method (C). The CONTRACTOR will thereby preserve the right to submit the matter of payment to arbitration, as hereinbelow provided.

6.04 TIME OF FILING CLAIMS. It is further agreed by both parties hereto that all questions of dispute or adjustment presented by the CONTRACTOR shall

be in writing and filed with the ENGINEER within thirty (30) days after the ENGINEER has given any directions, order or instruction to which the CONTRACTOR desires to take exception. The ENGINEER shall reply within thirty (30) days to such written exceptions by the CONTRACTOR and render his final decision in writing. In case the CONTRACTOR should appeal from the ENGINEER'S decision, any demand for arbitration shall be filed with the ENGINEER and the OWNER in writing within ten (10) days after the date of delivery to CONTRACTOR of the ENGINEER'S final decision. It is further agreed that final acceptance of the work by the OWNER and the acceptance by the CONTRACTOR of the final payment shall be a bar to any claims by either party, except where noted otherwise in the Contract Documents.

6.05 ARBITRATION. All questions of dispute under this Agreement shall be submitted to arbitration if agreed to by both parties.. The parties may agree upon one arbiter, otherwise, there shall be three, one named in writing by each party, and the third chosen by the two arbiters so selected; or if the arbiters fail to select a third within ten (10) days, he shall be chosen by a District Judge serving the County in which the major portion of the project is located, unless otherwise specified. Should the party demanding arbitration fail to name an arbiter within ten (10) days of the demand, his right to arbitrate shall lapse, and the decision of the ENGINEER shall be final and binding on him. Should the other party fail to choose an arbiter within ten(10) days, the ENGINEER shall appoint such arbiter. Should either party refuse or neglect to supply the arbiters with any papers or information demanded in writing, the arbiters are empowered by both parties to take ex parte proceedings.

The arbiters shall act with promptness. The decision of any two shall be binding on both parties to the contract. The decision of the arbiters upon any question submitted to arbitration under this contract shall be a condition precedent to any right of legal action. The decision of the arbiter or arbiters may be filed in court to carry it into effect.

The arbiters, if they deem the case demands it, are authorized to award the party whose contention is sustained, such sums as they deem proper for the time, expense and trouble incident to the appeal, and if the appeal was taken without reasonable cause, they may award damages for any delay occasioned thereby. the arbiters shall fix their own compensation, unless otherwise provided by agreement, and shall assess the cost and charges of the arbitration upon either or both parties. The award of the arbiters must be made in writing.

7. ABANDONMENT OF CONTRACT

7.01 ABANDONMENT BY CONTRACTOR. In case the CONTRACTOR should abandon and fail or refuse to resume work within ten (10) days after written notification from the OWNER, or the ENGINEER, or if the CONTRACTOR fails to comply with the orders of the ENGINEER, when such orders are consistent with the Contract Documents, then, and in that case, where

performance and payment bonds exist, the Sureties on these bonds shall be notified in writing and directed to complete the work, and a copy of said notice shall be delivered to the CONTRACTOR.

After receiving said notice of abandonment the CONTRACTOR shall not remove from the work any machinery, equipment, tools, materials or supplies then on the job, but the same, together with any materials and equipment under contract for the work, may be held for use on the work by the OWNER or the Surety on the performance bond, or another contractor in completion of the work; and the CONTRACTOR shall not receive any rental or credit therefore (except when used in connection with Extra Work, where credit shall be allowed as provided for under Section 6, Extra Work and Claims), it being understood that the use of such equipment and materials will ultimately reduce the cost to complete the work and be reflected in the final settlement.

Where there is no performance bond provided or in case the Surety should fail to commence compliance with the notice for completion hereinbefore provided for, within ten (10) days after service of such notice, then the OWNER may provide for completion of the work in either of the following elective manners:

7.01.1 The OWNER may thereupon employ such force of men and use such machinery, equipment, tools, materials and supplies as said OWNER may deem necessary to complete the work and charge the expense of such labor, machinery, equipment, tools, materials and supplies to said CONTRACTOR, and expense so charged shall be deducted and paid by the OWNER out of such moneys as may be due, or that may thereafter at any time become due to the CONTRACTOR under and by virtue of this Agreement. In case such expense is less than the sum which would have been payable under this contract, if the same had been completed by the CONTRACTOR, then said CONTRACTOR shall receive the difference. In case such expense is greater than the sum which would have been payable under this contract, if the same had been completed by said CONTRACTOR, then the CONTRACTOR and/or his Surety shall pay the amount of such excess to the OWNER; or

7.01.2 The OWNER under sealed bids, after five (5) days notice published one or more times in a newspaper having general circulation in the county of the location of the work, may let the contract for the completion of the work under substantially the same terms and conditions which are provided in this contract. In case any increase in cost to the OWNER under the new contract as compared to what would have been the cost under this contract, such increase shall be charged to the CONTRACTOR and the Surety shall be and remain bound therefore. however, should the cost to complete any such new contract prove to be less than what would have been the cost to complete under this contract, the CONTRACTOR and/or his Surety shall be credited therewith.

When the work shall have been substantially completed the CONTRACTOR and his Surety shall be so notified and Certificates of Completion

and Acceptance, as provided in Paragraph 5.06 hereinabove, shall be issued. A complete itemized statement of the contract accounts, certified to by the ENGINEER as being correct, shall then be prepared and delivered to the CONTRACTOR and his Surety, whereupon the CONTRACTOR and/or his Surety, or the OWNER as the case may be, shall pay the balance due as reflected by said statement, within fifteen (15) days after the date of such Certificate of Completion.

In the event the statement of accounts shows that the cost to complete the work is less than that which would have been the cost to the OWNER had the work been completed by the CONTRACTOR under the terms of this contract; or when the CONTRACTOR and/or his Surety shall pay the balance shown to be due by them to the OWNER, then all machinery, equipment, tools, materials or supplies left on the site of the work shall be turned over to the CONTRACTOR and/or his Surety. Should the cost to complete the work exceed the contract price, the CONTRACTOR and/or his Surety fail to pay the amount due the OWNER within the time designated hereinabove, and there remains any machinery, equipment, tools, materials or supplies on the site of the work, notice thereof, together with an itemized list of such equipment and materials, shall be mailed to the CONTRACTOR and his Surety at the respective addresses designated in this contract, provided, however, that actual written notice given in any manner will satisfy this condition. After mailing, or other giving of such notice, such property shall be held at the risk of the CONTRACTOR and his Surety subject only to the duty of the OWNER to exercise ordinary care to protect such property. After fifteen (15) days from the date of said notice the OWNER may sell such machinery, equipment, tools, materials or supplies and apply the net sum derived from such sale to the credit of the CONTRACTOR and his Surety. Such sale may be made at either public or private sale, with or without notice, as the OWNER may elect. The OWNER shall release any machinery, equipment, tools, materials, or supplies, which remain on the work, and belong to persons other than the CONTRACTOR or his Surety, to their proper owner. The books on all operations provided herein shall be open to the CONTRACTOR and his Surety.

7.02 ABANDONMENT BY OWNER. In case the OWNER shall fail to comply with the terms of this contract, and should fail or refuse to comply with said terms within ten (10) days after written notification by the CONTRACTOR, then the CONTRACTOR may suspend or wholly abandon the work, and may remove therefrom all machinery, tools and equipment, and all materials on the site of work that have not been included in payments to the CONTRACTOR and have not been wrought into the work. And thereupon the ENGINEER shall make an estimate of the total amount earned by the CONTRACTOR, which estimate shall include the value of all work actually completed by said CONTRACTOR (at the prices stated in the attached proposal where unit prices are used), the value of all partially completed work at a fair and equitable price, and the amount of all Extra Work performed at the prices agreed upon, or provided for by the terms of this contract, and a reasonable sum to cover the cost of any provisions made by the CONTRACTOR to carry the whole work to completion and which cannot be

utilized. The ENGINEER shall then make a final statement of the balance due the CONTRACTOR by deduction from the above estimate all previous payments by the OWNER and all other sums that may be retained by the OWNER under the terms of this Agreement and shall certify same to the OWNER who shall pay to the CONTRACTOR on or before thirty (30) days after the date of the notification by the CONTRACTOR the balance shown by said final statement as due the CONTRACTOR, under the terms of this Agreement.

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SPECIAL CONDITIONS

1. OWNER. Whenever the term "Owner" appears in these specifications, it shall be understood to mean McGehee Water and Sewer Commission, McGehee, Arkansas.

2. ENGINEER. The word "Engineer" in these specifications shall be understood as referring to A.L. Franks Engineering, 118 East Broad Street, Texarkana, Arkansas 71854, Engineer of the Owner, or such other Engineer, Supervisor or Inspector as may be authorized by said Owner to act in any particular position.

3. EXAMINATION OF SITE OF PROJECT. Prospective bidders shall make a careful examination of the site of the project, soil and water conditions to be encountered, improvements to be protected, disposal sites for surplus materials not designated to be salvaged materials, and methods of providing ingress and egress to private properties and of handling traffic during construction of the entire project.

4. QUALIFICATION OF LOW BIDDER. Before being awarded a contract, the low bidder shall submit such evidence as the Engineer may require to establish his financial responsibility, experience, and possession of such equipment as may be needed to prosecute the work in an expeditious, safe, and satisfactory manner.

Should the low bidder fail to produce evidence satisfactory to the Engineer on any of the foregoing points, he may be disqualified and the work awarded to the next low bidder so qualifying.

5. AWARD OF THE CONTRACT. The Owner, acting through its authorized representatives, will notify the successful bidder, in writing, within ninety (90) days after the date of receiving bids of its acceptance of this proposal. The Contractor shall complete the execution of the required Bond and Contract within fifteen (15) days of such notice.

6. ADDENDA. Bidders desiring further information or interpretation of the Plans or Specifications must make request for such information to the Engineer, prior to 48 hours before the bid opening. Answers to all such requests will be given in writing to all bidders in Addendum form, and all Addenda will be bound with, and made a part of, the Contract Documents. No other explanation or interpretation will be considered official or binding. Should a bidder find discrepancies in, or omission from the Plans, Specifications, or other Contract Documents, or should he be in doubt as to their meaning, he should at once notify the Engineer in order that a written Addendum may be sent to all bidders. Any addenda issued prior to 24 hours of the opening of bids will be mailed or delivered to each Contractor contemplating the submission of a proposal on this work. The proposal as submitted by the Contractor will be so constructed as to

include any addenda if such are issued by the Engineer prior to 24 hours of the opening of bids.

7. BASIS FOR BID AWARD. If no alternates are specified in the bid proposal, award will be made to the lowest responsible, responsive bidder. However, the Owner reserves the right to reject any and all bids and to waive any irregularities as may be deemed best and in the Owner's interest.

8. TIME FOR COMPLETION. The time allowed for completion of all items of work shall be **One Hundred Eighty** (180) consecutive calendar days, which time shall begin the tenth (10th) day after issuance of the Work Order. The Work Order shall consist of a written request by the Engineer for the Contractor to proceed with the construction of the project. Extensions due to weather days shall be based on delay above the normal rain days specified by the Corps of Engineers.

9. LIQUIDATED DAMAGES FOR DELAY. The Contractor agrees that time is the essence of this Contract, and that for each day of delay beyond the number of calendar days herein agreed upon for the completion of the work herein specified and contracted for (after due allowance for such extension of time as is provided for in the General Conditions of Agreement) the Owner may withhold, permanently from the Contractor's total compensation, the sum of Five Hundred Dollars ($500.00) per calendar day or an amount equal to actual damages incurred by the Owner, whichever is greater, as stipulated damages for such delay.

10. RIGHTS OF VARIOUS INTERESTS. Wherever work being done by the Owner's employees or by other Contractors is contiguous to work covered by this contract, the respective rights of the various interests involved shall be established by the Engineer to secure the completion of the various portions of the work in general harmony.

11. CORPORATE CONTRACTS. Corporate contractors to be eligible to enter into contract with the Owner shall be qualified to do business in the State or States where the work is to be performed. All licensing requirements shall be complied with. Foreign corporations which have not domesticated or otherwise become licensed in the State or States where work will be performed shall obtain a permit to do business in such State or States pursuant to the State's requirements.

12. PROPOSALS. **Proposals must be submitted on forms purchased from the Owner's Engineer, A.L. Franks Engineering** and endorsed as provided in the Contract Documents.

Proposals must be submitted filled out with ink or typewriter and without erasure, interlineations or changes, and if not made in accordance with the General Conditions and other contract documents, will be subject to rejection as irregular, yet the Owner reserves the right to waive any irregularities.

Proposals will be made in the name of the principal and, in a co-partnership, the names of all partners shall be given. Exact post office address shall be given in all cases. If proposals are submitted by an agent, satisfactory evidence of agency authority must accompany the proposal.

13. IRREGULAR PROPOSALS. Proposals shall be considered irregular and may be rejected for the following reasons unless otherwise provided by law:

a. If the proposal form furnished to the Contractor by the Owner or the Owner's Engineer is not used or is altered;

b. If there are unauthorized additions or conditional bids, or irregularities of any kind which may tend to make the proposal incomplete, indefinite, or ambiguous as to its meaning;

c. If the bidder adds any provisions reserving the right to accept or reject any award, or to enter into a contract pursuant to an award;

d. If the unit or lump sum prices contained in the bid schedule are obviously unbalanced either in excess or below the reasonable cost analysis values;

e. If the bidder fails to insert a unit price for every pay item indicated except in the case of authorized alternate pay items;

f. If the bidder fails to complete the proposal in any other particulars where information is requested so bidder's proposal may be properly evaluated.

The Owner reserves the right to reject any or all bids and to waive irregularities as may be deemed best and in the Owner's interest.

14. RETURN OF BID SECURITY. Bid security of the lowest two or more bidders may be retained until a contract is executed or rejection made by the Owner. Other bid security will be returned only after the canvass and tabulation of bids is completed.

15. FAILURE TO EXECUTE CONTRACT. Should the successful bidder fail to execute the contract and furnish bonds satisfactory to the Owner to validate the same within fifteen (15) days after award of contract, his bid security shall be forfeited to the Owner as liquidated damages.

16. RIGHT-OF-ENTRY. Contractor shall provide the Owner, the Owner's Architect or Engineer, or representative of the Federal, State, County, District and Municipal governmental services proper facilities for access to the work wherever it is in preparation or progress

17. PERMITS AND RIGHT-OF-WAY. The Owner will provide rights-of-way for the purpose of construction without cost to the Contractor by securing permits in areas of public dedication or by obtaining easements across privately owned property. It shall be the responsibility of the Contractor, forty-eight (48) hours prior to the initiation of construction on easements through private property, to inform the property owner of his intent to begin construction. Before beginning construction in areas of public dedication, the Contractor shall inform the agency having jurisdiction in the areas forty-eight (48) hours prior to initiation of the work.

18. CONSTRUCTION IN PUBLIC ROADWAYS AND PRIVATE DRIVEWAYS. No public road shall be entirely closed overnight. It shall be the responsibility of the Contractor to build and maintain all weather by-passes and detours, if necessary, and to properly light, barricade and mark all by-passes and detours that might be required on and across the road involved in the work included in this contract.

The Contractor shall make every effort to complete construction and allow immediate access to adjacent property at all driveway entrances located along the roads. Owners or tenants of improvements where access and/or entrance drives are located shall be notified at least eight (8) hours prior to the time the construction will be started at their drive-ins or entrances and informed as to the length of time driveways will be closed, which period shall not exceed six (6) hours.

The Contractor shall be responsible for all road and entrance reconstruction, and repairs and maintenance of same for a period of one year from the date of such reconstruction. In the event the repairs and maintenance are not made immediately to the satisfaction of the Engineer, and it becomes necessary for the Owner to make such repairs, the Contractor shall reimburse the Owner for the cost of such repairs.

The Contractor shall at all times keep a sufficient width of the roadway clear of dirt and other material to allow the free flow of traffic. The Contractor shall assume any and all responsibility for damage, personal or otherwise, that may be caused by the construction along public roadways or private driveways.

19. REFERENCE SPECIFICATIONS. Where reference is made in these specifications to specifications compiled by other agencies, organizations or departments, such reference is made for expediency and standardization from the material supplier's point of view, and such specifications referred to are hereby made a part of these specifications. Any reference to standard specifications in any of the Contract Documents shall always imply the latest edition of said standard specification or specifications available at time notice inviting Contractors to bid is published unless otherwise stated.

20. TRADE NAMES AND MATERIALS. No material which has been used by the Contractor for any temporary purpose whatever is to be incorporated in the permanent structure without written consent of the Engineer.

Where materials or equipment are specified by a trade or brand name, it is not the intention of the Owner to discriminate against an equal product of another manufacturer, but rather to set a definite standard of quality of performance, and to establish an equal basis for the evaluation of bids. Where the words "equivalent", "proper", or "equal to" are used, they shall be understood to mean that the thing referred to shall be proper, the equivalent of, or equal to some other thing, in the opinion or judgment of the Engineer. Unless otherwise specified, all materials shall be the best of their respective kinds and shall be in all cases fully equal to approved samples. Notwithstanding that the words "or equal to" or other such expressions may be used in the specifications in connection with a material, manufactured article or process, the materials, article or process specifically designated shall be used, unless a substitute shall be approved in writing by the Engineer, and the Engineer shall have the right to require the use of such specifically designated material, article or process.

21. QUALITY OF MATERIALS. In the absence of detailed specifications in other sections, all materials shall conform to the latest standards of the American Society for Testing Materials.

22. MATERIALS, SERVICES, AND FACILITIES. It is understood that except as otherwise specifically stated in the Contract Documents, the Contractor shall provide and pay for all materials, labor, tools, equipment, equipment rental, water, heat, light, fuel, power, transportation, superintendence, temporary construction of every nature and all other services and facilities of every nature whatsoever necessary to execute, complete and deliver the work within the specified time.

23. WORKMANSHIP, MATERIALS, EQUIPMENT, AND STORAGE. All work done and all materials and equipment furnished by the Contractor shall strictly conform to the plans, drawings, and specifications. Competent labor, mechanics, and tradesmen shall be used to supervise the installation of equipment as may be required by the Engineer. Any special tools or equipment which may be required for first class work shall be provided by the Contractor.

The acceptance at any time of materials by or in behalf of the Owner shall not be a bar to future rejection if they are subsequently found to be defective or inferior in quality or uniformity to the material specified, or are not as represented to the Engineer or Owner.

Contractor shall be responsible for the care and storage of materials delivered on the work site or purchased for use thereon. Stored materials shall be carefully and continuously protected from damage or deterioration and so located as to facilitate inspection by the Owner and Engineer. This responsibility for the care

and storage of materials shall be with the Contractor whether such materials are furnished by the Contractor or by the Owner.

24. INSPECTION AND TESTING OF MATERIALS.

a. During the progress of the work, it shall be subject to the inspection and observance of the Engineer, and the contractor shall afford every reasonable facility and assistance to the Engineer to make such inspection thorough and intelligent. If any work is covered up without approval or consent of the Engineer, it must, if required by the Engineer, be uncovered for examination at the Contractor's expense.

b. The fact that the Engineer is on the job site shall not be taken as an acceptance of the Contractor's work or any part of it. contractor shall notify the Engineer upon completion of his contract and the work shall be given final inspection by the Engineer and any tests shall be witnessed by the Engineer. If all parts of the work are acceptable and substantially comply with the intent of the plans, drawings, and specifications, a recommendation of final acceptance will be made by the Engineer to the Owner. If parts of the work are not acceptable and require additional work by the Contractor to complete the project, necessitating additional inspection by the Engineer, the cost of such additional inspections including time, travel, and lodging, shall be paid for by the Contractor to the Owner who will reimburse the Engineer.

c. Contractor shall submit to the Engineer seven (7) days in advance of construction, and without charge, samples or specifications of materials he proposes to use and shall not use these materials until he has received approval from the Engineer.

d. The Owner shall direct and furnish all items necessary for the testing of all materials called for in the specifications. The Owner shall pay the cost of the tests, including all transportation charges unless otherwise noted in the specifications. The cost of re-testing any failed specimens shall be paid by the Contractor.

e. All tests, unless otherwise provided, shall be in accordance with the pertinent sections of the latest edition of the standards applicable to the material or devices to be tested. A partial list of the principal societies referred to and their abbreviations follows:

ASTM	American Society for Testing Materials
AISC	American Institute of Steel Construction
ACI	American Concrete Institute
FS	Federal Specifications

AASHO	American Association of State Highway Officials
AWWA	American Water Works Association

f. All parts of the improvements shall conform to the standard of construction as given in detail under the various items, and in general to the intent thereof, and if they do not conform, shall be made to do so by rebuilding or replacing or otherwise as directed by the Engineer or Owner before acceptance shall be made.

25. BARRICADES, LIGHTS, AND WATCHMEN. Where the work is carried on in or adjacent to any street, alley or public place, the Contractor shall at his own cost and expense furnish and erect such barricades, fences, lights, and danger signals, shall provide such watchmen, and shall provide such other precautionary measures for the protection of persons or property and of the work as are necessary. Barricades shall be painted in a color that will be visible at night. From sunset to sunrise the Contractor shall furnish and maintain at least one light at each barricade and sufficient number of barricades shall be erected to keep vehicles from being driven on or into any work under construction. The Contractor shall furnish watchmen in sufficient numbers to protect the work.

The Contractor will be held responsible for all damage to the work due to failure of barricades, signs, lights, and watchmen to protect it, and whenever evidence is found of such damage, the Engineer may order the damaged portion immediately removed and replaced by the Contractor at his cost and expense. The Contractor's responsibility for the maintenance of barricades, signs, and lights, and for providing watchmen shall not cease until the project shall have been accepted by the Owner.

The Contractor shall use only battery powered lights, enclosed lanterns or other lights satisfactory to the Engineer. Smudge pots or other lights which have an open flame will not be permitted.

26. DISPOSAL OF WASTE AND SURPLUS EXCAVATION. All trees, stumps, slashings, brush or other debris removed from the job site as a preliminary to the construction of the work or its appurtenances shall be removed from the property and disposed of in a manner approved by the Engineer.

All excavated earth in excess of that required for backfilling shall be removed from the job site and disposed of in a satisfactory manner except in locations where, in the judgment of the Engineer, it can be neatly spread over and along the right-of-way.

27. GUARANTY AGAINST DEFECTIVE WORK. The Contractor shall indemnify the Owner against any repairs which may become necessary to any part of the work performed under the contract, arising from defective workmanship or materials used therein, for a period of one (1) year from the date of final acceptance of the work.

28. RESTORATION OF SITE & CLEANUP. Upon completion of the project (or major portions thereof) the Contractor shall restore the site to its original condition or better. Driveways and streets shall be compacted and resurfaced as originally found. All private property disrupted during construction including fences, patios, retaining walls, sidewalks, wooden decks, etc. shall be mended or repaired to their original condition. At the conclusion of the work, all tools, temporary structures and materials belonging to the Contractor shall be promptly removed, and all dirt, rubbish and other foreign substances shall be disposed of.

The Contractor shall thoroughly clean all equipment and materials installed by him and shall deliver over such materials and equipment in an undamaged, clean condition.

29. CONTRACTOR'S AND SUBCONTRACTOR'S INSURANCE. The Contractor shall not commence work under this contract until he has obtained at his expense all insurance required under this section of the General Conditions and by the Contract Documents, and such insurance has been approved by the Owner, nor shall the Contractor allow any subcontractor to commence work on any subcontract until all similar insurance required of the subcontractor has been so obtained and approved. Such insurance shall remain in full force and effect on all phases of the work, whether or not the work is occupied or utilized by the Owner, until all work under the Contract is completed and has been accepted by the Owner.

Nothing contained in the insurance requirements shall be construed as limiting the extent of the Contractor's responsibility for payment of damages resulting from his operations under the Contract.

Any insurance bearing an adequacy of performance will be maintained after completion of the project for the full guarantee period.

The Contractor shall obtain and maintain for the full period of the Contract the following types of insurance in the form, minimum limits and amounts herein specified or as may be otherwise required in the Contract Documents. The Contractor shall automatically renew any policy which expires during the performance of his Contract and notify the Owner and Engineer of such a renewal prior to expiration date.

A. Workmen's Compensation including Occupational Disease, and Employer's Liability Insurance. Before commencement of the work, the Contractor shall take out and maintain during the life of this contract Statutory Workmen's Compensation Insurance and Occupational Disease Disability Insurance for all of his employees to be engaged in work under this Contract, and in case any work is sublet, the Contractor shall require the subcontractor similarly to provide Workmen's Compensation and occupational Disease Disability Insurance for the latter's employees engaged in such work unless such

employees are covered by the protection afforded by the Contractor's insurance. In case any class of employees engaged in hazardous work under the Contractor is not protected under the Workmen's Compensation statute, or in case there is no applicable Workmen's Compensation Statute, the Contractor shall provide, and shall cause each subcontractor to provide adequate insurance for the protection of his employees not otherwise protected.

B. Public Liability and Property Damage Insurance: (Note "Indemnity" clause hereinafter). Before commencement of the work, the Contractor shall submit written evidence that he and all his subcontractors have obtained for the period of the Contract full Comprehensive General Liability and Property Damage Insurance coverage. This coverage shall protect the Contractor; the Owner; the Engineer, its architects and engineers; and each of their officers, agents and employees; from claims for damages for bodily or personal injury, sickness or disease, including death, and from claims for damages to property, which may arise directly or indirectly out of, or in connection with the performance of work under this Contract by the Contractor, by any of his Subcontractors, or by anyone directly or indirectly employed of either of them, or under the control of either of them, and the minimum amount of such insurance shall be as follows unless higher minimum amounts are otherwise required in the Contract Documents:

> Public Liability Insurance in an amount not less than Two Hundred Fifty Thousand Dollars ($250,000) for damages arising out of bodily or personal injury, sickness or disease, or death of one person and subject to the same limit for each person and in an amount not less than Five Hundred Thousand Dollars ($500,000) in any one occurrence; and Property Damage Insurance in an amount not less than Three Hundred Thousand Dollars ($300,000) for all damages arising out of injury to or destruction of property of others in any one occurrence with an aggregate limit in the same amount.

The Property Damage portion of this coverage shall include where applicable explosion, collapse and underground exposure coverage. In addition, where Completed Operation Insurance coverage is applicable, such coverage will be maintained after completion and acceptance of the project for the full guarantee period.

