PROJECT MANUAL
TECHNICAL SPECIFICATIONS
VALLEY AND OWENS DRAINAGE IMPROVEMENTS
CITY OF JONESBORO, ARKANSAS
BID # 2007:38
FEBRUARY 2007

Prepared By:

NRS
CONSULTING ENGINEERS

1220 Stone Street
Jonesboro, Arkansas 72401

(870) 972-5316
FAX (870) 932-0432

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ADVERTISEMENT FOR BIDS

BID # 2007:38

Sealed bids addressed Ms. Tracey Cooper, Contract Coordinator, City of Jonesboro, will be received at P.O. Box 1845, 307 Vine St., Jonesboro, Arkansas 72403 until 2:00 P.M. (Local Time) on July 5, 2007, and then publicly opened and read for furnishing all labor, material, and equipment, and performing all work required to construct the Valley and Owens Drainage Improvements.

The project consists of excavation for the construction of two (2) earthen ponds, installation of outlet structures, and channel excavation.

Proposals shall be accompanied by a cashier's or certified check upon a national or state bank in an amount not less than five (5%) percent of the total maximum bid price payable without recourse to the CITY OF JONESBORO or a bid bond in the same amount from a reliable surety company, as a guarantee that the Bidder will enter into a contract an execute performance and payment bonds within ten (10) days after notice of award of Contract to him. The notice of award of Contract shall be given by the Owner within sixty (60) days following the opening of bids.

The successful Bidder must furnish a performance and payment bond upon the form provided in the amount of one hundred (100%) percent of the contract price from an approved surety company holding a permit from the State of Arkansas to act as surety, or other surety or sureties acceptable to the Owner.

The attention of bidders is called to the fact that Act 150 of 1965 (as amended), Arkansas Statutes, states that under certain conditions a Contractor must be licensed by the State Licensing Board for Contractors before he may undertake work in Arkansas. The Bidder shall comply with requirements of this Arkansas law.

Plans, specifications, proposal forms and other contract documents may be examined at the Engineering Department, 307 Vine St., Jonesboro, Arkansas 72401 and at the office of the Engineer, NRS Consulting Engineers. Bid Documents may be secured from NRS Consulting Engineers, 1220 Stone Street, Jonesboro, Arkansas (Phone – 870-972-5316) at a cost of $75.00 Dollars. No refunds will be made.

Proposals will be considered on the basis of cost, the bidder's financial responsibility, his equipment, and his past performance in completing similar work. The Owner reserves the right to reject any or all bids, to waive any informalities, and to accept the proposal deemed to be for their best interest.

The City of Jonesboro encourages participation of small, minority, and woman owned business enterprises in the procurement of goods, services, and construction, either as a general contractor or subcontractor. It is further requested that whenever possible, majority contractors who require sub-contractors seek qualified small, minority, and women owned businesses to partner with them.

INSTRUCTION TO BIDDERS

1. PREPARATION OF BID

Each bid must be submitted on the prescribed form (Proposal) and Unit Price Schedule. All blank spaces must be filled in legibly with ink. All blank spaces for bid prices on the Unit Price Schedule must be filled in with figures; the extended total for each item shall be entered. If the unit price and the extended total of any item are not in agreement, the unit price shall govern and the extended total be corrected to conform thereto. Erasures or other corrections on the Proposal form or Unit Price Schedule shall be initialed by the signer of the bid. All bids must be signed in ink by an individual authorized to bind the Bidder. All bids must be regular in every respect and no interlineations, excisions or special conditions shall be made or included in the Proposal by the Bidder.

There must be a bid on all items which may appear on the Unit Price Schedule. No bid will be considered which covers only a part of the work. A conditional bid will not be considered.

The bid form and Unit Price Schedule shall not be detached, but shall be submitted in the original binding as furnished by the Engineer. Submission must be at the place, and at or prior to the time specified in the Advertisement for Bids.

Each bid must