C. Automobile Liability and Property Damage Insurance: Before commencement of the work, the Contractor shall submit written evidence that he and all his subcontractors have obtained Automobile Liability and Property Damage Insurance coverage on all self-propelled vehicles used in connection with the Contract, whether owned, non-owned, or hired. The liability limits shall be not less than Two Hundred Fifty Thousand Dollars ($250,000) for injury or death of one person and in an amount not less than Five Hundred Thousand Dollars ($500,000) in any one occurrence; and Property Damage limits of not less than Three Hundred Thousand Dollars ($300,000) in any one occurrence.

D. Contractual Liability Coverage: Each and every policy for Liability Insurance carried by each Contractor and Subcontractor will include a "Contractual Liability Coverage" endorsement sufficiently broad to insure the provision titled "Indemnity" hereinafter set forth.

E. Indemnity: The Contractor shall defend, indemnify and hold harmless the Owner; the Engineer, its Engineers; and each of their officers, agents, servants and employees; from any and all suits, actions, claims, losses or damage of any character and from all expenses incidental to the defense of such suits, actions or claims, based upon or arising out of or alleged to be based upon or arising out of (1) any injury, disease, sickness or death of any person or persons, (2) any damages to any property including in part loss of use thereof, caused by any act or omission of the Contractor, of any Subcontractor of the Contractor, or by their officers, agents, servants, employees, or anyone else under the Contractor's direction and control, and arising out of, occurring in connection with, resulting from, or caused by the performance or failure of performance of any work or services called for by the Contract or from conditions created by the performance or non-performance of said work or services, but not including the sole negligence of any party herein indemnified.

F. Builder's Risk "All-Risk" Insurance: In addition to such Fire and extended Insurance coverage which the Contractor or his Subcontractors elect to carry for their own protection, the Contractor, before commencement of the work, shall effect and maintain for the life of his Contract Builder's Risk "All-Risk" Completed Value Insurance coverage upon the full insurable value of all portions of the project which is the subject of this Contract and subject to a loss for which Builder's Risk "All-Risk" Insurance coverage gives protection, and shall include completed work and work in progress. This coverage shall be with an insurance company or companies acceptable to the Owner.

Such insurance shall include as Additional Named Insureds: the Owner; The Engineer, its architects and engineers; and each of their officers, agents, and employees; and any other persons with an insurable interest designated by the Owner as an Additional Named Insured.

Duplicate originals of the policy of insurance required herein shall be furnished to the Engineer as provided under "Evidence of Insurance Coverage" hereinafter.

G. Evidence of Insurance Coverage: Before commencement of any work, the Contractor shall submit written evidence that he and all his Subcontractors have obtained the minimum insurance required by the Contract Documents. Such written evidence shall be in the form of a Certificate of Insurance (see attached form) executed by the Contractor's insurance carrier showing such policies in force for the specified period or by furnishing a copy of the actual policy or policies. Each policy or certificate will bear an endorsement or

statement waiving right of cancellation or reduction in coverage without ten (10) days notice in writing to be delivered by registered mail to the owner.

The Contractor shall furnish duplicate originals of Builders' Risk "All-Risk" Completed Value Insurance coverage to the Engineer, one copy of which shall be for the Owner and one copy for the Engineer.

30. SAFETY.

a. In accordance with generally accepted construction practices, the Contractor alone will be solely and completely responsible for conditions of the job site, including safety of all persons and property during performance of the work. This requirement will apply continuously and not be limited to normal working hours.

b. The duty of the Engineer or Architect to conduct construction review of the Contractor's performance is not intended to include review of the adequacy of the Contractor's safety measures, in, or on, or near the construction site.

31. EXISTING UTILITIES AND SERVICE LINES. The Contractor shall be responsible for the protection of all existing utilities or service lines crossed or exposed by his construction operations. Where existing utilities or service lines are cut, broken or damaged, the Contractor shall replace or repair the utilities or service lines with the same type of original material and construction, or better, at his own cost and expense.

32. DURING CONSTRUCTION. During construction of the work, the Contractor shall, at all times, keep the site of the work and adjacent premises as free from material, debris, and rubbish as is practicable and shall remove same from any portion of the site, if in the opinion of the Engineer, such material, debris, or rubbish constitutes a nuisance or is objectionable.

The Contractor shall remove from the site all of his surplus materials and temporary structures when no further need therefore develops.

33. COPIES OF PLANS AND SPECIFICATIONS FURNISHED. Three (3) sets of plans and specifications shall be furnished to the Contractor, at no charge, for construction purposes. Additional copies may be obtained at cost of reproduction upon request.

34. LIGHT AND POWER. The Contractor shall provide, at his own expense, temporary lighting and facilities required for the proper prosecution and inspection of the work.

35. EXISTING STRUCTURES. The plans show the locations of all known surface and subsurface structures. However, the Owner assumes no responsibility for failure to show any or all of these structures on the plans, or to

show them in their exact location. It is mutually agreed that such failure shall not be considered sufficient basis for claims for additional compensation for extra work or for increasing the pay quantities in any manner whatsoever, unless the obstruction encountered is such as to necessitate changes in the lines or grades, or requires the building of special work, provisions for which are not made in the plans and proposal, in which case the provisions in these specifications for extra work shall apply.

36. USE OF EXPLOSIVES. Use of explosives will be allowed only upon written approval of their use by the Engineer.

Should the Contractor elect to use explosives in the prosecution of the work, the utmost care shall be exercised so as not to endanger life or property. The Owner shall not be held liable for damages done by the Contractor in the use of explosives. The Contractor shall notify the proper representatives of any public service corporation, any company, or any individual, not less than eight (8) hours in advance of the use of explosives which might endanger or damage their or his property along or adjacent to the work. Whenever explosives are stored or kept, they shall be stored in a safe and secure manner and all storage places be plainly marked "DANGER EXPLOSIVES", and shall be under the care of a competent watchman at all times.

37. SUNDAYS, HOLIDAYS, AND OVERTIME. Any work necessary to be performed after regular working hours, on Sundays, or legal holidays, shall be performed without additional expense to the Owner. The Contractor shall notify the Engineer if any work is to be performed on Sundays or holidays.

38. PAYMENTS NO EVIDENCE OF PERFORMANCE. No progress or final estimate certificate given or payment made under this contract shall be evidence of the performance of this contract or construed to be acceptance of defective work or improper materials, either wholly or in part.

39. TEMPORARY SUSPENSION OF THE WORK. The Engineer shall have authority to suspend the work wholly or in part for such period or periods of time as he may deem necessary due to unsuitable weather or other conditions considered unfavorable for the suitable prosecution of the work; or for the failure of the Contractor to carry out instructions or to perform any provisions of the contract. During periods of suspension, the Contractor shall properly protect the work from possible injury.

40. OWNER'S RIGHT TO DO WORK. If the Contractor should neglect to prosecute the work properly or fail to perform any provision of this contract, the Owner, after seven (7) days written notice to the Contractor, may, without prejudice to any other remedy the Owner may have, make good such deficiency and may deduct the cost thereof from the payment then or thereafter due the Contractor. Any money due the Owner after such deduction shall be paid by the Contractor or his sureties who hereby agree to these provisions.

41. RIGHT OF OWNER TO TERMINATE CONTRACT. Should it appear at any time that the work is not being prosecuted with sufficient competence or rapidity to insure the proper completion of the work within the stipulated time, and, if upon seven (7) days written notice to the Contractor, he fails to increase the quality or the quantity of his work, or both, the Owner reserves the right to annul and cancel this contract and relet the work or any part thereof, or at the Owner's option to complete it by day labor. The Contractor shall not be entitled to any claims for damages on account of such annulment, and he will be held liable for costs and expenses incurred in reletting or completing the work under this contract. All money due the Contractor will be retained until the work is completed and all expenses and costs have been deducted and any money due the Owner, after such deductions have been made, shall be paid by the Contractor or his Sureties who hereby agree to these provisions.

42. TERMINOLOGY. Throughout these specifications, the word "shall" denotes mandatory. The word "may" implies only permission. All other "terms" or "word phrases" shall be interpreted as having the meaning customarily ascribed to them by the several building trades of the United States.

43. CERTIFICATES AND GUARANTEES. Four (4) copies of any manufacturer's guaranty or certificate as may be required by the Contract Documents shall be submitted to the Owner prior to the acceptance of the work by the Owner.

44. COORDINATION WITH OTHERS. In the event other contractors are doing work in the same area simultaneously with this project, the Contractor shall coordinate his proposed construction with that of the other contractors.

45. DEWATERING EXCAVATION. The prospective bidders shall make sufficient subsurface explorations to determine the location of groundwater which might be encountered. The Contractor shall, at his own expense, utilize a pumping system in order to place materials in dewatered excavations.

46. PUBLIC UTILITIES AND OTHER PROPERTY TO BE CHANGED. In case it is necessary to change or move the property of any owner or of a public utility, such property shall not be moved or interfered with until ordered to do so by the Engineer. The right is reserved to the owner of public utilities to enter upon the limits of the project for the purpose of making such changes or repairs of their property that may be made necessary by performance of this Contract.

Any time the Contractor intends to expose, cross, or otherwise work in the area of the existing petroleum pipelines, telephone lines, water lines, etc., the Contractor shall notify the Owner(s) of the respective facilities forty-eight (48) hours in advance.

47. PAY ITEMS. Pay items are listed in the Proposal. All other items necessary to complete the work as shown and specified shall be considered subsidiary obligations of the Contractor.

48. MUTUAL RESPONSIBILITY OF CONTRACTORS. If, through acts or neglect on the part of the Contractor, any other Contractor or Subcontractor shall suffer loss or damage to his work, the Contractor agrees to settle with such other Contractor or Subcontractor by agreement or arbitration, if such other Contractor or Subcontractor will so settle. If such other Contractor or Subcontractor asserts been so sustained, the Owner shall notify the Contractor, who shall indemnify and save harmless the Owner against such claims and for any costs in connection with such claims.

49. PROTECTION OF PROPERTY. The Contractor shall, at no additional expense to the Owner, protect by false work, braces, shoring or other property along his line of work or affected directly by his work, against damage and shall repair the damages or repay the injured Owners if such damage occurs.

The Contractor shall exercise care to protect from injury all water pipes, sanitary sewer pipes, gas mains, telephone cables, electric cables, service pipes, and other utilities or fixtures which may be encountered during the progress of the work. All utilities and other service facilities or fixtures if damaged, shall be repaired by the Contractor without additional compensation.

The Contractor shall personally check and verify utility information on the plans. Where existing utilities or structures are shown on the plans or drawings, they are believed to be accurate but are not guaranteed to such or that these are the only utilities or structures in the construction area. Protection is Contractor's responsibility and he must satisfy himself as to the existence and location of all utilities and structures.

The Contractor shall give notice in writing at least 48 hours before breaking ground, to all persons, superintendents, inspectors, or those otherwise in charge of property, streets, water pipes, gas pipes, sewer pipes, telephone cables, electric cables, railroads or otherwise, who may be affected by the Contractor's operation, in order that they may remove any obstruction for which they are responsible and have a representative on the ground to see that their property is properly protected.

50. EXTENSION OF CONTRACT PERIOD. The Contractor may be granted an extension of time due to Acts of God, Acts or War, Strikes, or non-delivery of materials provided he submits a request in writing to the Engineer not later than ten (10) days from the date of such occurrence. A separate request must be made for each occurrence.

51. FAILURE TO COMPLETE WORK WITHIN CONTRACT PERIOD. If the Contractor fails to complete his work within the contract period, or any extension thereof, as provided in the "Extension of Contract Period" said contract shall upon written notice to the Contractor and Surety be in default.

The Owner may, at its (his) option, permit the Contractor or his surety to complete the work included in the contract, or may proceed to complete the work in accordance with "Completion of Contract in Default". In either event, the Contractor or his Surety shall be responsible for all costs incidental to the completion of the work and also for the liquidated damages stipulated in the proposal form. The Owner may waive such portion of the liquidated damages as may occur after the work is in condition for the safe and convenient use by the Owner.

52. CONTRACTS IN DEFAULT. The Owner may declare a contract in default for any one or more of the following reasons:

a. Failure to complete the work within the contract period or any extension thereof.

b. Failure or refusal to comply with an order of the Engineer or Architect within a reasonable time.

c. Failure or refusal to remove rejected materials.

d. Failure or refusal to perform anew any defective or unacceptable work.

e. Bankruptcy or insolvency, or the making of an assignment for the benefit of creditors.

f. Failure to provide a qualified superintendent, competent workmen or subcontractors to carry on the work in an acceptable manner or failure to prosecute the work according to the agreed schedule of completion.

g. Disregard or violation of any other important provisions of the Contract Documents as determined by the Engineer.

53. COMPLETION OF CONTRACTS IN DEFAULT. If for any reason, a contract is declared in default, the Owner shall have the right, without process or action at law to take over all or any portion of the work and complete it at its (his) option, either by day labor or by reletting same. Written notice shall be given the Contractor by the Owner that his contract has been declared in default and upon receiving such notice, the Contractor shall peaceable relinquish possession of said work or the parts thereof specified in the notice.

The Owner may, at its (his) option and at a rental which it considers reasonable, retain all materials, equipment, and tools on the work until the work is complete.

Neither the Owner nor the Owner's officers, agents, or employees shall be in any way liable or accountable to the Contractor or his Surety for the method by which the completion of the said work, or any portion thereof, may be accomplished, or

for the price paid therefor. Should the cost of completing the work be in excess of the original contract price, the Contractor and his Surety shall be held responsible for such excess cost. Should the cost of such completion including all proper charges, be less than the original contract price, the amount so saved shall be paid to the Contractor. Neither by taking over the work nor by declaring the contract in default shall the Owner forfeit the right to recover damages from the Contractor or his Surety for failure to complete the entire contract. Maintenance of the work shall continue to be the Contractor's and Surety responsibilities as provided for in the Bond and Guaranty of the Contractor.

54. EXCAVATION IN HIGHWAY RIGHTS-OF-WAY. No trench excavation within a highway right-of-way shall be carried closer than 10 feet of all pavement edges. No dirt from trench excavation shall be piled on roadway shoulders, slopes, ditches, and berms shall be restored to their original condition.

The Contractor shall notify the Highway Department of his construction schedule not less than five (5) days prior to commencing the work within the right-of-way. The Contractor shall conform to the requirements of the Arkansas Highway Department as to details of construction methods and time of construction.

55. PROVISIONS FOR REROUTING AND DETOUR OF TRAFFIC. The Contractor will be required to furnish all barricades, lights, signs, and flagmen where it becomes necessary to reroute traffic during the time construction is in progress in the City streets or highways. The detour will be determined by the Engineer and approved by the Owner and the Arkansas Highway Department.

56. REMOVAL AND REPLACEMENT OF EXISTING PIPE CULVERTS. Existing pipe culverts in conflict with the proposed construction shall be unearthed carefully, disjointed, and stockpiled adjacent to the right-of-way. The pipe culverts shall be cleaned and replaced immediately after the sewer line construction is clear so as to cause no serious inconveniences to the property owners and to allow access to their property as quickly as possible. Pipe culverts shall be laid to grade on a firm bedding and shall be backfilled and mechanically tamped to a density such that settlement will not occur. Where existing rubble or concrete headwalls are cut, damaged, or removed, they shall be replaced in an equal or better condition as determined by the Engineer.

Removal and replacement of existing pipe culverts will not be measured and paid for each. No separate payments will be made for removing and replacing headwalls on culverts and all costs in connection therewith shall be included in other items listed in the Proposal.

57. SCHEDULE OF WORK SEQUENCE. Upon award and prior to any construction, it shall be the responsibility of the Contractor to present, to the Owner and Engineer for approval, a tentative schedule of the sequence in which the work will be performed. The schedule should include the following information:

a. The sequence of work in which the construction will be done.

b. The approximate period of time in constructing and testing of the facilities.

c. Coordination of work using two (2) or more crews.

d. Schedule of possible night work in making tie-ins and road crossings.

58. COST BREAKDOWN. Immediately after being awarded a contract for the work, the Contractor shall furnish the Engineer with a cost breakdown of each lump sum bid. Such a breakdown shall be in sufficient detail to permit its use in the preparation of progress estimates by the Engineer. Progress payments for materials and equipment on hand shall be based on invoice prices and invoice copies must be presented to the Engineer.

59. FINAL FIELD TESTS. Upon completion of the work and prior to final payment, all equipment and appliances installed under this Contract shall be subjected to acceptance tests as specified or required to prove compliance with the Contract Documents.

The Contractor shall furnish labor, fuel, energy, water and all other material, equipment, and instrument necessary for all acceptance tests, at no additional cost to the Owner.

60. WATER FOR CONSTRUCTION. Water used for testing and flushing of the pipe line or any other purpose incidental to this project will be furnished by the Contractor. The Contractor shall make the necessary arrangements for securing and/or transporting such water and shall take such water in a manner and at such times that will not produce a harmful drain on the source of water. The Contractor shall be fully responsible for the draining and disposal of all water used in flushing and testing. The Contractor shall obtain approval of the Owner and Engineer of the manner in which the water will be drained and disposed of.

61. ELECTRICITY FOR CONSTRUCTION. Except as provided elsewhere in these specifications, the Contractor shall provide all electricity required.

62. SPECIAL CONSTRUCTION REQUIREMENTS IN STATE HIGHWAY RIGHT-OF-WAY.

a. All Highway signs removed or disturbed shall be restored to original condition.

b. All surplus material shall be removed from right-of-way and the excavation finished flush with surrounding natural ground.

c. Operation along highways shall be performed in such a manner that all excavated materials be kept off the pavements at all times as well as all operating equipment.

d. Barricades, warning signs and flagmen shall be provided by the Contractor.

63. CONTRACT DOCUMENTS. The Contract Documents shall consist of all documents contained herein as stated in the Table of Contents including the Notice to Bidders (Advertisement), Special Conditions, Instructions to Bidders, Proposal, signed Agreement. Performance and Payment Bonds (when required), Special Bonds (when required), General Conditions of Agreement, Technical Specifications, Plans, and all modifications thereof incorporated in any of the documents before the execution of the Agreement.

64. POLES, SIGNS, GUY WIRES, ETC. All utility poles, guy wires, private sign posts, signs, and similar private obstructions which interfere with the construction of this project will be removed and replaced by the Contractor at his own expense.

The removal and replacement of City street sign posts and signs is the responsibility of the Contractor. The Contractor shall be responsible for all damage to street sign posts and signs within the limits of his operations that remain in place or are removed and replaced.

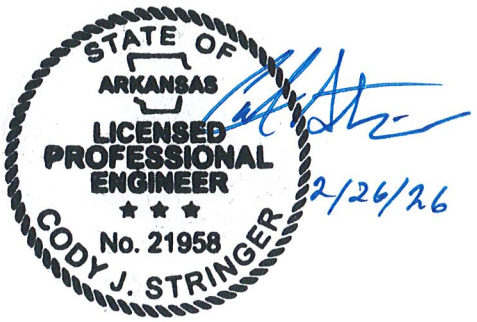
In event street sign posts and signs are injured or destroyed by the Contractor's operations, they shall be replaced by the Contractor. No separate compensation will be paid for this work, but the costs thereof shall be included in such contract pay items as are provided.

65. PROTECTION OF TREES, PLANTS AND SHRUBS. The Contractor shall make every effort to protect all trees, plants, and shrubs encountered during construction and shall notify property owners, as specified above, before removal of any such item. In all cases where questions arise, the Contractor shall request clarification from the Engineer.

66. PROPERTY LINES AND MONUMENTS. The Contractor shall protect all property lines, monuments and stakes encountered in his work. All monuments, and stakes for later use, that are disturbed or destroyed by the Contractor shall be replaced at his expense.

67. CONFINED SPACE ENTRY. The Contractor shall be responsible for compliance with any and all Federal and State confined spaced entry and permitting requirements.

TECHINCAL SPECIFICATIONS



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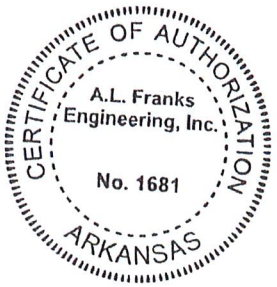

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SECTION G

GENERAL REQUIREMENTS

TECHNICAL SPECIFICATIONS

SECTION G1 - EXISTING UTILITIES

G1.1. DESCRIPTION: This section covers the requirements with respect to existing public or private utilities.

G1.2. PROXIMITY TO WATER MAINS: All plans are drawn in such manner that all known utilities are shown using the best available information including utility maps, field surveys, or other sources of information. A minimum distance of 10' shall be maintained between water and sanitary sewer lines where possible. Where this separation distance cannot be achieved, the following procedures shall be used.

A Where a new sanitary sewer crosses the water main, the water lines may be placed no closer than 18 inches from the sewer. The separation distance must be measured between the nearest outside pipe diameters. The water line shall be located at a higher elevation than the sewer wherever possible and one length of the sewer pipe must be centered on the water line.

G1.3. DAMAGE TO EXISTING UTILITIES:

Approximate locations and depths of all known utilities are shown using the best available information. The Contractor is responsible for verifying the existence and location of all utilities shown or not shown on the plans. The Contractor shall hold the Owner harmless from damages to existing utilities arising from the Contractor's operations. Repair expense and any damages suffered by the utility owner shall be at the Contractor's expense.

SECTION M

MATERIALS

TECHNICAL SPECIFICATIONS

SECTION M1 – DESCRIPTION

M1.1 GENERAL:

This section of the specifications shall govern for all materials used in the construction of sanitary sewerage facilities. Projects that would necessarily involve materials other than those included in this specification shall be subject to the approval of the Engineer. Complete specifications covering all materials not included herein shall be submitted for approval.

TECHNICAL SPECIFICATIONS

SECTION M2 – SEWER / FORCE MAIN

PIPE & FITTINGS

M2.1. DESCRIPTION: The different kinds and strengths of sewer pipe outlined in this section shall be used in the construction of sanitary sewer lines unless otherwise specified in Section C - Construction Methods. For the appropriate sizes specified below, all pipe materials shown in this section shall be considered suitable for use at any location unless a specific material is specified on the drawings or in the Proposal. Only pipe materials listed in this section shall be used for sewer mains. Unless otherwise shown or specified, all pipe of the same diameter shall be of the same material.

M2.2. SDR 21 PVC HEAVY WALL PRESSURE PIPE (SEWER FORCE MAIN) (4" – 36"): All pipe shall be circular. The pipe shall be of the size and kinds shown on the plans or as required.

Pipe shall be heavy wall polyvinyl chloride (PVC) pipe with intergrall wall bell and spigot joints. Joints shall be gasketed unrestrained joints unless specified otherwise. Pipe shall conform to ASTM D2241 for pressure class 200 pipe. Pipe shall be minimum DR-21 rating.

M2.3. DUCTILE IRON PIPE (4" – 36"): All pipe shall be circular. The pipe shall be of the sizes and kinds shown on the plans or as required.

Pipe shall conform to ANSI 21.51 (AWWA C151) and shall have a cement mortar lining and seal coat conforming to ANSI 21.4 (AWWA C104). The minimum thickness class shall be Class 50 unless otherwise specified.

M2.4. SDR 26 PVC HEAVY WALL NON-PRESSURE-TYPE SEWER PIPE (4" - 24"):

A. Scope: This specification designates general requirements for SDR 26 heavy wall polyvinyl chloride (PVC) non-pressure type pipe with integral wall bell and spigot joints. This pipe may be used at depths up to 25 feet. Pipe shall conform to ASTM D2241.

B. Materials: All pipes must meet requirements as set forth in PS 22-70, with standard dimension ratio SDR 26, and bearing the National Sanitation Foundation seal for potable water pipe. Provisions must be made for contraction and expansion at each joint with a rubber ring, and integral thickened bell as part of each joint. Pipe and fitting must be assembled with a non-toxic lubricant.

Pipe shall be made from clean, virgin, NSF approved Class 12454-A PVC Compound conforming to ASTM resin specification D 1784. Clean reworked material generated from the manufacturer's own pipe production may be used.

C. Testing Requirements: All Physical and Chemical Tests should be conducted at 73 deg. F.

The pipe shall be designed to pass without failure a pressure of 640 psi applied to 60 to 70 seconds when tested in accordance with PS 22-70 as referenced in ASTM D 1599.

The pipe shall be designed to pass without failure for 1,000 hours a pressure of 400 psi when tested in accordance with PS 22-70 as referenced to ASTM D 1598.

After two hours immersion in a sealed container of anhydrous (99.5% pure) acetone a 1" long sample ring shall show no visible spalling or cracking. (Swelling or softening is not a failure.) In accordance with PS 22-70, as referenced to ASTM D 2152.

Place between 2 flat parallel plates a 2" long ring and compress in less than one minute to 100% flattening. There shall be no evidence of splitting or shattering.

A single impact load from a freely falling missile having a 1/2" diameter rounded 1" long nose shall be imparted on a 6" long horizontally placed specimen sample. No shattering or splitting (denting is not a failure) shall be evident when the following energy is imposed:

Nominal size	1½"	2"	2½"	3"	4"	5"	6"	8"
Ft.-lbs.	24	34	43	57	86	100	100	100

M2.5. PIPE JOINTS:

A. All PVC Pipe: Provision shall be made for expansion and contraction at each joint with a rubber ring and integral thickened

bell as a part of each joint. Pipe and fittings must be assembled with a nontoxic lubricant.

B. Cast Iron Pipe: All joints shall be slip-type or mechanical and shall conform to the requirements of ANSI Specification A 21.11 unless otherwise specified on the Plans.

C. Ductile Iron Pipe: All joints shall meet with the requirements for cast iron pipe, Paragraph M2.6 (B), ANSI-A 21.11 (AWWA C111).

M2.6. PIPE FITTINGS:

A. Standard Fittings: All bends, tees, plugs, adaptors, wyes, or other fittings shall meet with the requirements of the type and kind of pipe used and all joints shall meet with the requirements for the joints listed above.

B. Special Fittings: All special fittings shall be in accordance with the pipe manufacturer's recommendations and as approved. Connections between different kinds of pipe and for future connections shall be made with an adaptor designed for this purpose and detailed and submitted to the Engineer for approval.

M2.7. SEWER LOCATE TAPE: Sewer locate tape shall be placed 12" above the center of all sewer mains.

TECHNICAL SPECIFICATIONS

SECTION M3 - MANHOLES & CLEANOUTS

M3.1. DESCRIPTION: This section covers materials to be used in the construction of manholes, drop manholes, and watertight manholes.

M3.2. CONCRETE: Concrete used in the construction of manholes shall conform to the requirements of Section M4 - Concrete and Reinforcing Steel for either Class A or Class B concrete.

M3.3. LIME: Hydrated lime shall be first quality mason's hydrate composed of at least 95% calcium and magnesium oxides (combined) and not more than 5% carbon dioxide. It shall be a known brand produced by an established manufacturer.

M3.4. MORTAR: Mortar shall be composed of one part cement to two parts fine aggregate by volume to which shall be added seven pounds of hydrated lime with each sack of cement. Cement and fine aggregate shall conform to the requirements of Section M4 - Concrete and Reinforcing Steel.

M3.5. PRECAST MANHOLES: Precast concrete manhole sections shall conform to the requirements of ASTM Designation D 478-70. Sections shall not be delivered to the site until the sections are at least ten days old. Cutouts in the bottom sections shall be appropriate for the pipe being laid and shall have identifying markings to facilitate their being used in the correct locations. The cone or top section shall be concentric. Natural or artificial "O" ring rubber gaskets shall be used in joints, double sealed with "Ram-Neck" asphalt sealer.

M3.6. POURED-IN-PLACE MANHOLES: Poured-in-place manholes shall be made of Class A concrete conforming to the requirements of Section M4 - Concrete and Reinforcing Steel.

M3.7. DROP MANHOLES: Materials used in the construction of drop manholes shall conform to the requirements of Paragraphs M3.5 or M3.6 above or other applicable parts of this specification.

M3.8. WATERTIGHT MANHOLES: Materials used in the construction of watertight manholes shall conform to the requirements of Paragraphs M3.5 or M3.6 above or other applicable parts of this specification.

M3.9. MANHOLES RINGS AND COVERS: Cast iron manhole rings and covers shall be of best quality cast iron and of such character that the metal will be strong, tough, and of even grain. They shall be free from blow holes, scales, cracks, and other defects which might make them unfit for the intended use. Standard manhole rings and covers shall be used on all manholes, except watertight manholes which shall have all bearing surfaces machined smooth, and shall be of the dimensions and weights as shown on the standard details or approved equal. Watertight manhole rings and covers shall conform to the requirements of standard manhole rings and covers except as shown in the details for watertight manhole rings and covers.

M3.10. CLEANOUTS: Cleanout covers shall be of best quality cast iron. Unless otherwise specified, the cover shall be free from perforations and shall conform to the cleanout detail shown on the drawings. The cleanout plug shall be of the best quality brass.

TECHNICAL SPECIFICATIONS

SECTION M4 - CONCRETE AND REINFORCING STEEL

M4.1. DESCRIPTION: This section covers materials for concrete and reinforcing steel used in sanitary sewer line construction.

M4.2. CEMENT:

A. Cement shall be Portland Cement conforming to AASHO Designation M 85, Type I. Type III cement, high early strength, may be used if approved by the Engineer.

B. When concrete is mixed on the job site, cement shall be delivered in plainly marked paper sacks of not less than 94 pounds net weight.

M4.3. WATER: Water used in mixing concrete and mortar shall be free from injurious amounts of acids, alkalies, oils, sewage, and vegetable matter. It shall be fit for drinking.

M4.4. COMPOSITION AND STRENGTH:

A. Concrete shall be composed of Portland Cement, fine and course aggregate, and water proportioned in keeping with the following:

	Class "A" Concrete	Class "B" Concrete
Minimum Sacks of Cement - Per Cubic Yd.	5½	4½
Consistency Range in Slump - In.	2 - 4	2 - 4

B. Proportioning of concrete shall be by weight except that water may be measured by volume.

(1) A 1 cubic foot sack of Portland Cement will be considered as 94 pounds in weight.

(2) A gallon of water will be considered as weighing 8.33 pounds.

C. Class "A" concrete made with ordinary Portland Cement shall have a minimum compressive strength at 28 days of 3,000 psi. If made with high early strength cement, those strengths shall be attained at the age of 7 days.

D. Admixtures: A cement reducing admixture conforming to ASTM C-618 will be used for all concrete at the Contractor's option. Concrete mix designs shall include the admixture, should this option be exercised.

Admixture shall be a cement dispersing agent used in conformance with manufacturer's directions. The dispersing agent used shall be subject to the approval of the Engineer. Contractor shall notify Engineer in writing that he is taking this option.

A retarding admixture, conforming to ASTM C-494, pretested with job materials under job conditions, shall be used, if approved, whenever necessary to prevent cold joints due to the quantity of concrete placed, to permit revibration of the concrete, to offset the effects of high concrete temperature, or to reduce the maximum temperature and rate of temperature rise.

M4.5. USE:

A. Class "A" concrete shall be used on all manholes and other structures and for Class "A" pipe bedding.

B. Class "B" concrete may be used for all concrete work except as specified in Paragraph M4.5.A and as shown on the standard details.

M4.6. REINFORCING STEEL:

A. Shop Drawings for all reinforcing shall be submitted in accordance with contract documents. Material shall not be fabricated or delivered to job site prior to return of approved shop drawings to Contractor. Shop drawings shall be sufficient in detail and dimensions that reinforcing steel and accessories may be placed without reference to drawings.

B. Reinforcing bars, including column ties and beam and joist stirrups shall conform to requirements of ASTM A615, Grade 40. The supplier shall provide 3 copies of certification as to type and grade at time of delivery.

C. Welded wire fabric shall conform to ASTM A185.

D. Galvanized Reinforcing Bars: Where specified or indicated on drawings, reinforcing shall be hot-dip galvanized after fabrication and bending in accordance with ASTM A153.

E. Smooth Dowel Bars for Wall and Floor Construction Joints shall be fabricated of round plain carbon steel bars complying with ASTM A663, Grade 40. Where indicated on drawings, a metal dowel cap shall be placed at one end of dowel to permit longitudinal movement of dowel within concrete section. The magnitude of movement shall equal joint width plus ½ inch.

M4.7. EXPANSION AND CONTRACTION JOINTS:

A. Asphalt mastic strips (preformed) shall be composed of approximately 75% asphalt, 15% fiber, and 10% mineral matter.

B. Mastic for poured joints shall be composed of refined asphaltic pyrobitumen and natural asphalt bitumens and show no tendency to separate.

C. Waterstops shall consist of a durable, elastic cured rubber compound, PVC, or vinyl capable of effectively sealing joints against the infiltration of moisture.

SECTION C

CONSTRUCTION METHODS

TECHNICAL SPECIFICATIONS

SECTION C1 - SITE WORK

C1.1. DESCRIPTION: The work to be performed under this section shall consist of furnishing all labor, equipment and materials, and in performing all operations necessary in connection with site clearing and restoration as shown in the plans and specifications herein.

It shall be the responsibility of each bidder to examine the site carefully and make his own calculations as to costs to be incurred by reason of the requirements of this section.

Site clearing and restoration shall include all of the following:

A. The cutting and removal of all trees, shrubs, underbrush, and the removal of any debris existing above natural ground surface and within the limits of right-of-way necessary to permit the construction of the improvements. Trees, shrubs, underbrush, and debris removed from the site shall be disposed of by the Contractor.

B. The removal, storage and reconstruction of fences where necessary to permit the construction of the improvements. As quickly as feasible after the work has been performed, fences shall be reconstructed to conditions at least as good as the original. The Contractor shall furnish new materials as necessary to permit proper restoration.

C. The replacement of yards, lawns, shrubbery, or plants in the right-of-way that are disturbed by the Contractor while constructing the improvement. Disturbed lawns shall be replaced by solid sodding, using the same kind of grass as existing in the undisturbed portion of the lawn. Yards shall be replaced by seeding, fertilizing and the control of erosion. Shrubbery or plants shall be replaced with the same kind in good condition. Topsoil shall be preserved or shall be hauled in prior to establishment of yard or lawn. All yards and lawns shall have 4 inches of topsoil on all disturbed areas.

D. The reconstruction of dirt and gravel roads or drives. The alignment and grade shall be restored, as close as possible, to that existing prior to construction. Gravel shall be preserved and hauled in as necessary and utilized for resurfacing per plans.

E. The removal and subsequent replacement of sidewalks, curbs, curb and gutter, culverts, storm drains and other related items which are displaced by the Contractor's operations. The Contractor shall furnish new materials necessary to permit replacement to a condition better than or equal to that existing prior to construction.

F. Where trees, plants, shrubbery, etc. are adjacent to the line of the work and are not to be removed or removed and replaced, the Contractor shall protect such trees, plants, shrubbery, etc. by substantial wooden boxes and guards and shall not permit machinery or employees to scrape, tear the limbs from, or damage, or attach guy cables to them, and if in the opinion of the Engineer such trees, plants, shrubbery, etc. would be damaged by machinery, etc., hand excavation may be required. The Contractor shall be responsible for all damages to adjacent trees, plants, shrubbery, etc.

G. Where construction will occur within state owned right-of-ways, sitework shall conform to Arkansas Highway and Transportation Department requirements. The Contractor shall be responsible for notification of the AHTD at least 48 hours prior to construction.

H. Damage to paved surfaces, not shown on the plans for scheduled repair, shall be repaired at the expense of the Contractor.

I. Contractor shall maintain sufficient steel plates of adequate length and width to maintain access for property owners. The number shall be at the discretion of the Engineer. Costs of emergency repairs to driveways and streets required by and in the opinion of the Owner shall be deducted from the contract price.

J. The Contractor's operations are restricted to street right-of-ways or secured easements. The Contractor shall, when paralleling streets or roads, determine the right-of-way limit and restrict operations to the right-of-way.

K. The Contractor shall provide for traffic control including but not limited to flagging, signage, etc. Through traffic shall be maintained on all streets during construction.

L. The Contractor shall provide barricades on all open ditches and trenches left unattended.

M. All yards shall be raked smoothly to grade and be absent from rocks and all debris as defined by the Engineer.

N. Contractor is responsible for restoring all surfaces to a condition better than or equal to that existing prior to construction within 30 consecutive calendar days after the surface has been damaged due to construction, unless

stricter timelines are required by additional state, local, or federal permits. Should the contractor fail to restore surfaces within the allotted timeframe, the Engineer and/or owner reserves the right to direct the Contractor to discontinue installing any new water mains until all previously disturbed areas have been restored to an acceptable condition.

O. Payment: No separate payment shall be made for any of the items listed in this section, but shall be considered subsidiary to the price for pipeline installation. Twenty percent (20%) of the cost for pipeline installation is considered equitable for site work. Twenty percent (20%) of the unit price bid for pipeline installation may be retained if site work is not being performed in an acceptable manner.

TECHNICAL SPECIFICATIONS

SECTION C2 - EXCAVATION AND BACKFILL

C2.1. DESCRIPTION: This section covers the excavation and backfill of sanitary sewer lines, manholes, or other structures.

C2.2. EXCAVATION:

A. General Requirements: Excavation work shall be preformed in a safe and proper manner with suitable precautions being taken against all hazards. Excavations shall provide adequate working space and clearance for the work to be performed therein and for installation and removal of concrete forms when required.

Subgrade surfaces shall be clean and free of loose material of any kind when concrete is placed thereon. Backfilling and construction of fills and embankments during inclement weather shall not be done except by written permission of the Engineer. All open ditches shall be backfilled prior to the end of each working day in order to protect the pipe and to prevent a safety hazard.

B. Classification of Excavated Materials: No classification of excavation materials will be made. Excavation and trenching work shall include the removal and subsequent handling of all materials, excavated or otherwise removed in performance of the contract work regardless of the type, character, composition, or condition thereof.

C. Blasting: Blasting shall not be permitted on this project.

D. Limiting Trench Widths: Trenches shall be excavated to a width which will provide adequate working space and pipe clearances for proper pipe installation, jointing, and embedment. However, the limiting trench widths below an elevation 12-inches above the top of the installed pipe and each trench wall, expressed in inches, shall be as shown on the drawings.

Stipulated minimum clearances are not minimum average clearances, but are minimum clear distances which will be required.

Where necessary to prevent sliding and caving, banks may be cut back on slopes which shall not extend lower than one foot above the top of the pipe. Where for any reason, the width of the lower

portion of the trench as excavated at any point exceeds the maximum permitted in the foregoing tables, either pipe of adequate strength, special pipe embedment, or arch concrete encasement, as required by leading conditions and as determined by the Engineer, shall be furnished and installed by and at the expense of the Contractor.

E. Removal of Water: The Contractor shall provide and maintain adequate dewatering equipment to remove and dispose of all ground water entering excavations, trenches, or other parts of the work. Each excavation shall be kept dry during subgrade preparation and continuously thereafter until the structure is built or the pipe to be installed therein is completed to the extent that no damage from hydrostatic pressure, flotation, or to other cause will result.

F. Whenever so ordered by the Engineer, in writing, the Contractor shall excavate to such depth below grade as the Engineer may direct and the trench bottom shall be brought to grade with such material as the Engineer may order installed. All timber, concrete foundations, pipes, posts, stringers, stone, and/or gravel made necessary by unstable soil, shall be installed as directed by the Engineer. Compensation for extra excavation, timber, concrete, or other foundations, except where provided by contract unit prices, shall be made in accordance with the contract provisions for extra work.

G. Unstable Trench Walls: Where an unstable or running soil condition is encountered in the trench wall, such as may be found by excavation below ground water, stabilize this condition before laying the pipe. Depending upon the severity of the condition, tight sheeting, stay bracing, or a trench box may be used to control such trench conditions during the course of pipelaying operations. If the condition is too severe, it may be necessary to leave the sheeting in place to prevent lateral migration of both the material used beneath and around the pipe and trench wall material. Well points or under-drain may also be used to control excessive ground water conditions.

H. Over-Excavation: During the course of construction, should the trench be inadvertently over-excavated below a point greater than 6-inches below the bottom of the pipe, but not beyond a point 12-inches below the bottom of the pipe, fill that area of over-excavation with an acceptable class of embedment material and compact to a minimum of 90 percent Standard Proctor Density, regardless of soil type. Fill any area of over-excavation beyond a point 12-inches

below the bottom of the pipe with processed stone or processed gravel. Any such over-excavation shall be replaced by, and at the expense of the Contractor.

I. Disposal of Excavated Materials: Excavated material shall be piled adjacent to the work to be used for backfilling as required. Excavated material which is unsuitable for backfilling and excess material shall be disposed of in a manner approved by the Engineer.

J. Excavation Below Pipe Subgrade: Except as otherwise required, pipe trenches shall be excavated approximately 4-inches below the finished pipe subgrade to allow for the installation of pipe bedding materials.

C2.3. PIPE EMBEDMENT FOR PVC PIPE: Pipe embedment shall consist of bedding, haunching, and initial backfill materials as shown on the standard detail sheets of the plans. The class of material to be used below and above the pipe and placement and compaction of embedment material shall conform to the requirements shown on the plans and to the following specifications:

A. Embedment Materials: The following are descriptions of the classifications of embedment materials which may be used for pipe embedment as shown on the standard detail sheets of the plans:

Class I: Angular, (3/4 to 1½) graded stone, including a number of fill materials that have regional significance such as coral, slag, cinders, crushed stone, and crushed shells.

Class II: Suitable native material including fine sands, sandy clay mixture, and gravel/clay mixtures. This also includes excavated trench material if suitable.

B. Bedding Placement and Composition: Prior to pipe installation, carefully bring the bedding material to grade along the entire length of pipe to be installed. To ensure that adequate and uniform support is provided under the pipe and to avoid differential settlement of the pipe, certain procedures should be adhered to and precautions taken as outlined herein. Blocking shall not be used to bring the pipe to grade.

(1) Class I Material: When Class I material is used for bedding, little or no compaction is necessary due to the nature of the angular particles. A depth of 4-inches of Class I material is sufficient to provide uniform bedding. However, in the initial

stage of placing this type of material, take care to ensure that sufficient Class I material has been worked under the haunch of the pipe to provide adequate side support. Take precautions to prevent movement of the pipe during placing of the material under the pipe haunch. Except for the protection of the pipe from large particles of backfill material, little care need be taken and no compaction is necessary in placing initial backfill to a distance of 6-inches above the top of the pipe.

C2.4. TRENCH BACKFILL: Backfilling from a point 6" above the pipe to the top of the trench shall be done with good earth and shall be free of large rocks. No material of a perishable, spongy or otherwise unsuitable nature shall be used in backfilling.

Where trenches are not under existing or proposed paved areas, backfill need not be mechanically tamped. Before reaching the top of the trench, the trench shall be flooded with water to achieve some degree of consolidation. Consolidation with heavy equipment shall not be allowed.

Where trenches are under existing or proposed paved areas, the entire trench up to a point 6" below existing or proposed subgrade shall be backfilled with select materials and compacted to a density of 90% AASHO T-180 modified or better. The remaining 6" shall be similarly backfilled, but the minimum compaction shall be 95% AASHO T-180 modified.

The backfill of materials in trenches under existing or proposed paved areas shall be compacted with mechanical devices manufactured for that purpose from the top of the pipe to the top of the existing or proposed subgrade.

C2.5. TESTING: In place moisture-density test may be ordered by the Engineer to insure that all trench backfill complies with the requirements of the specification. Tests will be performed by a recognized testing laboratory, and all costs will be paid for by the Owner. Copies of all test results will be furnished to the Contractor.

C2.6. COMPACTION: All trench backfill in areas under paved or unpaved roads, parking areas, sidewalks and other structures, as determined by the Engineer shall be compacted to a density of at least 90% of the maximum dry density as determined by the AASHO Method T99 to a point 6 inches below the top of the backfill. The top 6 inches shall be compacted to a density of 95% of the maximum dry density as determined by AASHO Method T99. In all other locations, compaction of backfill from the bottom of the trench to a distance of one foot above the top of the

pipe. From a point one foot above the top of the pipe to the top of the trench, the backfill need not be mechanically tamped. Before reaching the top of the trench, the trench shall be flooded with water or rolled by passing the wheel or track of a piece of equipment along the trench line to achieve some degree of consolidation.

In place moisture-density test may be ordered by Engineer to ensure that all trench backfill complies with the requirements of the specification. Tests will be performed by a recognized testing laboratory, and all costs will be paid for by the Owner. Copies of all test results will be furnished to the Contractor.

C2.7. SPECIAL PROBLEMS:

A. Bell Holes: When the pipe being installed is provided with elastomeric seal joints, bell holes shall be excavated in the bedding material to allow for unobstructed assembly of the joint. Care should be taken that the bell hole is no larger than necessary to accomplish proper joint assembly. When the joint has been made, the bell hole should be carefully filled with bedding or haunching material to provide for adequate support of the pipe throughout its entire length.

B. Minimum Cover for Load Application: Provide at least 36 inches of cover over the top of the pipe before the trench is wheel-loaded. Where pipelines are less than 36" deep, avoid the use of heavy equipment across these lines.

C. Use of Compaction Equipment: Take care to avoid contact between the pipe and compaction equipment. Compaction of haunching, initial backfill, and backfill material should generally be done in such a way so that compaction equipment is not used directly above the pipe until sufficient backfill has been placed to ensure that such compaction equipment will not have a damaging effect on the pipe.

D. Removal of Trench Protection: If sheeting or other trench protection is removed, take care so as not to disturb previously constructed foundation bedding, haunching, and initial backfill. If it has been necessary to place or drive sheeting or other trench protection below the top of the pipe, consideration should be given to leaving in place this portion of the sheeting or trench protection, since its removal could jeopardize the side support necessary for the pipe.

TECHNICAL SPECIFICATIONS

SECTION C3 - DEWATERING OF TRENCHES

C3.1. DESCRIPTION:

This section covers the dewatering of trenches to the extent that bedding material and sanitary sewer pipe can be placed on dry, firm trench bottom.

C3.2. WELLPOINTING:

Wellpointing where required to keep the excavation dry and the subgrade stable, shall be installed when the excavation is beneath the water table, except as hereinafter provided, and shall be in continuous operation until backfill is completed to this level. When construction equipment is to be operated in an area that has been excavated and wellpointing is required to keep trench excavation dry and the subgrade stable, the wellpointing shall be installed when the excavation is within two (2) feet of the water table. There shall be sufficient pumping equipment, in good working order, available at all times, to remove any water that accumulates in excavations to the extent that a stable subgrade is obtained. Where the pipe line crosses natural drainage channels, the work shall be conducted in such a manner that unnecessary damage or delays in the prosecution of the work shall be prevented. Provision shall be made for the satisfactory disposal of surface water pumped so as to prevent damage to public or private property.

C3.3. TRENCH DEWATERING:

Dewatering of trenches other than by wellpointing shall be accomplished by whatever means elected by the contractor; however, bedding material or pipe may not be placed in wet or unstable trenches. Soil that can not be properly dewatered shall be excavated and dry material tamped in place to such a depth as may be required to provide a firm trench bottom.

C3.4. SURFACE RUNOFF: Surface runoff water shall be diverted away from the trenches. Such diversion shall be into existing drainage structures, such as storm sewers, ditches or streams. Diversion of surface runoff shall be in such a manner to prevent flooding of streets or private property.

C3.5. DISPOSITION OF WATER FROM DEWATERING:

All water removed from the trenches by wellpointing or any other means shall be pumped, piped or drained into existing drainage structures, such

as storm sewers, ditches or streams. The disposition of water from dewatering operations shall be accomplished in a manner that will prevent the flooding of public or private property.

C3.6. MEASUREMENT & PAYMENT:

Dewatering of trenches shall not be measured for separate payment but shall be considered subsidiary to the item of the contract to which the work applies.

TECHNICAL SPECIFICATIONS

SECTION C4 – TRENCH SAFETY SYSTEMS

C4.1. DESCRIPTION:

This section covers excavation and supporting systems for trenches to protect the safety of workers, provide suitable means for constructing utility lines, and to protect public or private property, including existing utilities.

The Contractor's attention is directed to Bid Item "Trench Safety Systems" under which full compensation will be made for the design, materials, equipment, fabrication and labor required to furnish, install, and remove trench excavation, shoring, bracing and protective systems.

Trench safety shall fully comply with the Contractor's "Trench Safety System and Construction Plan".

C4.2. EXISTING STRUCTURES:

Where existing buildings, other utilities, streets, highways, or other structures are in close proximity to the trench, adequate protection shall be provided by the use of sheeting and shoring to protect the structure, street, or highway from possible damage. In the case of utilities, the Contractor may elect to remove the utility provided that the removal and subsequent replacement meets with the approval of the Engineer, the utility owner, or whoever has jurisdiction of the structure. In all cases, it shall be the responsibility of the Contractor to protect public and private property and any person or persons who might, as a result of the Contractor's work, be injured.

C4.3. EXCAVATIONS, TRENCHING, AND SHORING:

The Contractor shall include in his bid price and be solely responsible for trench safety provisions meeting the requirements of the United States Department of Labor Occupational Safety and Health Administration. The following regulations, as contained in Subpart P, Part 1926 of the Code of Federal Regulations, shall be complied with along with all other applicable Subparts and Regulations not herein contained:

TECHNICAL SPECIFICATIONS

SECTION C5 - PIPE LAYING

C5.1. DESCRIPTION:

This section covers the laying of pipe for sanitary sewers and force mains. All material shall be in accordance with PART M - MATERIALS of these specifications.

C5.2. GRAVITY SEWER and FORCE MAINS:

A. Each joint of pipe shall be inspected carefully before being placed in the trench. Any joint found to be cracked, or otherwise so damaged as to impair its usefulness, shall be plainly marked in such a manner that the marking will not rub or wash off. Damaged joints shall be removed from the site as soon as feasible.

B. All sewer pipe shall be laid with the bell up-stream. Each pipe shall be laid to plan line and grade, or to line and grade directed by the Engineer, using batter boards and top line, or laser beam grade light. Where batter board and top line is used, each pipe shall be plumbed for line with a plumb bob, and graded for elevation with a grade stick. Care shall be taken that each spigot is centered properly in the bell of the preceeding pipe and properly seated, and that each pipe is solidly bedded. As the work progresses, the pipes shall be cleaned of all dirt and other foreign matter. They shall be maintained clean until accepted or put in service.

C. At the end of each day's work, and when for any reason the laying of pipe will be discontinued for an appreciable period, the open ends of pipe line shall be closed temporarily.

D. The cutting of pipe for any reason shall be done in a neat and workmanlike manner without damage to pipe or pipe lining.

E. Pipe shall be lowered carefully into the trench in such manner that spigot and bell will not become contaminated. Spigot and bell shall be checked for cleanliness immediately before insertion of spigot into bell.

F. Proper facilities shall be provided for lowering sections of pipe into trenches. Under no circumstances shall pipe be laid in water and no pipe shall be laid when trench conditions or weather are unsuitable for

such work. Full responsibility for the diversion of drainage and for dewatering of trenches during construction shall be borne by the Contractor.

G. Spigot and bells shall be cleaned thoroughly before the application of lubricant and attachment of the preformed joint gasket. Application of lubricant and attachment of the gasket shall be in strict accord with the joint.

H. Pipe shall not be placed in the trench without excavating for bells so that the entire barrel of the pipe is uniformly supported on the pipe bedding.

I. Pipe shall be supported to proper line and grade, and secured against upheaval or floating during the placement of concrete bedding or encasement.

C5.3. STEEP GRADES:

A. Concrete Pipe Anchors: Where sanitary sewer lines are constructed on grades of fifteen percent (15%) or greater, concrete anchors shall be provided as shown on the plans. The first anchor will be placed just below the first pipe joint above the downstream manhole. Anchors will be placed at intervals not greater than one hundred fifty (150) feet above the first anchor.

B. Type of Pipe: Cast Iron or Ductile Iron Pipe, meeting the requirements of SECTION M2 – SANITARY SEWER PIPE, shall be used on all sewer lines when the grade is fifteen percent (15%) or greater.

C5.4. CONNECTIONS TO EXISTING SEWERS:

A. Connections to existing sewers shall not be made until all of the proposed sewer lines and manholes have been constructed, cleaned and approval granted by the Engineer for making connection. No connection to existing sewers shall be made until new sewers have passed specified leakage tests.

B. All work shall be completed in a workmanlike manner using materials specified or as approved by the Engineer. Watertight connections shall meet with the requirements concerning tests of these specifications.

TECHNICAL SPECIFICATIONS

SECTION C6 - PIPE JOINTS

C6.1 DESCRIPTION:

This section covers the installation of pipe joints. Joint materials shall be as specified in SECTION M2 – SANITARY SEWER PIPE.

C6.2 PIPE JOINT INSTALLATION:

All pipe joints other than those specified herein shall be made in strict accordance with the manufacturer's recommendation and as approved. All joints shall be made watertight in accordance with the latest ASTM Standards. Excavation for bells or other joint protrusions shall be made to insure that the bottom of the pipe firmly rests against the bedding for entire length of the pipe.

C6.3 INSTALLATION OF SLIP-TYPE JOINTS:

A. Prior to jointing, the bell and spigot end of the pipes shall be cleaned thoroughly by whatever means as are necessary to remove all foreign matter and attain the required cleanliness. A wire brush shall be used as necessary. Particular care shall be exercised to clean the gasket seat.

B. Joints shall be made in strict accord with the recommendations of the pipe manufacturer. The rubber gasket shall be cleaned and inserted in the gasket seat within the bell. The spigot end of the pipe shall be inserted in the bell of the pipe to which connection is being made, and forced to a firm contact with the shoulder of the bell. Pipe alignment may then be deviated from true alignment according to the pipe manufacturer's recommendation.

C6.4 INSTALLATION OF MECHANICAL JOINTS:

A. The spigot end of pipe and the bell of fitting and the rubber gasket shall be cleaned thoroughly as specified for pipe joints in paragraph C6.3 above. The gland shall also be cleaned in like manner.

B. After the gland and gasket are placed on the spigot end of the pipe a sufficient distance from the end to avoid fouling the bell, the spigot

end shall be inserted in the fitting bell to firm contact with the bell shoulder. The rubber gasket then shall be advanced into the bell and seated in the gasket seat. Care shall be exercised to center the spigot end within the bell.

C. The gland shall be brought into contact with the gasket, all bolts entered, and all nuts made hand tight. Continued care shall be exercised to keep the spigot centered in the bell. The joints shall be made tight by turning the nuts with a wrench, first partially tightening a nut, then partially tightening the nut 180 deg. therefrom and working thus around the pipe with uniformly applied tension until the required torque is applied to all nuts. Required torque ranges and indicated wrench lengths for standard cast iron bolts are as follows:

Diameter Inches	Range of Torque Foot Pounds		Length of Wrench Inches
5/8	40	60	8
¾	60	90	10
1	70	100	12
1¼	90	120	14

TECHNICAL SPECIFICATIONS

SECTION C7 - PIPE FITTINGS

C7.1 DESCRIPTION:

This section covers the installation of pipe fittings for sanitary sewer lines.

C7.2 PIPE FITTINGS INSTALLATION:

All pipe fittings shall be installed in strict accordance with the manufacturer's recommendations. Joints caused by the installation of fittings shall meet with the requirements of SECTION C6 - PIPE JOINTS. Pipe fittings shall meet with the requirements of SECTION M2 – SANITARY SEWER PIPE.

TECHNICAL SPECIFICATIONS

SECTION C8 - MANHOLES

C8.1. DESCRIPTION:

This section covers the construction methods for manholes, drop manholes, and watertight manholes.

C8.2. EXCAVATION AND BACKFILL:

A. Excavation: Excavation for manholes shall be completed in a workmanlike manner. The area of excavation for the base shall be only that necessary to provide an adequate base with its sides poured against undisplaced earth. All excavations shall be dewatered in accordance with SECTION C3 - DEWATERING OF TRENCHES before any permanent construction is started. Sheeting and shoring shall meet with the requirements of SECTION C4 - TRENCH SAFETY.

Where excavation is carried below plan grade because of unsuitable soil or for any other reason, the space below plan grade shall be filled with bedding material thoroughly tamped or the space may be filled with concrete poured monolithically with the base.

B. Backfill: Backfill of manholes shall be compacted to a density of not less than 90% of the density obtained in the laboratory. Moisture density relations of soils shall be determined in accordance with AASHO Designation T 180 modified. 90% density shall be obtained the entire depth of excavation except in public streets or roads where a density of 95% shall be obtained for the top 6 inches.

Backfill around manholes shall not be completed until adequate strength has been obtained to support the backfill without damage to the manhole. In no case will backfill be allowed on brick manholes, precast manholes, or poured-in-place manholes until the concrete is at least 48 hours old except as approved by the Engineer.

C8.3. INVERTS:

A. All pipe lines shall extend entirely through the manhole to a joint approximately 6" outside the manhole except where change in

direction or in sizes of pipes makes such construction unfeasible. Pipe in a manhole at the upper end of the line or discharging into an existing manhole shall not extend entirely through the manhole. In all cases, the pipe or pipes shall extend entirely through the manhole wall so that a joint occurs approximately 6" outside the manhole wall. Depth of the invert along the line of flow shall be approximately ½ the diameter of the abutting pipe. Curves in inverts shall have as long radius as feasible to facilitate flow. Shape of the invert shall be that approximating the bottom half of the pipe and inverts shall be brushed smooth.

B. The surface of the concrete slab shaped to form the invert shall be sloped upward from the edge of the invert to the manhole wall. The upper half of any pipe extending inside the manhole wall shall be cut substantially flush with the wall. Any rough edge shall be smoothed with mortar.

C. Mortar used in manholes shall be mixed in the proportions by volume of one part cement to four parts sand. If carefully done, mortar may be mixed in a mortar box. Mortar shall have a workable consistency, but shall be as dry as feasible.

D. Before constructing the invert of precast section manholes, the groove of the bottom riser shall be cleaned thoroughly. Care shall be exercised that the groove is entirely filled with mortar.

E. Inverts shall be formed directly in the manhole's concrete base in accordance with details shown on the standard manhole details.

C8.4. PRECAST MANHOLES:

A. Manholes of precast sections shall be positioned carefully upon the concrete base and be raised in a truly vertical plane. Space between pipe and periphery of cut-out shall be entirely filled with mortar or concrete as is appropriate for space to be filled. A collar approximately 8" wide shall be formed around the pipe against the outside of the manhole.

B. Minimum wall thickness for manhole risers shall be as listed under wall "B" of the "Class Tables" of ASTM C76.

C. All precast manholes shall be constructed with a 1' section of pipe immediately below the cone or top section in order to lower the manhole for any future change in grade.

D. The base concrete shall be Class "A", and deposited on an undisturbed bearing surface. The base shall have a minimum diameter 6" greater than the outside diameter of the manhole and the minimum thickness of the slab (as measured from the bottom of the sewer mains) shall be as follows:

0-8' manholes	-	8"
8-12' manholes	-	10"
12' and above	-	12"

C8.5. POURED-IN-PLACE MANHOLES:

A. Forms for poured-in-place manholes shall have cut-outs to fit around the sewer pipe entering the manhole so that the form rests upon the concrete base. The space around cut-outs shall be filled in accordance with the requirements for pre-cast manholes.

B. Poured-in-place manholes shall meet with the requirements and details as shown on the standard details. The top section or cone shall be concentric.

C. Construction of poured-in-place manholes shall be in accordance with all applicable parts of these specifications.

D. The base shall be cast monolithically with the rest of the manhole. The invert and flow channel shall be formed during or immediately after the placing of the concrete and brush-finished as soon as concrete has sufficiently set. The concrete must set for 24 hours before any pipe inside of the manhole is trimmed.

The base concrete shall be 3,000 psi, maximum slump 4", vibrated or tamped on undisturbed bearing. The base shall have a minimum diameter 6" greater than the outside diameter of the manhole, and a minimum thickness including the area under the pipe as follows:

0-8' manhole	-	8"
8-12' manhole	-	10"
12 and above	-	12"

E. All invert channels shall be smooth and accurately shaped to a semi-circular bottom conforming to the inside of the adjacent sewer section. Inverts shall be formed directly in the concrete of the manhole base or may be constructed by laying full section sewer pipe straight through the manhole and breaking out the top half after the base is constructed. Inverts shall extend up at least half of the diameter of the pipe. Changes in the direction of the sewer and

entering branches shall have a true curve of as large a radius as the size of the manhole will permit. Where the pipe is laid through the manhole, the invert shall be finished to 1/4" below the center of the pipe. The pipe shall be trimmed down to 1/4" below the surface of the invert, and the edges of the pipe along the invert and at the walls of the manhole shall be plastered and brush-finished. Plaster shall be 2 parts of masonry sand to 1 part of Portland cement.

F. The vertical forms, wall spacers, and placing cone must be carefully positioned and firmly clamped in place before any placement is made. The wall spacers must be located 90 deg. from each other. The manhole shall be cast of 3,000 psi concrete with a maximum slump of 4". The first placement shall consist of approximately ½ yard of concrete deposited evenly around the walls and vibrated until there is a minimum slope of 60 deg. from the bottom of the forms to the bearing surface both inside and outside of the manhole. When this is complete and before additional concrete is added, the concrete must be carefully vibrated on each side of each pipe. Additional concrete must be deposited in evenly distributed layers of about 18" with each layer vibrated to bond it to the preceding layer. The wall spacers must be raised as the placements are made with the area from which the space is withdrawn being carefully vibrated. Excessive vibration is to be avoided.

Form marks and offsets up to 1" will be permitted on the outside surface of the manhole. Form marks and offsets up to 1/2" will be permitted inside of the manhole. All offsets on the inside surface of the manhole will be smoothed and plastered so there is no projection or irregularity capable of scratching a worker or catching and holding water or solid materials. Honeycomb will be plastered with a mortar consisting of 3 parts of masonry sand to 1 part Portland cement immediately upon removal of the forms.

The specific ring and cover and the method of installing it will be designated by the Owner or Engineer.

Backfilling will be performed evenly and carefully around the manhole 24 hours or more after the placement of concrete is completed.

Should circumstances make a cold joint necessary, a formed groove or reinforcing dowels will be required in the top of the first placement for shear protection. Immediately before the second placement is made, the surface of the cold joint shall be thoroughly

cleaned and wetted with a layer of mortar being deposited on the surface.

C8.6. MANHOLE DETAILS:

All manholes shall be constructed in accordance with the standard manhole details or as approved by the Engineer. Manholes 4'0" or less in height shall have a 24" minimum, 30" maximum high cone section and a maximum 8" high throat section.

C8.7. CONNECTION TO EXISTING MANHOLES:

A. Connection to existing manholes shall not be made until all other manholes and sewer lines have been completed, cleaned, tested, and inspected in accordance with these specifications.

B. Connections to existing manholes shall be made by cutting a hole in the wall of the manhole, shaping the bottom of the manhole to fit the invert of the connections, inserting a length of sewer through the opening and filling around the pipe with a 1 part Partland cement to 2 parts masonry sand cement mortar and troweling the cement mortar inside and outside the manhole to a neat finish. When necessary to satisfactorily perform the work the flow of sewage shall be blocked at a time of minimum flow. If necessary to prevent flow back up in the line to the extent that damage would occur the contractor shall maintain the flow level lowered with a trench pump section inserted in the line or in the next manhole up the line. Discharge shall be made into an appropriate manhole downstream of the construction. Connections to manholes, mains, and house services shall be made in a thoroughly workmanlike manner to the satisfaction of the Engineer.

C8.8. MANHOLE RINGS AND COVERS:

Manhole ring settings shall be as shown on the standard details. Tops of the manhole rings and covers shall be level except in public rights-of-way where the top shall be set flush with pavements, sidewalks, or other surface areas.

C8.9. MANHOLE CONNECTIONS FOR PVC SEWER PIPE:

PVC Sewer Pipe shall be connected to all manholes by using a waterstop gasket conforming to ASTM F477 Specifications for "Elastomeric Seals for Joining Plastic Pipe" and by a stainless steel, worm drive, 3/8" Hex Head, Slotted Screw, 9/16" wide, clamp equal to or exceeding Ideal, 64 or 68

Series, 0.024" thick, or equal. An equal connection shall be recommended by the respective pipe manufacturer.

TECHNICAL SPECIFICATIONS

SECTION C9 - RESTORATION OF SPECIAL SURFACES

C9.1. DESCRIPTION:

This section covers replacement of special services including private drives, parking areas and paved street surfaces.

Restoration of other surfaces is covered under Section C-1 SITE WORK.

C9.2. BACKFILL UNDER SPECIAL SURFACES:

Backfill under special surfaces shall be specified in Section C2 - Excavation and Backfill of these specifications as modified herein.

Backfill from 6-inches above the pipe shall be made of suitable materials from the spoil bank brought up in compacted layers not exceeding 6-inches in depth of loose material. Compaction of backfill shall be carefully and thoroughly done so as not to displace utility lines from their original positions. All the backfill materials shall be at optimum moisture and shall be thoroughly compacted to 90% of the maximum density as determined by the Modified Proctor Compaction Test. However, the top 6-inches of the backfill shall be compacted to 95% maximum density as determined by the Modified Proctor Compaction Test.

C9.3. STREET REPLACEMENT:

City streets shall be replaced as specified herein for "paved street open-cut repair". The type of street replacement used in specific locations shall be as directed by the Engineer.

A. Paved Street Open-Cut Repair: After the backfill material has been brought within 7½" of the finish surface, the material on either side of the trench shall be removed for a horizontal distance of 12" from the widest point of the trench to a depth of 8". This will provide a shoulder of undisturbed bearing along each side of the trench 12" wide. The cut shall have a uniform width as nearly as is practicable, and shall be made perpendicular to the surface of the pavement in order that the repair shall result in a uniform, neat appearance. If the street is asphalt, 6" of Class "B" concrete will be poured to within 1½" of the surface. As soon as the concrete has obtained its final set, the surface will be tack coated and surfaced with 1½" hot mix asphaltic concrete meeting the Arkansas Highway

Department specifications. The above requirements shall apply for all pavement thicknesses up to and including the thickness outlined above, but in no case shall the total thickness of repairs to streets be less than the total thickness of the pavement in each individual case.

B. Oiled Street Open-Cut Repair: Backfill on streets which are oil streets and as described by the Engineer shall be done in the following manner:

(1) Compaction requirements will be the same as outlined in Section C9.2.

(2) The backfill will top within 12" of the finished surface. Compacted native iron ore gravel will be used to within 4" of the finished surface. The final 4" will be composed of a road oil and sand mixture. The oil and sand mixture shall be of the portion one gallon of road oil per one cubic foot of sand.

TECHNICAL SPECIFICATIONS

SECTION C10 - CAST-IN-PLACE CONCRETE

C10.1. GENERAL:

A. Standards: Concrete work shall conform to all requirements of ACI-30l "Specifications for Structural Concrete for Buildings" ACI-318 "Building Code Requirements for Reinforced Concrete" ACI-350 "Concrete Sanitary Engineering Structures", and ACI 305 and 306 "Recommended Practice for Hot (Cold) Weather Concreting", and the provisions of these specifications.

B. Scope: Work consists of furnishing all plant, labor, materials, equipment, and appliances, and performing all operations in connection with installation of the concrete work, complete, in strict accordance with the Specifications and Drawings.

C. Inspection: Embedded items must be inspected and tests for concrete and other materials shall have been completed and approved by the Engineer before concrete is placed.

C10.2. MATERIALS: All concrete materials shall conform to the latest revised ASTM Designations listed below:

A. Coarse Aggregate shall consist of gravel, crushed gravel, crushed stone, air-cooled blast furnace slag, or a combination thereof, conforming to ASTM C-33 with a maximum size of 1½".

B. Fine Aggregate shall conform to ASTM C-33 and shall be washed river sand composed of clean, uncoated grains of strong materials.

C. Cement shall be Portland cement conforming to ASTM Specification C-150, Type I, Type IA, Type III, or Type IIIA. Only one brand of cement shall be used for exposed concrete.

D. Water: Clean, fresh and free from oil, acids, alkali, vegetable, sewage, organic or other deleterious matter.

E. Admixtures: A retarding admixture, conforming to ASTM C-494, pretested with job materials under job conditions, shall be used, if approved, whenever necessary to prevent cold joints due to the quantity of concrete placed, to permit revibration of the concrete, to

offset the effects of high concrete temperature, or to reduce the maximum temperature and rate of temperature rise.

F. Premolded Expansion Joint Filler Strips shall be non-extruding type conforming to the current AASHTO Designation M153.

G. Abrasive Aggregate shall be equal to fine (c.f.) "Alundum" aggregate as manufactured by Norton Company, Worcester, Mass. or "Frictex NS" as manufactured by Sonneborn-Contech.

H. Curing Compound: Concrete curing compound shall be of a nature and composition not deleterious to concrete and shall be of a standard and uniform quality ready for use as shipped by the manufacturer. At the time of use, the curing compound shall be in a thoroughly stirred condition. Curing compounds shall not be diluted by the addition of solvent or thinners, or be altered in any manner without the specific approval of and in a manner prescribed by the manufacturer. Curing compound shall conform to the requirements of ASTM C309 Type 1.

The curing compound shall be sufficiently transparent and free from color that there will be no permanent change in the color of the concrete. The compound shall contain, however, a temporary dye of sufficient color to make the membrane clearly visible for a period of at least four hours after application.

I. Cement Grout: Cement based grout shall be used for grouting work except as otherwise specified.

(1) Quality: Grout shall be composed of cement, sand, admixtures and water proportioned and mixed as herein-after specified.

(2) Cement: Cement for grout shall be Type I normal Portland cement conforming to the specifications for cement in concrete. Type III high early strength Portland cement may be used only when approved by the Engineer.

(3) Sand: Sand shall conform to ASTM C33 and shall be graded so that 100% by weight will pass a standard No. 8 mesh sieve, and at least 45% by weight will pass a standard No. 40 mesh sieve.

(4) Design Mix: Grout shall be a mixture of one part cement to two parts sand with a water cement ratio of 0.55. Drypack grout shall be a mixture of one part cement, two parts sand

and the minimum amount of water required for mixing and placing. When shrinkage control of standard grout is required, aluminum powder shall be added as herein specified.

(5) Mixing: Mixing and placing apparatus shall be similar to that specified for concrete. Grout shall be mixed for a period of at least one minute. Diluted grout shall be agitated from time to time as considered necessary to keep the ingredients well mixed and in suspension. Sand and cement shall be free from lumps when placed in the mixer. Grout shall be screened to remove coarse particles.

J. Nonshrink Cement-Based Grout: Grout for setting equipment, column and other bases and anchor bolts shall be nonshrink cement-based grout. Nonshrink cement-based grout shall consist of pre-measured, prepackaged materials supplied by the manufacturer, requiring only the addition of potable water. The manufacturer's instructions shall be printed on the outside of each bag.

The manufacturer shall submit information verifying the cement-based grout exhibits the following properties:

(1) Nonshrink - No shrinkage (0.0%) and a maximum 4.0% expansion when tested in accordance with ASTM C-827. No shrinkage (0.0%) and a maximum of 0.2% expansion in the hardened state when tested in accordance with CRD-C 621.

(2) Compressive Strength - A minimum 28-day compressive strength of 5,000 psi when tested in accordance with ASTM C-109.

(3) Setting Time - A minimum initial set time of 60 minutes when tested in accordance with ASTM C-191.

(4) Composition - No metallic particles (aluminum powders, iron fillings) or expansive cement.

The contractor shall perform all grouting in accordance with the manufacturer's recommendations. Technical service shall be supplied upon request.

Grout shall be Five Star Grout, as manufactured by U.S. Grout Corporation, Fairfield, CT or equal.

K. Nonshrink Epoxy-Based Grout: Nonshrink Epoxy-based Grout shall be a pourable, 100% solids epoxy system consisting of three, pre-measured, prepackaged components: resin, hardener, and specially-blended aggregate. Resin component shall not contain any non-reactive diluents. Variation of component ratios is not permitted unless specifically recommended by the manufacturer.

The manufacturer shall submit information verifying the epoxy grout exhibits the following properties:

(1) Grout for bonding new cement to old, setting reinforced dowels into pre-drilled holes and or pressure grouting shall be an epoxy grout mixed in accordance with the manufacturer's instructions.

(2) Nonshrink - No shrinkage (0.0%) and a maximum 4.0% expansion when tested in accordance with ASTM C-827.

(3) Compressive Strength - A minimum compressive strength of 10,000 psi in 7 days when tested according to ASTM C-579, Method B.

(4) Heat Development - A maximum 100 degrees F peak exotherm in a 2" diameter x 4" high sample when tested at 75 degrees F material and laboratory temperatures.

(5) Thermal Coefficient - A maximum 30 x 10^6 in./in./degree F thermal coefficient when tested according to ASTM C-531.

The contractor shall perform all grouting in accordance with the manufacturer`s recommendations. Technical service shall be supplied upon request.

Grout shall be Five Star Epoxy Grout, as manufactured by U.S. Grout Corporation, Fairfield, CT or approved equal.

L. Drypack Mortar: Drypack mortar shall be composed of approximately one part Type II Portland cement, 1½ to 2 parts sand, 2 to 3 fluid ounces water reducing densifier per sack of cement, aluminum powder as required for shrinkage control, and sufficient water to make a stiff workable mix. Sand, cement, water, and water reducing densifier shall be as specified for concrete.

C10.3. QUALITY AND CONTROL

A. Design: Concrete shall be composed of Portland cement, fine aggregate, coarse aggregate and water. All concrete shall be designed by an approved testing laboratory in accordance with the ACI Standard Recommended Practice for Selecting Proportions for Concrete (ACI-211) to produce the strength for each class of concrete specified, and with slumps and maximum sizes of coarse aggregate in accordance with the requirements outlined below. The concrete shall be so designed that the concrete materials will not segregate and excessive bleeding will not occur. Any costs to the testing laboratory for designing concrete mixes shall be borne by the Contractor.

Prior to placing any concrete, the Contractor shall submit for review mix designs for each specified concrete and grout type. Design data shall include the name of the concrete supplier; manufacturer/supplier and type of cement used; size and type of aggregate; proportional weights of cement, aggregate, and water per cubic yard of concrete; name and quantity of admixture used. Trial batches shall be made and the following data shall be submitted: 1-seven day, 1-14 day, and 1-28 day compressive strength test for each mix at various slumps; and percent of air content for each mix. No deviation for accepted mix designs will be permitted without prior written approval by the Engineer.

Concrete strengths shall be as follows:

Class A Concrete	-	4000 psi @ 28 days; minimum 6 sack mix (To be used for all work unless otherwise specified)
Air Content	-	4 ± 1%
Maximum Water Cement Ratio	-	0.45
Class B Concrete	-	2000 psi @ 28 days; minimum 4 sack mix (To be used only as concrete fill)

MAXIMUM SLUMPS FOR VARIOUS
TYPES OF CONSTRUCTION

Types of Construction	Hand Placed Maximum	High Frequency Vibrator Used Maximum
Reinforced Foundation Walls and Footings	4"	2"
Slabs, Beams, and Reinforced Walls	4"	3"
Building Columns	4"	3"
Pavements	3"	2"

The slump shall not exceed the maximum specified above for the type of construction for which it is to be used. The 28-day compressive strength determined in accordance with current ASTM Specifications C-39 and C-31 and with specimens cured in accordance with C-31 shall not be less than that shown above for the specified class of concrete. No water will be added after the amount specified by the mix design.

B. Production of Concrete: All ready-mixed concrete shall be batched, mixed and transported in accordance with "Specifications for Ready-Mixed Concrete (ASTM C-94)". Plant equipment and facilities shall conform to the "Check List for Certification of Ready-Mixed Concrete Production Facilities" of the National Ready-Mixed Concrete Association. Site mixed concrete shall conform to the requirements of "Specifications for Structural Concrete" (ACI-301). The Contractor may elect to use either ready-mixed or site mixed concrete for this project provided he informs the Engineer of his choice.

C. Laboratory Testing: The Owner shall engage an independent testing laboratory to conduct concrete tests. Unless otherwise informed, the Contractor will be responsible for sampling concrete for test cylinders, recording, and delivering them to the laboratory, providing all materials required, and for making all slump tests in the field directed by the Engineer. All costs in connection with work performed by the laboratory will be paid by the Owner. The Contractor shall be responsible for the costs of work performed by the laboratory required for redesign of concrete proportions and retesting of in place concrete when cylinders indicate low strength concrete has occurred.

At least one test shall be made on fresh concrete for each sixty (60) cu. yds. of each class of concrete (or fraction thereof) placed on any one day and in any event, not less than one test for each class of concrete each day it is used. Testing shall be done in accordance with the following ASTM Specifications, latest edition:

C172, Standard Method of Sampling Fresh Concrete
C31, Standard Method of Making and Curing Concrete Compression & Flexure Test Specimens in the Field
C39, Standard Method of Test of Compressive Strength of Molded Concrete Cylinders
C143, Standard Method of Slump Test for Consistency of Portland Cement Concrete

Before any concrete is poured, the Contractor shall construct a storage box in accordance with ASTM Specification C31. Each set of tests shall consist of one slump test and three compression test cylinders. All cylinders shall be kept in the storage box for the first 24 hours. The three cylinders shall be laboratory cured and tested for adequacy of the design for strength of the concrete in accordance with ASTM Specification C31. One cylinder shall be tested at 7 days and two at 28 days.

D. Failure of Concrete to Meet Strength Requirements: The concrete shall be considered acceptable if, for any one class of concrete, the average of all tests or any five consecutive tests is equal to or greater than the specified strength, provided that no more than one test of the five falls between 90% and 100% of the specified strength. The only cylinders to be used for determination of concrete acceptability will be those laboratory cured and tested at 28 days. When it appears the tests of laboratory-cured cylinders will fail to meet these requirements, the Engineer may require changes in the proportions of concrete for the remainder of the work in order to meet the strength requirements. In addition, the Engineer may also require additional curing not to exceed a total of 21 days on portions of the concrete already poured.

The Engineer may also require tests in accordance with Methods of Securing, Preparing and Testing Specimen from Hardened Concrete for Compressive and Flexural Strengths (ASTM Specifications C42) when the concrete cylinder tests fail to meet strength requirements. In the event there still is questions as to the quality of the concrete in the structure, the Engineer may require load tests for that portion where the questionable concrete has been placed. Such load tests will be made as outlined in Chapter

20 of American Concrete Institute Building Code. (ACI 318-71), and shall be at the expense of the Contractor.

E. Removal of Under Strength Concrete: If the above tests indicate that a particular batch of previously placed concrete is under strength, the Engineer may direct that the under strength batch be removed and replaced. The removal of the under strength concrete shall also include the removal of concrete that has obtained the required strength if the Engineer deems this necessary to obtain structural or visible continuity when the concrete is replaced.

The removal, and replacement of any under strength concrete, shall be made at no additional cost to the Owner. This shall include any new formwork required or any reinforcing steel that may be required. The Owner shall not be charged any additional costs for any extra work that is required because of the failure of any concrete to meet the minimum test requirements.

C10.4. INSTALLATION:

A. Preparation Before Placing: Water shall be removed from excavations before concrete is deposited. Hardened concrete, wood chips, shavings, and other debris shall be removed from interior of forms and inner surfaces of mixing and conveying equipment. Wood forms shall be oiled or, except in freezing weather, wetted with water in advance of pouring. Reinforcement shall be secured in position, inspected and approved by the Engineer before starting pouring of concrete.

B. Conveying: Concrete shall be conveyed from mixer to forms as rapidly as practicable and by methods which will prevent segregation or loss of ingredients. It shall be deposited as nearly as practicable in its final position. Chutes used shall be such that concrete slides in them and does not flow. Chutes, if permitted, shall have a slope of less than 1 on 2. Where a vertical drop greater than five (5) feet is necessary, placement shall be through elephant trunks or similar devices to prevent segregation.

C. Placing: Concrete shall be placed before initial set has occurred and in no event after it has contained its water content for more than 30 minutes. Unless otherwise specified, all concrete shall be placed upon clean, damp surfaces free from running water, or upon properly consolidated fills, but never upon soft mud or dry, porous earth. The concrete shall be compacted and worked in an approved manner into all corners and angles of the forms and around reinforcement and embedded fixtures as to prevent

segregation of the coarse aggregate. Construction of forms for the lifts of vertical walls shall be such as to make all parts of the walls easily accessible for the placement, spading, and consolidation of the concrete as specified herein.

D. Vibration: All concrete shall be placed with the aid of mechanical vibration equipment as approved by the Engineer. Vibration shall be transmitted directly to the concrete; in no case shall it be transmitted through forms. The duration of vibration at any location in the forms shall be held to the minimum necessary to produce thorough compaction. Vibrations shall be supplemented by forking or spading by hand, and adjacent to the forms on exposed faces in order to secure smooth, dense and even surfaces, with particular care being taken to prevent coarse aggregate from becoming set too near any surfaces that are to receive rubbed finish.

E. Construction Joints: Construction joints shall be formed as indicated on the Drawings or as approved or directed by the Engineer. Where indicated or required, dowel rods shall be used. All concrete at the joints shall have been in place not less than 12 hours, and longer if so directed by the Engineer, before concrete resting thereon is placed. Before placing is resumed, or commenced, excess water and laitance shall be removed, and concrete shall be cut away, where necessary, to insure a strong dense concrete at the joint. In order to secure adequate bond, the surface of concrete already in place shall be cleaned, roughened, and then spread with a one-half (½) inch layer of mortar of the same cement-sand ratio as is used in the concrete, immediately before the new concrete is deposited. The unit of operation is not to exceed 100 feet in any horizontal direction, unless otherwise required by the Drawings. Construction joints, if required, shall be located near the mid-point spans for slabs, beams or griders. Joints in columns or piers shall be made at the underside of the deepest beam or girder at least five (5) hours before any overhead work is placed thereon. Joints not shown or specified shall be so located as to least impair strength and appearance of work. Vertical joints in wall footings shall be reduced to a minimum. Placement of concrete shall be at such a rate that surfaces of concrete not carried to joint levels will not have attained initial set before additional concrete is placed thereon. Girders, beams and slabs shall be placed in one operation. To insure a level straight joint in exposed vertical surfaces, a strip of dressed lumber may be tacked to the inside of the forms at the construction joint. the concrete shall be poured to a point one (1) inch above the underside of the strip. The strip shall be removed one (1) hour after concrete has been placed and any irregularities in the joint line

leveled off with a wood float and all laitance removed. Waterstops shall be installed in all construction joints below grade or in liquid containing structures as noted on the Plans. Install as per SECTION C13 - CONSTRUCTION JOINTS & WATERSTOPS.

F. Patching: Any concrete which is not formed as shown on the Plans, or for any reason is out of alignment or level or shows a defective surface shall be considered as not conforming with the intent of these Specifications and shall be removed from job by Contractor at his expense, unless the Engineer grants permission to patch defective area, which shall be done in accordance with the following procedure. Permission to patch any such area shall not be considered a waiver of the Engineer's right to require complete removal of defective work if patching does not, in his opinion, satisfactorily restore quality and appearance of surface. Suitable non-shrink, latex or epoxy mortar shall be used for patching and repairing defective surface if directed by the Engineer.

After removing forms, all concrete surfaces shall be inspected and any poor joints, voids, stone pockets, all tie holes, or other defective areas shall be patched, if permitted by the Engineer. Where necessary, defective areas shall be chipped away to a depth of not less than one (1) inch with edges perpendicular to the surface. Area to be patched and a space at least six (6) inches wide entirely surrounding it shall be wetted to prevent absorption of water from the patching mortar. A grout of equal parts Portland cement and sand, with sufficient water to produce a brushing consistency, shall then be well brushed into the surface followed immediately by the patching mortar. The patch shall be made of the same material and of approximately the same proportions and shall not be richer than 1 part cement to 3 parts sand. White Portland cement shall be substituted for a part of the gray Portland cement to match color of the surrounding concrete. The proportion of white and gray cements shall be determined by making a trail patch. The amount of mixing water shall be as little as consistent with the requirements of handling and placing. The mortar shall be retempered without the addition of water by allowing it to stand for a period of one (1) hour during which time it shall be mixed occasionally with a trowel to prevent setting.

The mortar shall be thoroughly compacted into place and screeded off so as to leave patch slightly higher than surrounding surface. It shall then be left undisturbed for a period of 1 to 2 hours to permit initial shrinkage before being finally finished. the patch shall be finished in such a manner as to match the adjoining surface. On exposed surfaces where unlined forms have been used, the final

finish shall be obtained by striking off the surface with a straightedge spanning the patch and held parallel to the direction of the form marks.

Tie holes left by withdrawal of rods or the holes left by removal of ends of ties shall be filled solid with mortar after first being thoroughly wetted.

G. Slabs on Grade: The Contractor shall insure that subgrade has been thoroughly compacted and leveled prior to concrete placement. Sprinkle all subgrades with water no more than ½ hour prior to placing concrete.

Place vapor barrier below interior slabs unless noted otherwise. Sprinkling of fill is not necessary when using vapor barrier. Lap vapor barrier 6" in direction of pour, and seal laps with specified mastic. Repair all ruptures of the vapor barrier that might occur before or during concrete pour.

The Contractor shall insure that all reinforcing steel is located properly prior to pour, and that steel will not be vertically displaced during the pour.

H. Edging: Edges exposed to view on the outside of structures, footings, pads and slabs, and all those in the inside of structures shall be chamfered, beveled or neatly edged with a radius tool as approved by the Engineer. Bevel shall be at an angle of 45 degrees, such bevel being ¾ inch on a side. If so required by the Engineer, however, the Contractor shall provide square edges for any portion of the work.

C10.5. SLAB FINISHES:

A. Exterior Walks & Paving: The top surface shall be "slip-resistant" as follows:

Steel troweled as noted in SECTION C10.5B and have a final finish applied in brushing lightly with a soft bristle brush to form a slightly roughed surface.

B. Interior slabs that are to receive a finish floor covering (this does not include ceramic tile covering) shall be finished by tamping the concrete with special tools to force the coarse aggregate below the surface, then screeding and floating with straightedges to bring the surface to the required finish level. While the concrete is still green but sufficiently hardened to bear a man's weight without deep

imprint, it shall be wood floated to a true and even plane with no coarse aggregate visible. Sufficient pressure shall be used on the wood floats to bring moisture to the surface. After surface moisture has disappeared, surfaces shall be steel-trowelled to a smooth, even, impervious finish, free from trowel marks. After cement has set enough to ring the trowel, surface of all slabs shall be given a second steel trowelling to a burnished finish.

C. Interior slabs to receive fill or mortar setting bed shall be finished by tamping concrete with special tools to force coarse aggregate below the surface, and screeded with straightedges to bring surface to required finish plane. Surface shall be left roughened sufficiently to produce good bond with topping material.

D. Top and bottom slabs of all structures and water carrying conduits except as noted otherwise on the Plans shall be finished as follows: The top of the slab shall be screeded to grade and cross section; lightly tamped as required to bring up a good bed of mortar for finishing and re-screeded as necessary. The surface shall then be finished with a wood float and leveling darby. No further finish will be required on top slabs of structures or conduits which are to be buried. In the case of all exposed top slabs of structures and conduits, they shall be given a final wood float and a light broomed, slip resistant finish to a uniform surface which conforms with accuracy to required shape, slope and grade. Slabs shall be edged as appropriate.

E. Interior floor slabs that are not to receive any finish floor covering shall be "slip resistant finish" as follows: The top surface shall be steel trowelled as noted in C3.5B above and have a final finish applied by brushing lightly with a soft bristle brush to form a slightly roughed surface.

F. The floor surfaces of basins in which raking mechanisms are to be installed shall be finished, as indicated on the Drawings, by sweeping in cement grout with the mechanism. The cement grout to be used shall be composed of one part Portland cement and two parts sand by weight.

The sweeping-in process shall be performed under the supervision of the Engineer or, if necessary, under the supervision of a factory representative of the equipment manufacturer.

The slab upon which the grout is to be applied shall be finished in accordance with the provisions of paragraph C10.5D above except that after leveling and floating, it shall be raked in such a manner as

to provide a good bond for the grout. Before grout is deposited on the slab, it shall be thoroughly cleaned, wet down with clean water, and lightly dusted with neat cement immediately prior to placement of the grout.

G. Concrete Hardener shall be applied to the floors where scheduled to be exposed concrete. Concrete surfaces to be treated must be thoroughly set and dry, clean and free of dust. Three applications of "lapidolith", "saniseal", "hornolith","vitrox", or approved equal liquid are required, using one gallon per 100 square feet for the complete treatment. Apply hardener strictly according to the manufacturer's printed instructions. Any substitution for the specified hardeners must be of the magnesium fluosilicate or zinc fluosilicate types.

C10.6. FINISH OTHER THAN FLOORS:

A. All top surfaces, other than slabs, not covered by forms, and which are not to be covered by additional concrete or fill shall receive a wood float finish without additional mortar. Care shall be taken that no excess water is present when the finish is made. Other surfaces shall be brought to finished elevations and left true and regular. All exposed interior concrete shall be grouted smooth and give a cement wash of one part light colored Portland cement and two parts fine aggregate mixed with water to consistency of thick paint. Grout shall be cork or wood floated to fill all pits, air bubbles, and surface holes. Excess grout shall be scraped off with a trowel and rubbed with burlap to remove any visible grout film. Surface shall be kept damp during setting period. The finish for any area shall be completed in same day and the limits of a finished area shall be made at natural breaks in finished surface.

B. Rubbed Finish Unless otherwise indicated, all faces (except top surfaces of slabs) exposed to view, such as walls, grade beams, columns, beams, canopy soffits and fascias, etc. shall be finished as follows:

Forms shall be removed, as specified in SECTION C12 - CONCRETE FORMWORK, and all fins removed, offsets leveled, damaged places and depressions resulting from the removal of metal ties or other causes shall be carefully pointed with a mortar of sand and cement in the proportion which has been employed for the particular class of concrete treated. The surface film of all such pointed places shall be carefully removed before setting occurs. After the point has set sufficiently to permit it, all exposed surfaces shall be dampened and rubbed with a No. 16 carborundum stone,

to a smooth even plane. Final rubbing shall be done with a No. 30 carborundum stone, or an abrasive of equal quality, to obtain an entire surface of a smooth texture and uniformity in color. Mortar or grout worked up during rubbing shall be promptly removed by sacking with burlap or other suitable means so that no visible grout film or paste will remain. A cement wash or plaster coat shall not be used. All surfaces shall be finished uniformly smooth and washed clean. The rubbed finish for any area shall be completed in the same day and the limits of a finished area shall be made at natural breaks in the finished surface. If the Contractor does not provide suitable surface finish using carborundum stones specified above, the Engineer, without additional cost to the Owner, may require the use of a power operated grinding machine to produce the desired finish.

C10.7. CURING:

A. Unformed concrete surfaces shall be water cured to prevent check of the fresh concrete surface. Where drying conditions are severe, as determined by the Engineer, fog sprays shall be employed to prevent checking of the fresh concrete surface. Fog spraying shall be continued as specified until the finished surface has attained sufficient strength to permit flooding or covering with burlap mats. Where drying conditions are not severe, as determined by the Engineer, unformed concrete surfaces shall be covered with wet burlap mats as soon as the concrete has sufficiently set, and shall thereafter be kept under wet burlap.

Formed surfaces, both interior and exterior, shall be water cured by water sprays or under burlap mats beginning as soon as the forms are stripped. Prior to stripping of forms, the concrete and forms shall be kept moist by the water sprays.

Unless otherwise specified, surfaces shall be water cured for 7 days after the concrete is placed.

After 48 hours of water cure, and with the acceptance of the Engineer, the curing of concrete surfaces may be completed by the curing compound method. Curing compounds shall be applied in strict conformance with the manufacturer's instructions. If the compound is applied to a surface which is later to be painted, the Contractor shall thoroughly sandblast the surface to remove all vestiges of the compound prior to concrete finishing. Curing compound shall not be used on any surfaces against which additional concrete or other finishing materials are to be bonded.

B. In all concrete structures, Class A concrete made with normal Portland cement shall be prevented from drying for at least the first seven (7) days after placing. Whenever the temperature of the surrounding air is between 40 deg. and 60 deg. F., adequate provision shall be made for maintaining the temperature of concrete above 60 deg. F. or the moist curing period shall be extended to insure a compressive strength corresponding to that which would be secured under provisions of the previous part of this paragraph.

C. Whenever the temperature of surrounding air is below 40 deg. F., all Class A concrete shall be maintained at a temperature of not less than 50 deg. F. for at least 72 hours for normal concrete or for as much more time as is necessary to insure proper rate of curing of the concrete. The housing, covering or other protection used in connection with curing shall remain in place and intact at least 24 hours after the artificial heating is discontinued. No salt or other chlorides shall be used for prevention of freezing.

D. Protection from the Sun: All concrete shall be adequately protected from injurious action of sun in a manner satisfactory to the Engineer.

E. Temperature Control: During and at the conclusion of the specified curing period, means shall be provided to insure that the temperature of the air immediately adjacent to the concrete does not fall more than 3 deg. F in any 1 hour nor more than 30 deg. F in any 24 hours.

C10.8. CONCRETING IN COLD WEATHER: When the atmospheric temperature may be expected to drop below 40 deg. F at the time concrete is delivered to the work site, during placement, or at any time during the curing period, the following provisions also shall apply:

A. The temperature of the concrete at the time of placing shall not be less than 50 deg. F nor more than 90 deg. F. The temperature of neither aggregates nor mixing water shall be more than 100 deg. F just prior to mixing with the cement.

B. When the daily minimum temperature is less than 40 deg. F, concrete structures shall be insulated or housed and heated after placement. The temperature of the concrete and air adjacent to the concrete shall be maintained at not less than 50 deg. F nor more than 90 deg. F for the duration of the curing period.

C. Methods of insulating, housing, and heating the structure shall conform to "Recommended Practice for Cold Weather Concreting," ACI Standard 306.

D. When dry heat is used to protect concrete, means of maintaining an ambient humidity of at least 40% shall be provided unless the concrete has been coated with curing compound or is covered tightly with an approved impervious material.

C10.9. CONCRETING IN HOT WEATHER: When climatic or other conditions are such that the temperature of the concrete may reasonably be expected to exceed 90 deg. F at the time of delivery at the work site, during placement, or during the first 24 hours after placement, the following provisions also shall apply:

A. The Contractor shall maintain the temperature of the concrete below 90 deg. F during mixing, conveying, and placing. Methods used shall conform to "Recommended Practice for Hot Weather Concreting," ACI Standard 305.

B. The concrete shall be placed in the work immediately after mixing. Truck mixing shall be delayed until only time enough remains to accomplish it before the concrete is placed.

C. Exposed concrete surfaces which tend to dry or set too rapidly shall be continuously moistened by means of fog sprays or otherwise protected from drying during the time between placement and finishing, and after finishing.

D. Finishing of slabs and other exposed surfaces shall be started as soon as the condition of the concrete allows and shall be completed without delay.

E. Concrete surfaces exposed to the air shall be covered as soon as the concrete has hardened sufficiently and shall be kept continuously wet for at least the first 48 hours of the curing period, and for the entire curing period unless curing compound is applied as specified.

F. Formed surfaces shall be kept completely and continuously wet for the duration of curing period (prior to, during, and after form removal) or until curing compound is applied as specified.

C.10.10. INSERTS AND EMBEDDING:

A. Inserts: Where pipes, castings or conduits are to pass through the walls, the Contractor shall place such pipes or castings in the forms before pouring the concrete, or in special cases, with the express consent of the Engineer or as specified, he shall build accepted boxes in the forms to make openings for subsequent insertion of such pipes, castings or conduits as required by the Engineer. To withstand water pressure and to insure watertightness around the openings so formed, the boxes shall be provided with continuous keyways and waterstops all the way around, and they shall have a slight flare to facilitate grouting and the escape of entrained air during grouting. Before placing the grout, the concrete surfaces and the surfaces of the insert shall be coated with an epoxy bonding compound. Mixing and application of the bonding agent and time of placement of the grout shall be in accordance with the manufacturer's directions.

Additional reinforcement shall be provided around large openings, as shown on the drawings. The pipes, castings or conduits as specified shall be grouted in place by pouring in grout under a head of at least 4 inches. The grout shall be poured or rammed or joggled into place to fill completely the space between pipes, castings or conduits, and the sides of the openings so as to obtain the same watertightness as the wall itself. The grouted castings shall then be water cured as specified herein. The grouting material so placed shall be surfaced when the forms are removed to give a uniform appearance to the wall if such wall be exposed to view.

B. Embedding: The Contractor shall set accurately and hold in exact position in the forms until the concrete is poured and set, all gate frames, gate thimbles, special castings, channels or other metal parts that are to be embedded in the concrete; and he shall set accurately all inserts and anchor or other bolts necessary for the attaching of piping, valves, metal sash and equipment. All nailing blocks, plugs, strips and the like, necessary for the attachment of trim, finish and similar work shall be furnished and placed by the Contractor.

Blockouts may be used for embedded items, with the prior written consent of the Engineer. Where blockouts are allowed, non-shrink cement based grout shall be used to set the embedded items.

In lieu of embedding anchor bolts and other items to be anchored in the concrete, the Contractor will be permitted with prior written

acceptance of the Engineer, to drill holes in hardened concrete and install the anchor bolts and other items with non-shrink epoxy based grout. Drilling or coring holes shall be done by rotary drill with diamond boring or coring bits. Bonding mortar or grout shall be epoxy bonding adhesive grout or epoxy bonding adhesive mortar. Holes shall be blown clean and dry before installation of embedded items. Before insertion, both the hole and the item to be embedded shall be coated with bonding compound. Studs of equal size and length may be substituted for anchor bolts if nut fasteners are used. When accepted by the Engineer, three-part compounded expansion shields may be used for anchorage of minor miscellaneous metal.

C10.11. DRYPACK MORTAR: Where surfaces are required to be built up with mortar, such surfaces shall be thoroughly roughened by brushing, completely cleaned, and coated with appropriate bonding compound before the application of the required mortar. The mortar shall be applied immediately following the application of the bonding compound in bands or strips to form a compact durable covering of the required thickness and shall be free from lumps and depression. Construction joints in the mortar shall be sloped to thin edges and, before application is resumed, the joint shall be thoroughly cleaned. Drypack mortar shall be used for built-up surfaces, setting miscellaneous metal items, and correcting minor repairs and imperfections.

No mortar shall be applied during freezing weather unless adequate protection is provided.

The mortar shall be cured as specified for concrete.

C10.12. MODIFICATION OF EXISTING CONCRETE: Where the work indicated on the drawings required modification of existing concrete structures or concrete poured over six months previously to be removed or modified, the existing concrete shall be cut accurately to the lines required under the supervision of the Engineer. Concrete faces exposed to view shall be cut with a concrete saw. The cutting shall be accomplished in a manner that preserves, free from cracks or other injuries, those parts of the existing structure that are to remain. Where the cut surface is to be left exposed, it shall be cleaned and faced with non-shrink grout and finished to match adjacent surface. Where new concrete or mortar is to be placed against existing concrete surfaces or surfaces that have been cut, such surfaces shall be thoroughly cleaned by sandblasting, if required by the Engineer, and coated with the bonding compound just prior to the placement of the new concrete. Bonding compounds shall be as specified herein. Depth of saw cut should be ¾" minimum. Unless otherwise indicated on the drawings or specified, continuity of reinforcing steel shall be obtained by

either exposing bars to provide sufficient laps with new bars or by welding existing bars with new bars as specified. Where indicated, existing bars shall be exposed and fully developed by; embedding in new concrete.

C10.13. PROTECTION AND REPAIR OF CONCRETE CONSTRUCTION: All surfaces shall be protected against injury. During the first 72 hours after placing the concrete, any wheeling, working or walking on the concrete shall not be permitted. All slabs subject to wear shall be covered with a layer of sand or other suitable material as soon as the concrete has set. Sisalcraft paper or other similar tough waterproof paper may also be used, provided all joints between adjacent strips of paper are carefully sealed. This does not alter the requirements for proper curing as specified herein.

No concrete slabs or top surfaces or walls shall be placed during rain unless acceptable protective shelter is provided, and during such weather, all concrete placed within the preceding 12 hours shall be protected with waterproof canvas or other suitable coverings. These shall be provided and kept ready at hand.

Immediately after the removal of forms, all concrete shall be inspected, and all pour joints, rough sections or rock pockets containing loose materials such size and shape as will form a 1" key for cement mortar fill. Before the mortar is applied, the surface of the existing concrete shall be coated with epoxy bonding compound. All form tie holes and small imperfections shall be filled. The fill for small imperfections and form ties shall consist of cement mortar composed of one part cement well mixed with three parts of the fine aggregate by volume and just enough water so that the mortar will stick together on being molded into a ball by slight pressure of the hands; and is shall be thoroughly compacted into place. Where the area or volume of defective concrete is large, it may be repaired by; reforming the surface and filling the opening with concrete. For such major repairs, the filling shall be reinforced and doweled securely to the old concrete, neatly finished to match the surface and texture of the adjacent concrete. All patches shall be cured as accepted by the Engineer.

TECHNICAL SPECIFICATIONS

SECTION C11 - STEEL REINFORCEMENT

C11.1. MATERIAL: Steel reinforcement shall conform to the "Specification for Deformed Billet Steel Bars for Concrete Reinforcement" ASTM A615, Grade 40.

Wire fabric reinforcement shall conform to the current "Specifications for Welded Steel Wire Fabric for Concrete Reinforcement", ASTM A-185, or "Specifications for Welded Deformed Steel Wire Fabric for Concrete Reinforcement", ASTM A-497.

C11.2. STORAGE: Reinforcement shall be stored above the ground surface upon skids, platforms or other supports and shall be protected from mechanical injury and surface deterioration by exposure to the weather.

C11.3. SPLICES: No splices of bars, except when shown on the Plans, will be permitted without the approval of the Engineer. Bars shall be rigidly clamped or wired at all spices in a manner approved by the Engineer. Welding may not be used except with the specific approval of the Engineer. Welding, when approved, shall conform to the American Welding Society's "Recommended Practices for Welding Reinforcing Steel, Metal Inserts and Connections in Reinforced Concrete Construction" (AWS D12.1). Welded wire fabric shall be lap spliced a minimum of 2 inches plus the bar spacing. Splices in reinforcing bars shall conform to the general requirements of the ACI Code, except ring tension reinforcement splices, which should be a minimum of 40 bar diameters. Splices should be staggered where possible or increased by 30%.

C11.4. DETAILING & FABRICATION: Furnish Shop Detail and Field Placing Drawings for all reinforcing steel for approval of the Engineer. Shop Drawings shall include reinforcing, placing plans and details indicating size, location, arrangement, splice locations, bending diagrams, placing sequence, etc. Placing Drawings shall be insufficient detail to allow field personnel to accurately place reinforcing. Shop and Placing Drawings shall be prepared in accordance with "Manual of Standard Practice for Detailing Reinforced Concrete Structures" ACI 315-65, current edition.

Reinforcement bars shall be bent cold to the shapes indicated on the Plans. Fabrication tolerances, fabrication, and detailing of steel

reinforcement shall conform to the "Manual of Standard Practice for Detailing Reinforced Concrete Structures" (ACI-315).

Steel reinforcement shall be of the type and size, cut to lengths and bent to shapes as indicated on the Plans. Unless otherwise indicate, hooks, laps, splices, embedment lengths, and other details of reinforcement shall be provided as set forth in the

ACI Building Code (ACI-318) to develop the full tensile strength of the bar.

C11.5. PLACING REINFORCEMENT: Metal reinforcement at the time concrete is placed shall be free from mud, oil, paint, excessive rust and excessive mill scale or any other coating that would destroy or reduce its bond with the concrete.

Metal reinforcement shall be accurately positioned and dimensioned in accordance with the Plans and Specifications. The bars and mesh shall be tightly secured against displacement by ties of annealed wire, or suitable clips at intersections. Wall reinforcement shall be supported and held securely against displacement in its proper position clear of the forms as indicated on the Plans. Placing tolerances shall conform to ACI-318.

Nails shall not be driven into the wall forms to support reinforcement nor shall any other device used for this purpose come in contact with the form on the waterside of any water containing structure. Metal devices used to provide the required clear distances from reinforcing steel to waterside of concrete surfaces shall be galvanized, or shall be as approved by the Engineer.

The main reinforcement of slabs in contact with the ground shall be supported in its proper position, as indicated on the Plans, by means of precast cement mortar blocks, of approved dimensions, resting on the slabs' subbase. Such precast blocks shall be made of mortar composed of 1 part cement to 2 parts sand. Blocks shall be spaced at the intervals required to maintain the reinforcement in its required position in the slab during the placing of the concrete. The slab reinforcement shall not be used to support planking or runways used in placing concrete.

Bending of bars embedded in hardened concrete will not be permitted except when specifically approved by the Engineer for the field condition encountered.

In the case of floor slabs, galleries, deck slabs, and beams, metal chairs, spacers and other metal accessories necessary to provide the required clear distances and proper alignment and spacing between bars shall be

galvanized or shall have plastic protective covering over portions in contact with forms.

C11.6. CONCRETE PROTECTION FOR REINFORCEMENT: Steel reinforcement shall be placed and held in position so that the concrete cover, as measured from the surface of the bar shall be the following, except as otherwise shown, specified, or directed:

Slabs:

1½ inches, in general, top and bottom.
1½ inches at surfaces troweled as floor finish, walkway, or driveway.
2 inches on bottom for slabs over water and where exposed to the weather.

Footings:

2 inches at top of footings.
3 inches at bottom, sides, and end of footings.

Walls:

2 inches on surfaces against earth.
1 inch on interior surfaces.
2 inches on interior surfaces contacting water.

Beams and Girders in Contact with Water:

2 inch minimum to stirrup steel.
2½ inch minimum to main longitudinal steel.

Columns:

2 inches, in general, to main vertical reinforcement.
2½ inches, to main reinforcement on surfaces in contact with water.

Beams and Girders:

1½ inch minimum to stirrup steel.
2 inches minimum to longitudinal Steel.

TECHNICAL SPECIFICATIONS

SECTION C12 - CONCRETE FORMWORK

C12.1. SCOPE: Work in this section includes all labor, plant and material necessary to furnish and install all concrete formwork required by the project. Concrete formwork shall conform to all requirements of ACI 301 "Specifications for Structural Concrete for Buildings" and ACI 318 "Building Code Requirements for Reinforced Concrete" and ACI 347 "Recommended Practice for Concrete Formwork" except as modified herein.

C12.2. MATERIALS:

A. Forms shall be of wood, metal, highly water resistant plywood, or other material approved by the Engineer. Forms for sections greater than 18" thick shall be of wood. Form surfaces shall be smooth and free from irregularities, dents, sags, or holes when used for permanently exposed surfaces. Bolts and rods used for internal ties shall be so arranged that, when the forms are removed, all metal will not be less than two (2) inches from any concrete surface. Wire ties will not be permitted where concrete surface will be exposed to weathering, and discoloration would be objectionable. Exposed concrete shall have approved form liners of masonite or plywood, or shall be constructed of smooth surfaced plywood.

B. Corner forms forming ½ inch chamfers or as otherwise specified on plans, shall be used on all outside corners that are to be exposed in the finished structure. Chamfer forms shall be molded plastic or polyvinyl chloride radius of chamfer strips. Use one style of form throughout the project.

C. Rustication and Score Line Strips shall be a non-absorbent material such as extruded polyvinyl chloride, plastic, fiberglass or metal or they may be milled from good quality lumber and well sealed to prevent moisture absorption, wood strips may not have protruding splinters which may become embedded in the concrete. Sealing wood shall be accomplished by immersion or brushing on two coats of form coating.

D. Form ties for concrete shall have an approved waterstop barrier to prevent seepage of moisture along the ties. The ends of the tie

metal after breaking off shall be minimum of 1½ inches from the finished wall face. Submit samples to the Engineer for review.

C12.3. EXECUTION: Forms shall be built true to line and grade, and be mortartight and sufficiently rigid to prevent displacement or sagging between supports. All formwork and shoring shall be designed for the construction loads to be placed on them, and the design and construction of said forms shall be in accordance with ACI Standard "Recommended Practice for Concrete Formwork (ACI 347). The structural adequacy of the formwork shall rest with the Contractor. All forms shall be so constructed that they can be removed without hammering or prying against the concrete. Forms shall not be removed without approval of the Engineer. Forms shall not be removed before the minimum times given below, or longer if job control tests indicate the concrete has not attained strength specified below, except when specifically authorized by the Engineer.

Beams and Slabs	14 days
Walls up to 12" Thick and Vertical Surfaces	3 days
Columns	5 days
Walls greater than 12" Thick	7 days

In general, forms or shores for supported slabs and beams shall not be removed until the concrete, so supported, has acquired 70% of its design strength; except where loads other than the dead weight of the concrete are added, the shores shall not be removed until 24 hours after the concrete has obtained 90% of its design strength. Forms shall be removed immediately after expiration of the lapsed time specified above or sooner, if required by the Engineer, where concrete is to receive a rubbed finish.

TECHNICAL SPECIFICATIONS

SECTION C13 - CONSTRUCTION JOINTS AND WATERSTOPS

C13.1. GENERAL: This section covers construction joints, expansion joints, and the placing of waterstops where such are indicated on the Plans.

C13.2. POLYVINYL PLASTIC WATERSTOP: Waterstops shall be installed in all construction joints with water or other liquid on one side of joint and at other locations as required by the Plans. All waterstops shall be continuous throughout their length.

The waterstops shall be heavy duty polyvinyl waterstop conforming to Corps of Engineers Specification CRD-C-572, latest edition, as manufactured by Servicised Products Division of W.R. Grace and Company; Vinylstops by Sonneborn-Contech; W.R. Meadows, Inc.; Vinylex Corporation; or an approved equal of the same type and material and approximately equal in dimensions and weight but not necessarily of exactly the same shape. Waterstops shall be "Rib Type" with a center bulb, 4" wide, capable of resisting a maximum pressure load of 65 feet of water, unless otherwise shown on Plans.

"Expansion Type" waterstops shall be of ribbed construction, 6" wide, with a capacity for 1" of movement.

All waterstops shall be installed so that one-half its width will be embedded on one side of the joint and one-half on the other. The Contractor shall employ a method of holding the waterstop in position for the first pour that is satisfactory to the Engineer. The method selected must insure that the waterstop will be held securely in true vertical or horizontal position and in straight alignment in the joint.

Care shall be exercised to insure that the waterstop is completely encompassed in good mortar.

C13.3. JOINTS IN WATERSTOPS: All waterstops shall be continuous and so joined at all points of contact in the same plane, or at intersections with waterstops in different planes, as to form a complete barrier to the passage of water through any construction, contraction, or expansion joint.

Joints in the waterstops, whether made for the purpose of continuity in a straight strip or for the purpose of securing a watertight junction between

strips in different planes, shall be made by heat welding as hereinafter specified.

Joints in PVC waterstops shall be made by heating the two surfaces to be jointed until the material has softened to the point where it is just short of being fluid and then bringing the two softened surfaces together with a slight rubbing motion followed by firmly pressing them together so that a solid and tight bond is made.

The joints in strips of waterstop made in the above manner shall be such that the entire cross section of the joint shall be dense, homogeneous and free of all porosity. All finished joints shall have a tensile strength of not less than 75 percent of the material of the strip as extruded.

The heating of the surfaces to be joined shall be done by means of an electric splicing iron designed for the specified purpose and controlled by means of a voltage regulator.

In use, the heat of the hot plate shall be so regulated as to prevent too rapid melting and accompanying charring of the waterstop material.

The use of makeshift hot plates will not be permitted nor will other means of heating the strips to be joined be allowed except in a case of emergency, as determined by the Engineer.

The Contractor shall provide such jigs as will assist in making the joints in a proper and workmanlike manner and in holding the strips so that the alignment of jointed strips is correct and angles are true to those required.

Prior to embedment, all joints in the waterstop strips will be inspected by the Engineer and any found defective shall be remedied without delay.

C13.4. PROTECTION OF WATERSTOP BETWEEN POURS: The Contractor shall take such steps as are necessary to protect exposed waterstops in the interim period between concrete pours.

C13.5. EXPANSION JOINTS: Expansion joints of the size and type shown on the Plans, or specified herein, shall be placed in concrete pavement or structure as shown on the Plans.

A. Preformed Asphalt Fiber Joint Material: Asphalt fiber sheet filler shall consist of preformed strips of inert material impregnated with asphalt. It shall be of the thickness shown on the Plans or indicated in these Specifications.

The sheet filler shall conform to the requirements of AASHTO Specification M-59 with the following additional provisions.

The sheet filler shall be of such character that it will not be deformed by ordinary handling during hot weather nor become hard and brittle in cold weather. It shall be of a tough, resilient, durable material not affected by weathering.

B. Hot Poured Rubberized Tar Joint Sealer: Hot poured rubberized mastic sealer shall consist of a mixture of durable, elastic rubber, coal tar pitch, and other materials which will form a resilient and adhesive compound capable of effectively sealing concrete joint surfaces against repeated expansion and contraction. The material shall be installed in accordance with the manufacturer's directions.

C13.6. CONSTRUCTION JOINTS: Location of all construction joints shall be approved by the Engineer. Maximum length of wall pours shall be 40 ft. maximum height of wall pours shall be 18 ft. provided in the construction joints or as shown on the plans. Bottom slabs and wall footings for concrete structures that will hold water shall be poured monolithically without cold joints or other discontinuities or weakened areas. Radial control joints consisting of ½" to ¾" wide troweled grooves shall be required at 60 deg. increments in circular slabs. Such joints shall be caulked with epoxy joint sealer after the concrete is cured and prior to placement of grout topping if required. All cracks greater than 0.05" wide not located in control joints shall be sealed by cutting a bevel groove on the water side of the crack ½" to ¾" wide and caulking with epoxy sealant. Crack widths shall be measured at the concrete surface.

C13.7. ADHESIVE WATERSTOP: Preformed plastic waterstop shall meet or exceed all requirements of Federal Specification SS-S-00210 Type I or Type II. Such plastic waterstop shall be equal to SYNKO-FLEX as manufactured by SYNKO-FLEX Products, Inc. Houston, TX or approved equal and shall meet the following requirements.

The plastic waterstop shall be produced from blends of refined hydrocarbon resins and plasticizing compounds reinforced with inert mineral filler, and shall contain no solvents, irritating fumes or obnoxious odors. The plastic waterstop shall not depend on oxidizing, evaporating or chemical action for its adhesive or cohesive strength. It shall be supplied in extruded form of suitable cross-section and of a size to seal the joint areas of concrete sections. the plastic waterstop shall be protected by a suitable removable two-piece wrapper. The two-piece wrapper shall be so designed that ½ may be removed longitudinally without disturbing the other half, to facilitate application of the sealing compound. The flexible

plastic waterstop shall also meet the requirements as stated in the following table:

Composition	Test Method	Min	Max
Bitumen (petroleum plastic content)	ASTM D 4	50	70
Ash-Inert Mineral Matter	AASHO T 111	30	50
Volatile Matter	ASTM D 6	--	2.0

Property	Test Method	Min	Max
Specific Gravity @ 77 deg. F.	ASTM D 71	1.20	1.30
Softening Point	ASTM D 36	320 deg. F.	--
Penetration 77 deg. F. (150 gms) 5 sec.	ASTM D 217	50	120

SECTION T

TESTING

TECHNICAL SPECIFICATIONS

SECTION T1 - DESCRIPTION

T1.1. GENERAL: This part of the specifications stipulates test requirements for materials, construction methods, and leakage tests of the sewer lines.

TECHNICAL SPECIFICATIONS

SECTION T2 - SEWER LINE TESTING

T2.1. DESCRIPTION: This section covers the testing of pipe materials, joints, or other materials incorporated into the sanitary sewer line and leakage tests to determine watertightness.

T2.2. SANITARY SEWER PIPE: All pipe and pipe materials will be accepted on the manufacturer's certificate that the pipe meets with the specification requirements and has been tested in accordance with the latest ASTM standard procedure for testing pipe, pipe joints, or other material unless specific tests are requested by the Engineer. All pipe and pipe materials shall be subject to permeability and hydrostatic tests.

T2.3. LEAKAGE TESTS OF GRAVITY SEWERS: All sewers shall pass leakage tests as specified herein. The leakage test must be performed in the presence of a representative of the Engineer. The Contractor is requested to provide 24 hours notice before beginning testing procedures. Leakage tests for watertightness of gravity sewer lines shall be completed in accordance with one of the two following procedures:

A. Infiltration-Exfiltration Test: The pipeline shall not leak under exterior ground water pressures in excess of 50 gallons per inch of nominal pipe diameter per mile of pipeline per 24 hours. If, in the opinion of the Engineer, the ground water table at the time of testing is too low to produce dependable results, exfiltration tests shall be run. Allowable limits of exfiltration shall be 50 gallons per inch of nominal pipe diameter per mile of pipeline per 24 hours. This test shall be performed in the following manner:

The lower end of the section to be tested shall be plugged with a suitable watertight plug. The manhole at the upper end of the section shall be filled with water to an average depth of four (4) feet above the lower end, taking steps to ensure that all air has been removed from the line at the lower end. Depth measurements shall then be taken by the Engineer to establish the variance in the water level. An allowance of an additional ten (10) percent of gallonage lost shall be permitted for each additional two feet of head over a basic two (2) feet minimum internal head.

B. Air Testing: Prior to air testing the pipe shall be visually inspected to determine collapsed or crushed pipe. After visual inspection the section to be tested shall be cleaned and flushed. After flushing, all

pipe outlets in the test section shall be plugged and each plug shall be suitably and securely braced.

(1) Constant Pressure: Add air slowly until the pressure in the test section reaches 3.0 pounds per square inch gauge. Maintain the 3.0 psig pressure until the air in the system reaches the temperature of the pipe. (Approximately two minutes.) The volume of air leaked from the test section shall be measured by a rotameter placed in the system. The maximum rate of air loss for acceptance shall not exceed 0.003 cubic feet per minute per square foot of interior pipe surface, or 2.0 cfm minimum when subjected to a constant pressure of 3.0 psig. For each foot of water table elevation above the invert of the pipe under test, the allowable loss shall be reduced six percent.

(2) Time Pressure Drop: Add air slowly to the portion of the pipe under test until the internal air pressure is raised to 4.0 pounds per square inch gauge. Maintain the internal pressure at 4.0 psig, by adding air until the air temperature inside the pipe under test has stabilized. (Approximately two minutes.) At the end of the two minute period disconnect the air supply. When pressure decreases to 3.5 psig, start stop watch. Determine the time in seconds that is required for the internal air pressure to reach 2.5 psig. The amount of air loss shall then be determined from the pipe size, length of test section and time in seconds and compared with the time required by specification as shown on the next page.

C. Safety Provisions: Plugs used to close the sewer pipe for the air test must be securely braced to prevent the unintentional release of a plug which can become a high velocity projectile. Gauges, air piping manifolds, and valves shall be located at the top of the ground. No one shall be permitted to enter a manhole where a plugged pipe is under pressure. Four pounds (gauge) air pressure develops a force against the plug in a 12" diameter pipe of approximately 450 pounds. Pipes larger than 24" in diameter shall not be air tested because of the difficulty of adequately blocking the plugs.

AIR TESTING (TIME PRESSURE DROP METHOD)

MINIMUM TIME IN SECONDS FOR 1 PSIG DROP (3.5 psig to 2.5 psig)

Pipe Diameter in Inches
Length of Test Section in Feet

	4	6	8	10	12	15	18	21	24	27	30	33	36
25	4	10	18	28	40	62	89	121	158	200	248	299	356
50	9	20	35	55	79	124	173	243	317	401	495	599	713
75	13	30	53	83	119	186	267	364	475	601	743	898	1020
100	18	40	71	110	158	248	356	485	639	765	851	935	
125	22	50	88	138	198	309	446	595	680				
150	26	59	106	165	138	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	79	170											
500	88												
550	97												
600	106												
650	113	170	227	283	340	425	510	595	680	765	851	935	1020

T2.4. MANHOLE VACUUM LEAKAGE TESTS: Upon completion of installation, each manhole will be visually inspected to insure the watertight integrity. One hundred percent (100%) of the total number of manholes on the project shall be tested in the following manner:

Procedure for testing shall be as follows:

1. Temporarily plug all pipes entering the manhole.
2. The test head shall be placed inside the rim of the cast iron frame at the top of the manhole and inflated, in accordance with the manufacturer's recommendations.
3. A vacuum of at least ten inches of mercury (10" Hg) shall be drawn on the manhole. Shut the valve on the vacuum line to the manhole and shut off the pump or disconnect the vacuum line from the pump.
4. The pressure gauge shall be liquid filled, having a 3.5-inch diameter face with a reading from zero to thirty inches of mercury.

The manhole shall be considered to pass the vacuum test if the vacuum reading does not drop more than 1" Hg (i.e. from 10" Hg to 9" Hg) during the following minimum test times. Minimum Test Times for Various Manhole Diameters

MH Depth (feet)	***4' Diameter MH***	***5' Diameter MH***	***6' Dia. MH***
15 Feet or less	*50 sec.*	*1 min. 5 sec.*	*1 min. 20 sec.*
15.01 to 30 Feet	*1 min. 20 sec.*	*1 min. 45 sec.*	*2 min. 10 sec.*

T2.5. LEAKS ENCOUNTERED IN FINAL INSPECTION: In addition to passing the above described leakage tests, all obvious running leaks which may be observed in the final inspection shall be satisfactorily repaired.

T2.6. DEFLECTION TESTING: Deflection testing shall be performed on the total footage of the project. The deflection test shall occur after a thirty day consolidation of the backfill in the trench section. A maximum of five percent deflection is allowable. A contractor shall use a mandrell deflection testing as follows:

A. Completely flush the line making sure the pipe is clean of any mud or trash that would hinder the passage of the mandrell.

B. During the final flushing of the line, attach a floating block or ball to the end of the mandrell. Pull rope and float the rope through the line.

C. After the rope is threaded through the line, connect the pull rope to the mandrell and place the mandrell in the entrance of the pipe.

D. Connect a second rope to the back of the mandrell. This will enable you to retrieve the mandrell if a blockage is encountered.

E. Remove all the slack in the pull rope by gently pulling the rope at the far manhole. After the slack has been removed, place a tape marker on the rope close to the pipe where the mandrell will exit. If the mandrell encounters blockage, the marker will provide a means of measuring the traveled distance of the mandrell so that the restricted area can be located.

F. Draw the mandrell through the sewer.

G. An increasing resistance to pull is an indication of excessive deflection. If this occurs, measure beginning marker on rope the distance to manhole. Locate section and replace bedding or pipe if visual examination reveals damage.

H. Retest.

Resistance to pull may be caused by not properly flushing or cleaning the line prior to testing. Actions to take prior to digging are as follows:

(1) Remove mandrell and reflush with water, or

(2) Preferably remove mandrell and pull a rubber sewer cleaning ball through the line with water to clear any mud or debris that did not flush during initial cleaning.

The mandrell O.D. shall be equal to the minimum pipe I.D. less the allowance for the maximum five percent deflection.

The test equipment used shall be certified as satisfactory by the Engineer at the beginning of the project. The Engineer or his representative may at any time require a calibration check of the instrumentation used.

T2.7. CLEANING UP: As the construction work progresses, the Contractor shall backfill the trenches, remove excess excavated materials and other debris

and do sufficient clean-up and blading of the trench surfaces to make the streets and alleys suitable for safe use of traffic.

After the construction work is completed and before final acceptance by the Owner, the Contractor shall remove all rubbish, excess materials, excess materials from excavations and other debris from the site of the work, and all trench surfaces shall be bladed as heretofore specified. Adjacent road ditches and slopes which have been disturbed by this construction shall be restored to original shape density and condition. The cost of clean-up shall be included in the bid prices for the various units of work.

SECTION MP

MEASUREMENT AND PAYMENT

TECHNICAL SPECIFICATIONS

SECTION MP - MEASUREMENT AND PAYMENT

MP.1. GENERAL:

This section of the specifications covers the components considered to be a portion of each pay item as furnished to aid the Contractor in preparing his bid. Of necessity, the items described as components of the various items are discussed in a general manner only, describing the major pieces of equipment and/or materials. Any items and/or appurtenances not specifically mentioned shall be considered a portion of the bid item to which, in the opinion of the Engineer, its function is most directly related. Failure to list all items and/or appurtenances does not relieve the Contractor from furnishing all apparatus, devices, labor, or materials of whatever nature required for a complete and operating installation in accordance with the intent of the Drawings, approved Shop Drawings, and these Specifications.

This successful Contractor shall, as soon as possible after award of the Contract, submit a list itemizing the components of each Lump Sum Bid Item and their respective costs to be used as an aid in the preparation of partial payments.

MP.2. BID ITEM DESCRIPTION:

Tabulated in the paragraphs below are descriptions of the various bid items listed in the proposal.

A. Sanitary Sewer Mains: The contract price per lineal foot for the various sizes, types, and depths of sanitary sewer shall be full compensation for furnishing all materials, equipment, tools, and labor, including clearing, trenching, laying of pipe, backfilling and disposal of vegetation or surplus excavated material, necessary to construct the sewer in accordance with the plans and these specifications. The trench depth will be measured as the vertical distance from the original ground surface to the invert or flow line of the pipe. No extra compensation will be allowed for rock excavation, special bedding or backfill materials required on the plans, tamping backfill, or clearing and grubbing unless specifically set out as a bid item and specified as such. The Engineer will measure the number of lineal feet of each size of sanitary sewer laid. No deduction will be made from the lineal footage of pipe for the space occupied by manholes. Sewers will be classified for payment according to depth of cut as set forth in the Proposal. All

sanitary sewers shall be paid for at the unit price for "Sanitary Sewer" of the appropriate size and depth.

Additional costs required for the installation of "road bores", "bore and encasement", and "aerial crossings" shall be included in their respective bid items as set forth in the Proposal, and shall include cast or ductile iron pipe as required and set forth in the Plans for these items.

No additional payment shall be made for special bedding or changes in pipe wall thickness for depths greater than 12 feet or for cast iron or ductile iron pipe as may be required at locations set forth in the Plans and Specifications. All such items as herein stipulated shall be considered subsidiary to the price bid for "Sanitary Sewer." 85% of the unit price shall be paid for installed pipe. The remainder upon approved site restoration.

B. Jack and Bore Sewer Main: Item shall consist of furnishing all tools, equipment, materials, labor and appurtenances necessary to bore sanitary sewer main on grade. Measurement and payment of this item shall be based on linear foot basis from face of bore pit to face of bore come out pit as shown in the Proposal.

C. Remove Existing Manholes: Item shall consist of furnishing all tools, equipment, backfill, materials including disposal of removed items per plans necessary to remove existing manholes at locations shown on the plans. Cost for surface improvements such as asphalt or concrete repair shall be included in this item. Measurement and payment of this item shall be based on contract unit price per manhole removed.

D. Connection to Existing Manhole: Item shall include furnishing all tools, equipment, materials, and labor to connect a proposed sewer main to an existing manhole in accordance with the plans and specifications. Measurement and payment of this item shall be based on contract unit price per connection as shown in the Proposal.

E. Manholes and Clean Outs: Item shall consist of furnishing all tools, equipment, materials, and labor to construct Standard 4' dia. Concrete Manholes and Clean-Outs in accordance with the plans and specifications. Measurement and payment of this item shall be based on contract unit price per manhole and clean-outs as shown in the Proposal.

F. Existing Sanitary Sewer Services: Item shall consist of furnishing all tools, equipment, materials, and labor to connect existing sewer services to the proposed sewer main in accordance with the plans and specifications. Measurement and payment of this item shall be based on contract unit price per connection as shown in the Proposal.

CITY OF MCGEHEE, ARKANSAS
WASTEWATER COLLECTION IMPROVEMENTS
MCG-02-26

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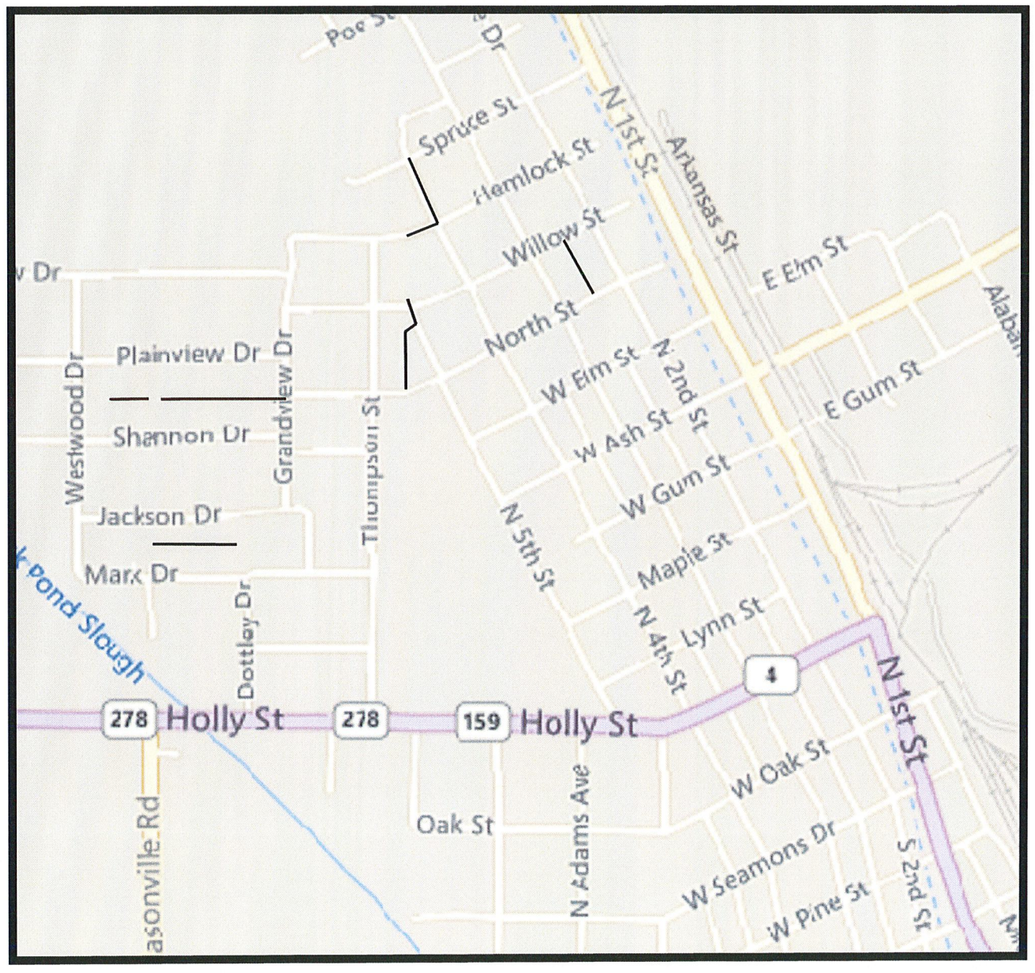

901 HOLLY ST.
MCGEHEE, ARKANSAS 71654
PH: 870–222–3160

APPROVED BY:
CITY OF MCGEHEE, ARKANSAS

CALL BEFORE YOU DIG 1-800-482-8998 ARKANSAS ONE-CALL SYSTEM

BEFORE CONSTRUCTION BEGINS
GIVE 48 HOURS NOTICE
FOR UNDERGROUND UTILITY LOCATIONS
CALL: THE ARKANSAS ONE-CALL SYSTEM 1-800-482-8998

SUBMITTED BY:

A.L. FRANKS ENGINEERING

CERTIFICATE OF AUTHORIZATION
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STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CODY J. STRINGER
7/20/26

CODY J. STRINGER,P.E. PROJECT ENGINEER — 3/20/2026 DATE

KIRON S. BROWNING,P.E. PROJECT ENGINEER — 3-20-26 DATE

GRAVITY SEWER CONSTRUCTION NOTES

1) SEWER MAINS SHALL BE CONSTRUCTED UTILIZING A LAZER WITH GRADE ESTABLISHED THROUGH SEWER PIPE.

2) CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE TO EXISTING STRUCTURES, PIPING, CONDUIT ETC.. RESULTING FROM CONSTRUCTION WHETHER SHOWN ON THESE DRAWINGS OR NOT.

3) CONTRACTOR SHALL PERFORM FINISH GRADING, AND TOP SOILING AND ESTABLISH GRASS IN ALL DISTURBED AREAS PER PLANS AND SPECIFICATIONS

4) ALL PROPOSED SEWER MAIN LINES AND MANHOLES TO BE TESTED PER SPECIFICATIONS.

5) SEWER MAIN LINES SHALL MAINTAIN A 10' SEPARATION WHEN PARALLELING A WATER LINE. WHEN CROSSING A WATER LINE THE SEWER MAIN SHALL BE 18" BELOW THE WATER LINE AND SHALL CROSS SAID WATER LINE WITH A FULL JOINT OF PIPE CENTERED UNDER THE WATER LINE. IF 18" SEPERATION IS IMPOSSIBLE THE SEWER MAIN SHALL BE ENCASED IN WATER TIGHT STEEL ENCASEMENT.

6) CONTRACTOR SHALL HAVE UTILITIES LOCATED AND SHALL BE RESPONSIBLE FOR DAMAGE TO ALL UTILITIES ARISING FROM CONTRACTOR'S WORK, REGARDLESS OF BEING SHOWN OR OMITTED FROM THESE DRAWINGS. SHOWN UTILITIES ARE INDICATED IN APPROX. LOCATIONS ONLY.

7) ALL DEBRIS SHALL BE DISPOSED OF AT THE CONTRACTOR'S EXPENSE. BURNING OR BURYING DEBRIS ON SITE IS PROHIBITED UNLESS APPROVED BY THE ENGINEER.

8) ACCESS TO PRIVATE EASEMENTS SHALL BE THE CONTRACTOR'S RESPONSIBILITY. PROPERTY OWNERS SHALL BE NOTIFIED 24-HOURS PRIOR TO ENTRY. ANY DAMAGE TO PRIVATE PROPERTY SHALL BE REPLACED TO THE PROPERTY OWNER'S APPROVAL AT THE CONTRACTOR'S EXPENSE.

9) CONTRACTOR SHALL EXPOSE EXISTING UTILITIES IN ADVANCE OF CONSTRUCTION. GRADE ADJUSTMENTS SHALL BE MADE BY THE ENGINEER. COSTS ASSOCIATED w/ NOT EXPOSING EXISTING UTILITIES TO ALLOW GRADE ADJUSTMENT SHALL BE BORNE BY CONTRACTOR.

10) SEWER MAIN SHALL BE SDR-26 HEAVYWALL PVC PIPE UNLESS OTHERWISE NOTED ON THE PLANS.

11) WHEN TIE-INS TO EXISTING MANHOLES ARE TO BE MADE, CONTRACTOR SHALL VERIFY MANHOLE FLOW LINE AT AN INTERVAL PRIOR TO MANHOLE TO ENSURE ADEQUATE DEPTH OF NEW SEWER MAIN.

12) CONTRACTOR SHALL CONCRETE ENCASE ANY SEWER MAIN LINES LESS THAN 24" BELOW EXISTING GROUND.

ARKANSAS HEALTH DEPARTMENT NOTES

1. THIS PROJECT SHALL CONFORM TO THE FOLLOWING:
   - A) "RECOMMENDED STANDARDS FOR WATER AND WASTEWATER FACILITIES" (TEN STATES STANDARDS).
   - B) ARKANSAS STATE LICENSING LAW FOR COMMERCIAL CONTRACTORS ACT 150 OF 1965 AND ACT 162 OF 1987 (AS AMENDED) REQUIRES THE INSTALLATION CONTRACTOR TO HAVE A CONTRACTORS LICENSES CLASSIFICATION OF MUNICIPAL AND UTILITY CONSTRUCTION.
   - C) ARKANSAS BOARD OF HEALTH "RULES AND REGULATIONS PERTAINING TO PUBLIC WATER SYSTEMS"
   - D) ALL APPLICABLE AWWA (AMERICAN WATER WORKS ASSOCIATION) SPECIFICATIONS INCLUDING:
     - a) AWWA C600-10 STANDARDS FOR INSTALLATION OF DUCTILE WATER MAIN AND THEIR APPURTENANCES.
     - b) AWWA C605-05 STANDARD FOR UNDERGROUND INSTALLATION OF POLYVINYL CHLORIDE (PVC) PRESSURE PIPE AND FITTINGS FOR WATER.
     - c) AWWA C651-05 STANDARDS FOR DISINFECTING WATER MAINS.
     - d) AWWA C900 & C905 STANDARD FOR PVC PRESSURE PIPE FOR WATER DISTRIBUTION.
     - e) AWWA C651-05 STANDARDS FOR DISINFECTING WATER MAINS REQUIRE BACTI SAMPLING ON DISTRIBUTION SYSTEM EVERY 1200 FEET. HOWEVER, THE ARKANSAS DEPT. OF HEALTH, DIVISION OF ENGINEERING WILL ALLOW BACTI SAMPLING EVERY 2600 FEET ON MAINS AND BRANCH LINES AT THE END OF EVERY BRANCH LINE.
     - f) AWWA C605 SECTION 10.3 STANDARDS FOR HYDROSTATIC TESTING.
2. AWWA C651-05, APPENDIX C (CHLORINE NEUTRALIZATION) WILL BE COMPLIED WITH. " DRAINAGE OF MAINS AND DISPOSAL OF CHLORINATED WATER SHALL BE IN ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL LAWS, ORDINANCES AND REGULATIONS. MAINS SHALL BE DRAINED TO SANITARY SEWERS, WHERE AVAILABLE. DRAINAGE DIRECTLY TO SURFACE WATERS (CREEKS, RIVERS, STREAMS, LAKES, PONDS, ECT.) WILL NOT BE ALLOWED. DRAINAGE BRANCHES, BLOW-OFF'S, AIR VENTS AND APPURTENANCES SHALL BE PROVIDED WITH VALVES AND SHALL BE LOCATED AND INSTALLED AS SHOWN ON THE PLANS AND STANDARD DETAILS. DRAINAGE OF MAINS WILL BE ACCOMPLISHED IN SUCH A MANNER AS TO MINIMIZE EROSION AND SILTATION TO ADJOINING PROPERTIES. WATER VELOCITY FROM DRAINAGE AND OR BLOW-OFF WILL BE DISSIPATED AS NECESSARY TO PREVENT EROSION. DRAINAGE BRANCHES OR BLOW-OFFS SHALL BE NOT BE CONNECTED TO ANY SEWER, SUBMERGED IN ANY STREAMS, OR INSTALLED IN ANY OTHER MANNER THAT WILL PERMIT BACK SIPHONAGE INTO THE DISTRIBUTION SYSTEM.

Date	Revision	By

Designed _____
Checked _____
Drawn _____
Approved _____

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CITY OF MCGEHEE, AR
WASTEWATER COLLECTION IMPROVEMENTS

GENERAL NOTES

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CARL L. STRUNK

Job No.: MCG-02-26
Scale: N/A
Date: FEB 2026
Sheet 2 OF 12

Date	Revision	By

Designed _____
Checked _____
Drawn _____
Approved _____

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CITY OF MCGEHEE, AR
WASTEWATER COLLECTION IMPROVEMENTS

SHEET INDEX MAP

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CODY L. STRONG

Job No.: MCG-02-25
Scale: 1"=300'
Date: FEB 2026

Date	Revision	By

Designed _____
Checked _____
Drawn _____
Approved _____

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CITY OF MCGEHEE, AR
WASTEWATER COLLECTION IMPROVEMENTS

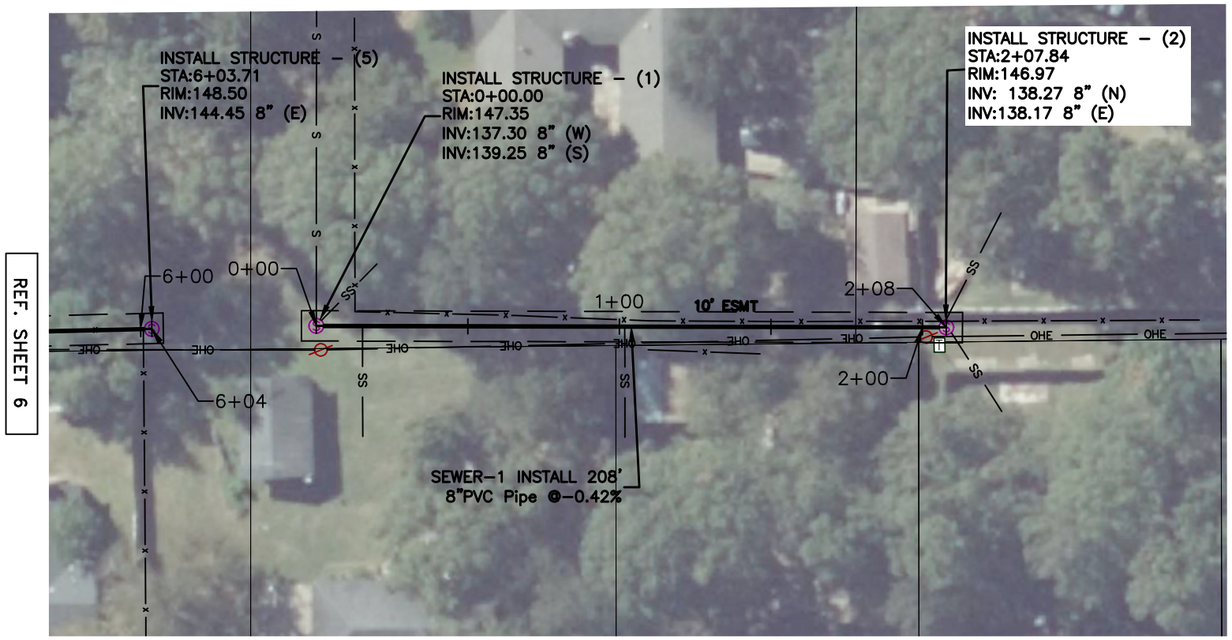
MANHOLE INDEX MAP

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
SCOTT A. STRUNK

Job No.: MCG-02-25
Scale: 1"=300'
Date: FEB 2026
Sheet 4 OF 12

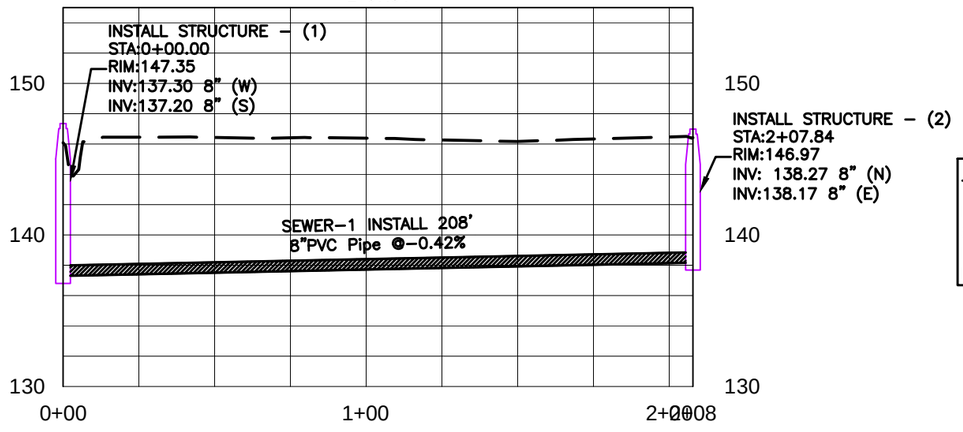
NOTE:

CONTRACTOR IS RESPONSIBLE FOR CLEARING & GRUBBING, FENCE REMOVAL AND REPLACING, AND ALL OTHER SITE PREPARATION AND RESTORATION OF THE RIGHT OF WAY REQUIRED FOR NEW SEWER INSTALLATION.



REF. SHEET 6

SEWER-1 PROFILE
0+00.00 to
2+07.84



NOTE:

EXISTING SSMH FLOODED. STRUCTURE-2 INVERTS ARE FOR REFERENCE ONLY. FIELD VERIFY INVERT DEPTHS

SEWER SERVICE CONNECTION AND INSTALLATION.

ALL EXISTING SEWER SERVICES CONNECT TO NEW SEWER PIPE. LOCATION WILL NEED TO BE FIELD VERIFIED AND INSTALLED ON INFIELD CONDITIONS. LOCATIONS ON PLAN ARE FOR REFERENCE ONLY.

- CLEANOUT
- POWER POLE
- –FO– FIBER OPTIC CABLE
- GAS METER
- –GL– GAS LINE
- – S – SANITARY SEWER
- SANITARY SEWER MANHOLE
- WATER METER
- WATER VALVE
- FIRE HYDRANT
- –SS– SEWER SERVICE
- –X– FENCE

Date	Revision	By

Designed
Checked
Drawn
Approved

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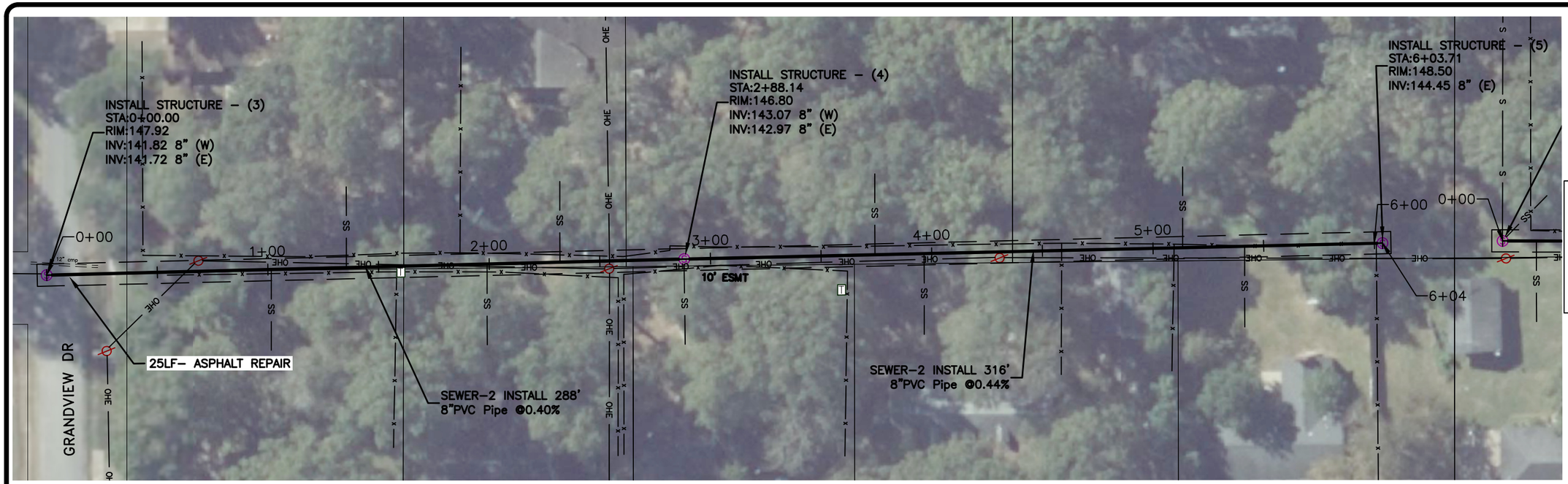
CITY OF MCGEHEE, AR
WASTEWATER COLLECTION
IMPROVEMENTS

SEWER MAIN PLAN & PROFILE
SEWER–1
0+00 TO 2+08

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CODY L. STEWART

Job No.: MCG–02–26
Scale: 1"=50
Date: FEB 2025
Sheet 5 OF 12



SEWER SERVICE CONNECTION AND INSTALLATION.

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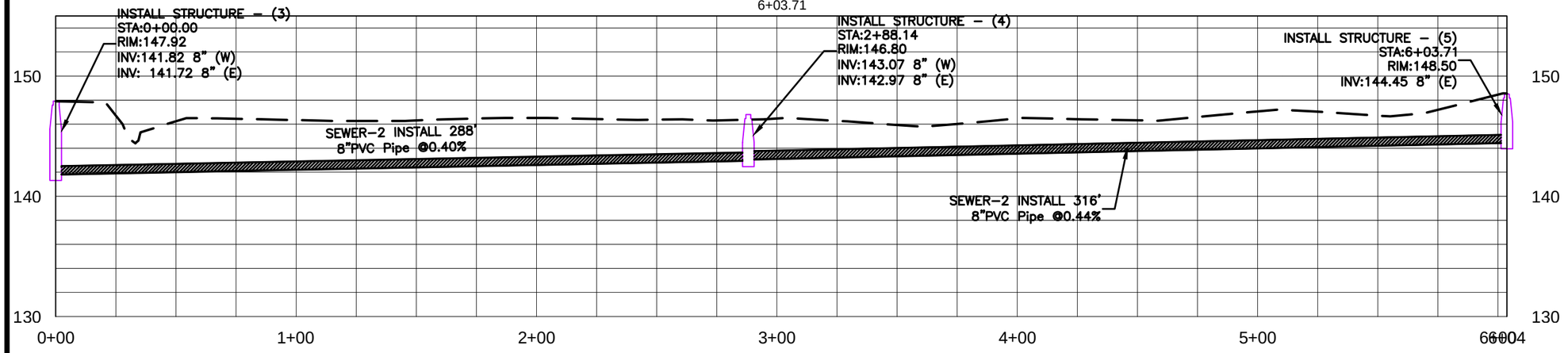
- WATER METER
- WATER VALVE
- FIRE HYDRANT
- –SS– SEWER SERVICE
- – X – FENCE

SEWER-2 PROFILE
0+00.00 to
6+03.71



NOTE:

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Date	Revision	By

Designed
Checked
Drawn
Approved

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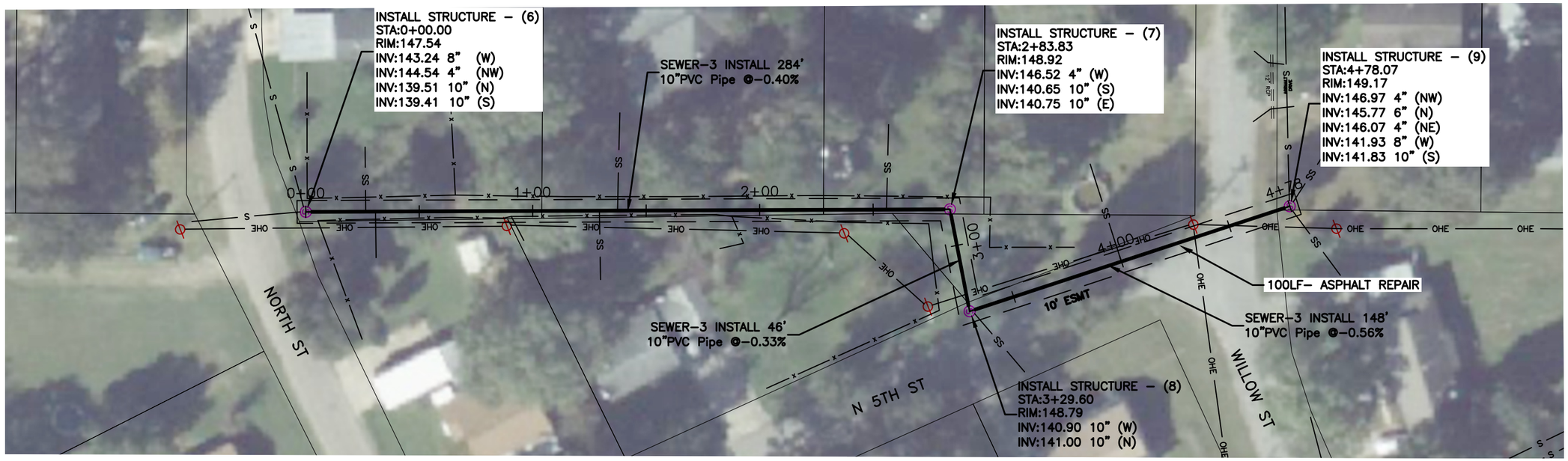
CITY OF MCGEHEE, AR
WASTEWATER COLLECTION IMPROVEMENTS

SEWER MAIN PLAN & PROFILE
SEWER–2
0+00 TO 6+04

STATE OF ARKANSAS LICENSED PROFESSIONAL ENGINEER No. 21958 CODY L. STEWART

Job No.: MCG–02–26
Scale: 1"=50
Date: FEB 2025
Sheet 6 OF 12



SEWER SERVICE CONNECTION AND INSTALLATION.

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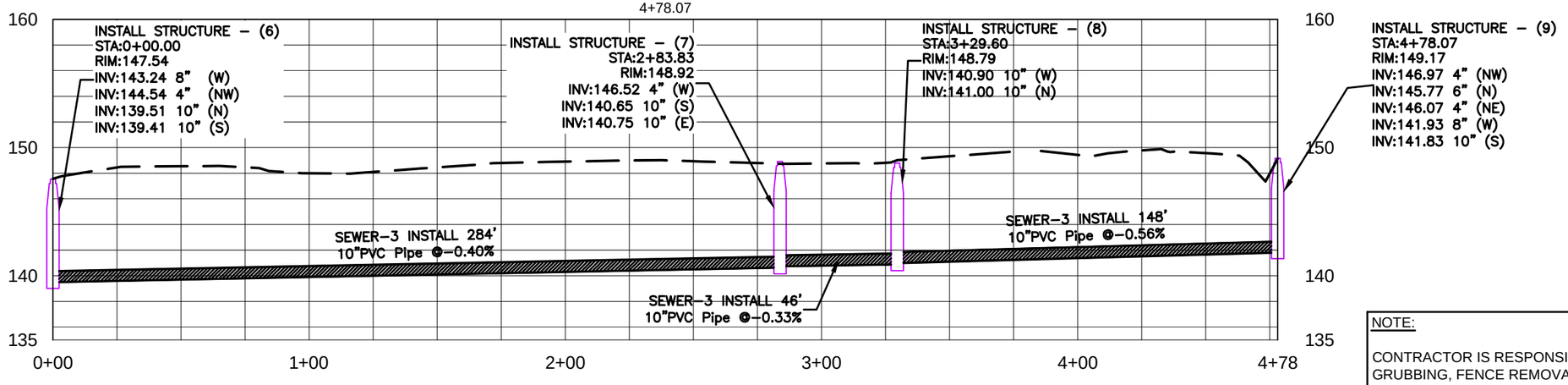
- WATER VALVE
- FIRE HYDRANT
- –SS– SEWER SERVICE
- –X– FENCE

SEWER-3 PROFILE
0+00.00 to
4+78.07



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Date	Revision	By

Designed
Checked
Drawn
Approved

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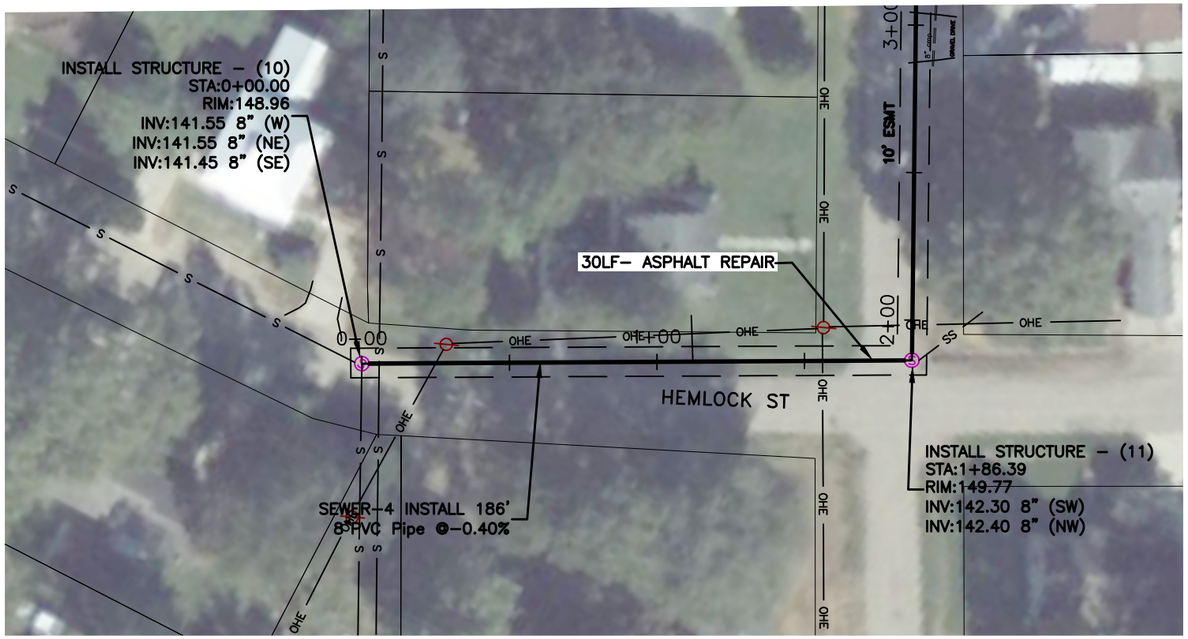
CITY OF MCGEHEE, AR
WASTEWATER COLLECTION IMPROVEMENTS

SEWER MAIN PLAN & PROFILE
SEWER–3
0+00 TO 4+78

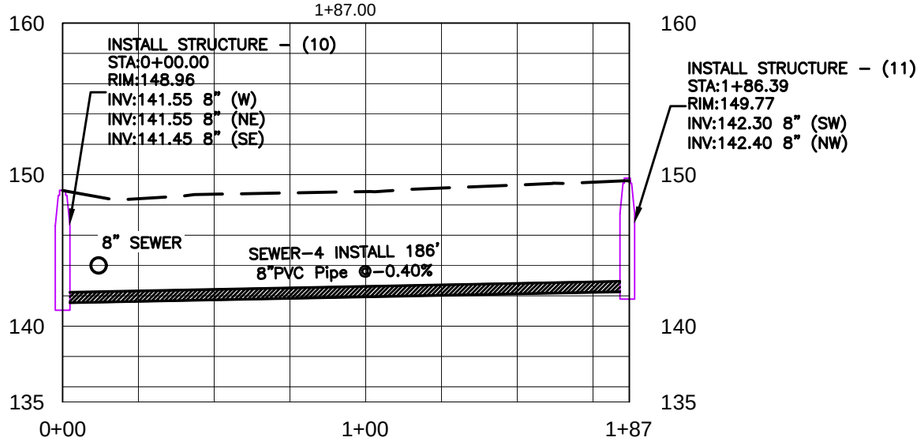
STATE OF ARKANSAS LICENSED PROFESSIONAL ENGINEER No. 21958 CODY L. STINNETT

Job No.:	MCG–02–26
Scale:	1"=50
Date:	FEB 2026
Sheet	7 OF 12

REF. SHEET 9



SEWER-4 PROFILE
0+00.00 to
1+87.00



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SEWER SERVICE CONNECTION AND INSTALLATION.

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- SANITARY SEWER MANHOLE
- WATER METER
- WV WATER VALVE
- FIRE HYDRANT
- –SS– SEWER SERVICE
- –X– FENCE

Date	Revision	By

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Checked _____
Drawn _____
Approved _____

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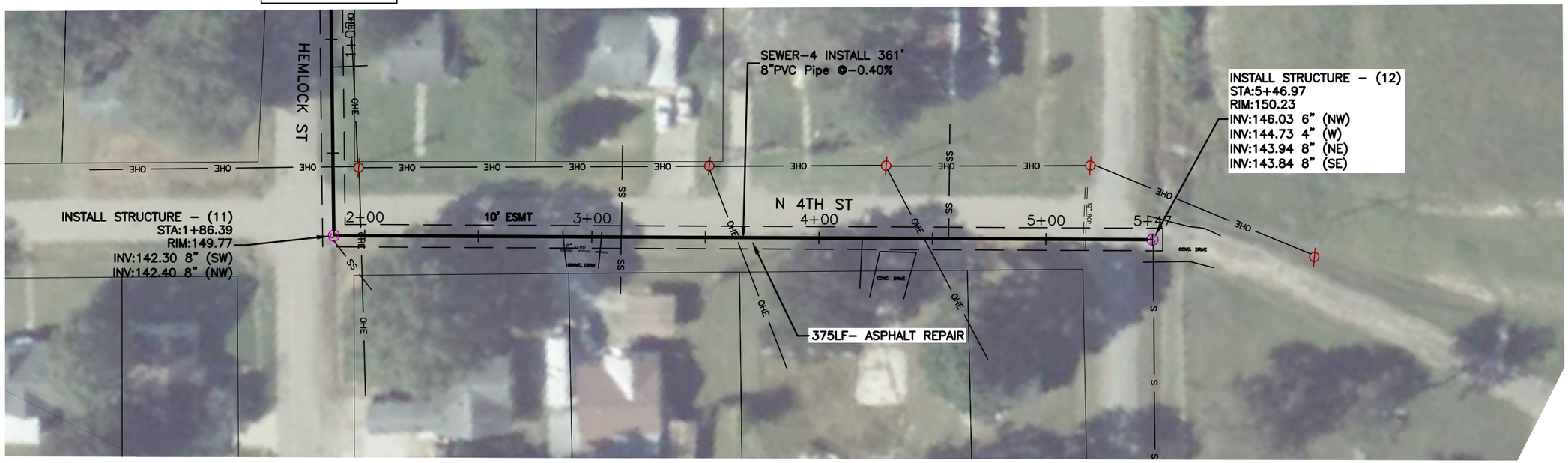
CITY OF MCGEHEE, AR
WASTEWATER COLLECTION
IMPROVEMENTS

SEWER MAIN PLAN & PROFILE
SEWER–4
0+00 TO 1+87

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CODY J. STRONG

Job No.: MCG–02–26
Scale: 1"=50
Date: FEB 2025
Sheet 8 OF 12

REF. SHEET 8



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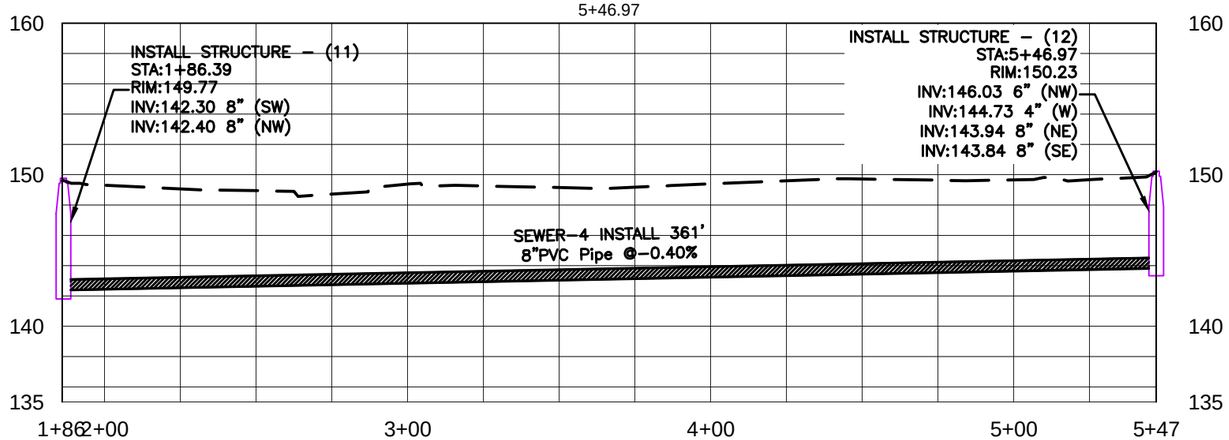
SEWER-4 PROFILE
1+86.00 to
5+46.97



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Designed
Checked
Drawn
Approved

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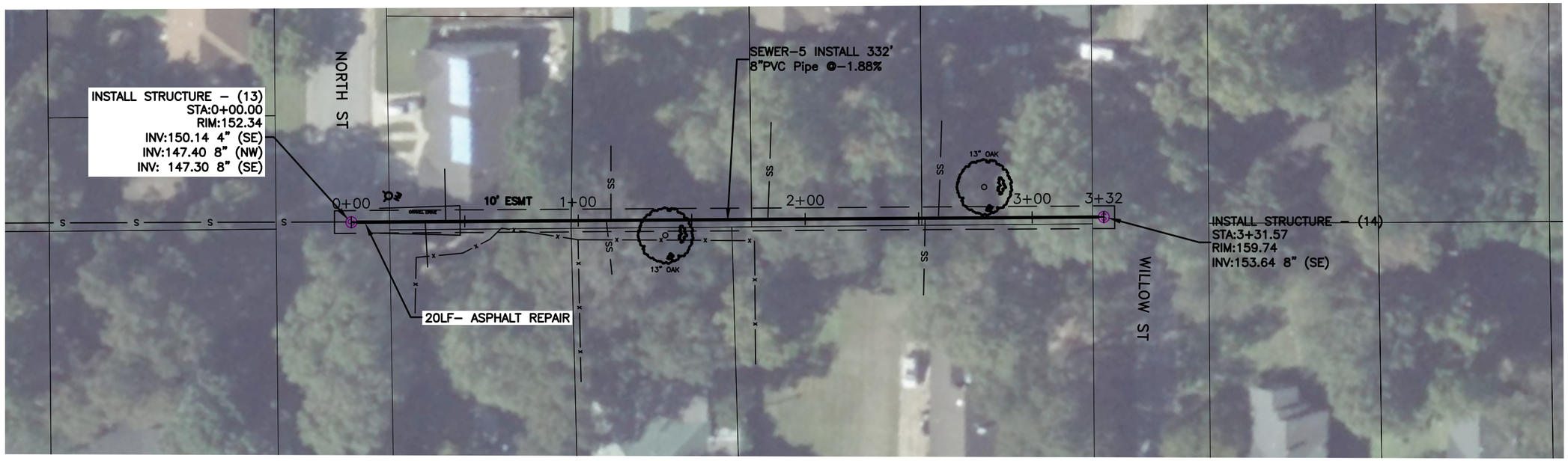
CITY OF MCGEHEE, AR
WASTEWATER COLLECTION IMPROVEMENTS

SEWER MAIN PLAN & PROFILE
SEWER–3
1+87 TO 5+47

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CHAD J. STROUD

Job No.: MCG–02–26
Scale: 1"=50
Date: FEB 2026
Sheet 9 OF 12



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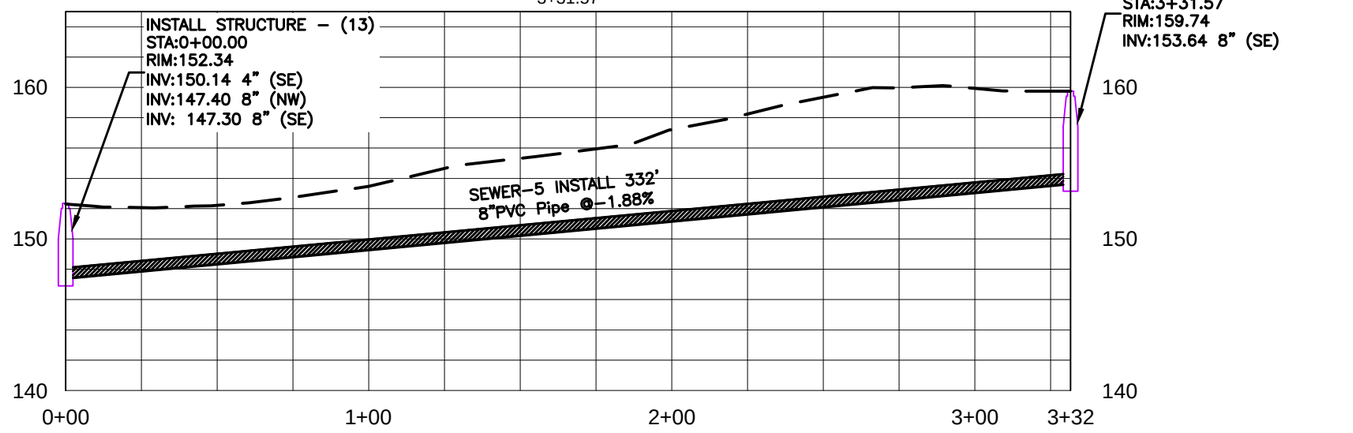
- –X– FENCE

SEWER-5 PROFILE
0+00.00 to
3+31.57



NOTE:

EXISTING SSMH FLOODED. STRUCTURE-14 INVERTS ARE FOR REFERENCE ONLY. FIELD VERIFY INVERT DEPTHS

NOTE:

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Date	Revision	By

Designed
Checked
Drawn
Approved

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CITY OF MCGEHEE, AR
WASTEWATER COLLECTION IMPROVEMENTS

SEWER MAIN PLAN & PROFILE
SEWER–5
0+00 TO 3+32

STATE OF ARKANSAS LICENSED PROFESSIONAL ENGINEER No. 21958 CODY L. STEWART

Job No.: MCG–02–26
Scale: 1"=50
Date: FEB 2026
Sheet 10 OF 12

SEWER SERVICE CONNECTION AND INSTALLATION.

ALL EXISTING SEWER SERVICES CONNECT TO NEW SEWER PIPE. LOCATION WILL NEED TO BE FIELD VERIFIED AND INSTALLED ON INFIELD CONDITIONS. LOCATIONS ON PLAN ARE FOR REFERENCE ONLY.

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- WATER METER
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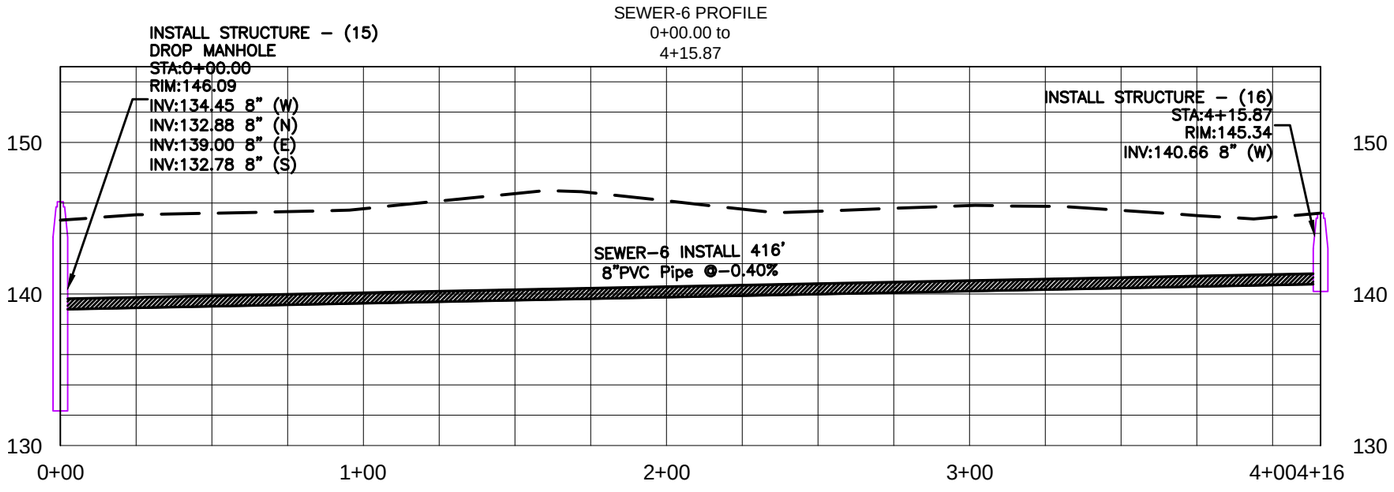
- FIRE HYDRANT
- –SS– SEWER SERVICE
- –X– FENCE

SEWER-6 PROFILE
0+00.00 to
4+15.87



NOTE:

EXISTING SSMH FLOODED. STRUCTURE-16 INVERTS ARE FOR REFERENCE ONLY. FIELD VERIFY INVERT DEPTHS

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Date	Revision	By

Designed
Checked
Drawn
Approved

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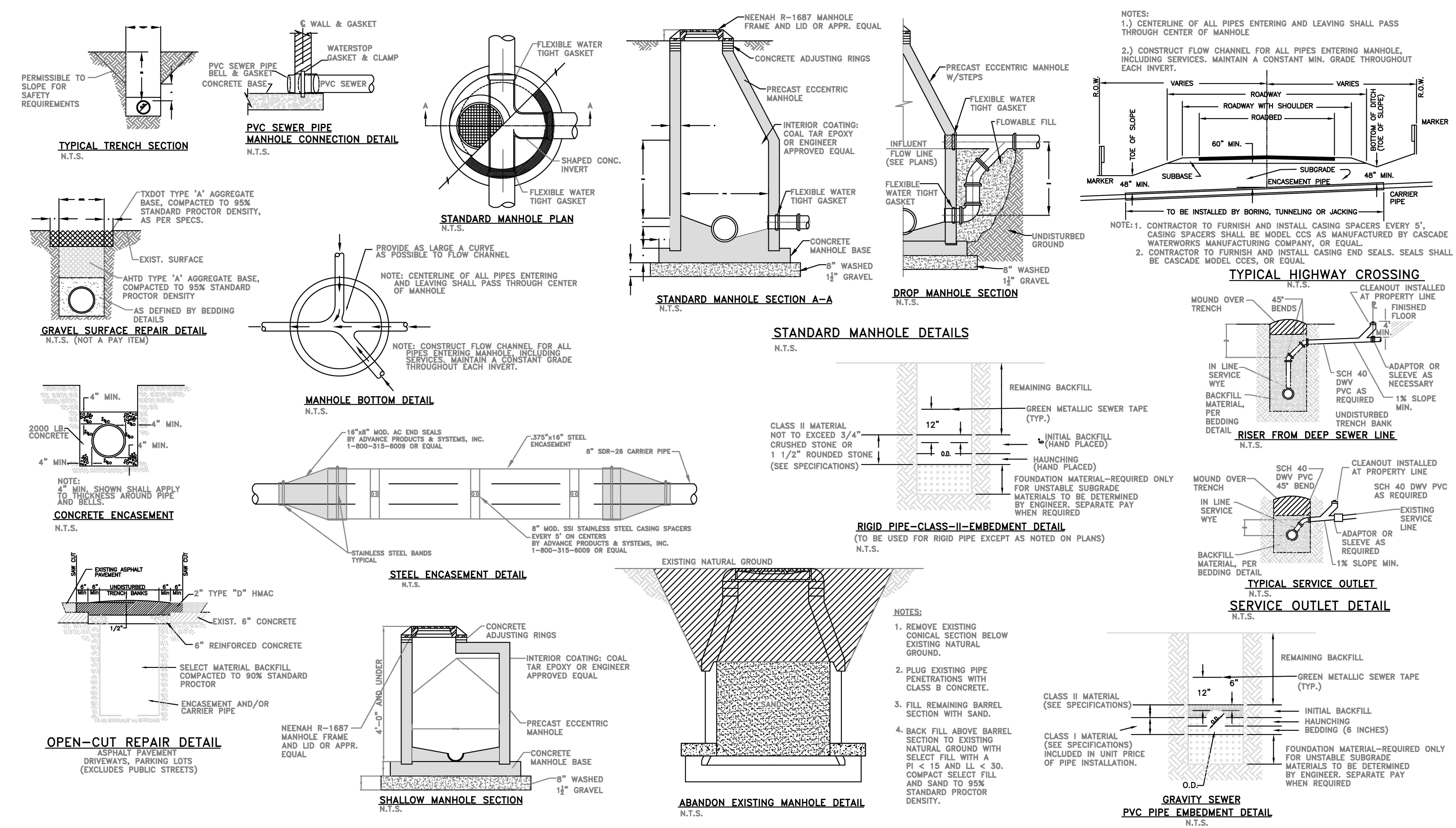
CITY OF MCGEHEE, AR
WASTEWATER COLLECTION IMPROVEMENTS

SEWER MAIN PLAN & PROFILE
SEWER-6
0+00 TO 4+16

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No. 21958
CODY J. STRICKLAND

Job No.: MCG-02-26
Scale: 1"=50
Date: FEB 2026



PERMISSIBLE TO SLOPE FOR SAFETY REQUIREMENTS
TYPICAL TRENCH SECTION
N.T.S.
℄ WALL & GASKET
WATERSTOP GASKET & CLAMP
PVC SEWER PIPE BELL & GASKET
CONCRETE BASE
PVC SEWER
PVC SEWER PIPE MANHOLE CONNECTION DETAIL
N.T.S.
FLEXIBLE WATER TIGHT GASKET
SHAPED CONC. INVERT
FLEXIBLE WATER TIGHT GASKET
STANDARD MANHOLE PLAN
N.T.S.
NEENAH R-1687 MANHOLE FRAME AND LID OR APPR. EQUAL
CONCRETE ADJUSTING RINGS
PRECAST ECCENTRIC MANHOLE
INTERIOR COATING: COAL TAR EPOXY OR ENGINEER APPROVED EQUAL
FLEXIBLE WATER TIGHT GASKET
CONCRETE MANHOLE BASE
8" WASHED 1½" GRAVEL
STANDARD MANHOLE SECTION A-A
N.T.S.
PRECAST ECCENTRIC MANHOLE W/STEPS
FLEXIBLE WATER TIGHT GASKET
FLOWABLE FILL
INFLUENT FLOW LINE (SEE PLANS)
FLEXIBLE WATER TIGHT GASKET
UNDISTURBED GROUND
8" WASHED 1½" GRAVEL
DROP MANHOLE SECTION
N.T.S.
NOTES:
1.) CENTERLINE OF ALL PIPES ENTERING AND LEAVING SHALL PASS THROUGH CENTER OF MANHOLE
2.) CONSTRUCT FLOW CHANNEL FOR ALL PIPES ENTERING MANHOLE, INCLUDING SERVICES. MAINTAIN A CONSTANT MIN. GRADE THROUGHOUT EACH INVERT.
R.O.W.
VARIES
ROADWAY
ROADWAY WITH SHOULDER
ROADBED
60" MIN.
TOE OF SLOPE
BOTTOM OF DITCH (TOE OF SLOPE)
MARKER
SUBBASE
SUBGRADE
ENCASEMENT PIPE
48" MIN.
CARRIER PIPE
TO BE INSTALLED BY BORING, TUNNELING OR JACKING
NOTE: 1. CONTRACTOR TO FURNISH AND INSTALL CASING SPACERS EVERY 5', CASING SPACERS SHALL BE MODEL CCS AS MANUFACTURED BY CASCADE WATERWORKS MANUFACTURING COMPANY, OR EQUAL.
2. CONTRACTOR TO FURNISH AND INSTALL CASING END SEALS. SEALS SHALL BE CASCADE MODEL CCES, OR EQUAL
TYPICAL HIGHWAY CROSSING
N.T.S.
TXDOT TYPE 'A' AGGREGATE BASE, COMPACTED TO 95% STANDARD PROCTOR DENSITY, AS PER SPECS.
EXIST. SURFACE
AHTD TYPE 'A' AGGREGATE BASE, COMPACTED TO 95% STANDARD PROCTOR DENSITY
AS DEFINED BY BEDDING DETAILS
GRAVEL SURFACE REPAIR DETAIL
N.T.S. (NOT A PAY ITEM)
PROVIDE AS LARGE A CURVE AS POSSIBLE TO FLOW CHANNEL
NOTE: CENTERLINE OF ALL PIPES ENTERING AND LEAVING SHALL PASS THROUGH CENTER OF MANHOLE
NOTE: CONSTRUCT FLOW CHANNEL FOR ALL PIPES ENTERING MANHOLE, INCLUDING SERVICES. MAINTAIN A CONSTANT GRADE THROUGHOUT EACH INVERT.
MANHOLE BOTTOM DETAIL
N.T.S.
STANDARD MANHOLE DETAILS
N.T.S.
MOUND OVER TRENCH
45° BENDS
CLEANOUT INSTALLED AT PROPERTY LINE
FINISHED FLOOR
4' MIN.
IN LINE SERVICE WYE
BACKFILL MATERIAL, PER BEDDING DETAIL
SCH 40 DWV PVC AS REQUIRED
ADAPTOR OR SLEEVE AS NECESSARY
1% SLOPE MIN.
UNDISTURBED TRENCH BANK
RISER FROM DEEP SEWER LINE
N.T.S.
4" MIN.
2000 LB. CONCRETE
4" MIN.
4" MIN.
4" MIN.
NOTE: 4" MIN. SHOWN SHALL APPLY TO THICKNESS AROUND PIPE AND BELLS.
CONCRETE ENCASEMENT
N.T.S.
16"x8" MOD. AC END SEALS BY ADVANCE PRODUCTS & SYSTEMS, INC. 1-800-315-6009 OR EQUAL
.375"x16" STEEL ENCASEMENT
8" SDR-26 CARRIER PIPE
8" MOD. SSI STAINLESS STEEL CASING SPACERS EVERY 5' ON CENTERS BY ADVANCE PRODUCTS & SYSTEMS, INC. 1-800-315-6009 OR EQUAL
STAINLESS STEEL BANDS TYPICAL
STEEL ENCASEMENT DETAIL
N.T.S.
REMAINING BACKFILL
GREEN METALLIC SEWER TAPE (TYP.)
CLASS II MATERIAL NOT TO EXCEED 3/4" CRUSHED STONE OR 1 1/2" ROUNDED STONE (SEE SPECIFICATIONS)
12"
6"
O.D.
INITIAL BACKFILL (HAND PLACED)
HAUNCHING (HAND PLACED)
FOUNDATION MATERIAL-REQUIRED ONLY FOR UNSTABLE SUBGRADE MATERIALS TO BE DETERMINED BY ENGINEER. SEPARATE PAY WHEN REQUIRED
RIGID PIPE-CLASS-II-EMBEDMENT DETAIL
(TO BE USED FOR RIGID PIPE EXCEPT AS NOTED ON PLANS)
N.T.S.
MOUND OVER TRENCH
SCH 40 DWV PVC 45° BEND
CLEANOUT INSTALLED AT PROPERTY LINE
SCH 40 DWV PVC AS REQUIRED
IN LINE SERVICE WYE
EXISTING SERVICE LINE
ADAPTOR OR SLEEVE AS REQUIRED
BACKFILL MATERIAL, PER BEDDING DETAIL
1% SLOPE MIN.
TYPICAL SERVICE OUTLET
N.T.S.
SERVICE OUTLET DETAIL
N.T.S.
SAW CUT
EXISTING ASPHALT PAVEMENT
6" MIN
6" MIN
UNDISTURBED TRENCH BANKS
2" TYPE "D" HMAC
EXIST. 6" CONCRETE
1/2"
6" REINFORCED CONCRETE
SELECT MATERIAL BACKFILL COMPACTED TO 90% STANDARD PROCTOR
ENCASEMENT AND/OR CARRIER PIPE
OPEN-CUT REPAIR DETAIL
ASPHALT PAVEMENT DRIVEWAYS, PARKING LOTS (EXCLUDES PUBLIC STREETS)
CONCRETE ADJUSTING RINGS
INTERIOR COATING: COAL TAR EPOXY OR ENGINEER APPROVED EQUAL
4'-0" AND UNDER
NEENAH R-1687 MANHOLE FRAME AND LID OR APPR. EQUAL
PRECAST ECCENTRIC MANHOLE
CONCRETE MANHOLE BASE
8" WASHED 1½" GRAVEL
SHALLOW MANHOLE SECTION
N.T.S.
EXISTING NATURAL GROUND
SAND
ABANDON EXISTING MANHOLE DETAIL
N.T.S.
NOTES:
1. REMOVE EXISTING CONICAL SECTION BELOW EXISTING NATURAL GROUND.
2. PLUG EXISTING PIPE PENETRATIONS WITH CLASS B CONCRETE.
3. FILL REMAINING BARREL SECTION WITH SAND.
4. BACK FILL ABOVE BARREL SECTION TO EXISTING NATURAL GROUND WITH SELECT FILL WITH A PI < 15 AND LL < 30. COMPACT SELECT FILL AND SAND TO 95% STANDARD PROCTOR DENSITY.
REMAINING BACKFILL
GREEN METALLIC SEWER TAPE (TYP.)
CLASS II MATERIAL (SEE SPECIFICATIONS)
12"
6"
O.D.
INITIAL BACKFILL
HAUNCHING
BEDDING (6 INCHES)
CLASS I MATERIAL (SEE SPECIFICATIONS) INCLUDED IN UNIT PRICE OF PIPE INSTALLATION.
FOUNDATION MATERIAL-REQUIRED ONLY FOR UNSTABLE SUBGRADE MATERIALS TO BE DETERMINED BY ENGINEER. SEPARATE PAY WHEN REQUIRED
GRAVITY SEWER PVC PIPE EMBEDMENT DETAIL
N.T.S.

Date	Revision	By

Designed
Checked
Drawn
Approved

A.L. FRANKS ENGINEERING

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CITY OF MCGEHEE, AR
WASTEWATER COLLECTION IMPROVEMENTS

DETAILS

STATE OF ARKANSAS LICENSED PROFESSIONAL ENGINEER No. 21958

Job No.: MCG-02-26
Scale: N/A
Date: FEB 2026
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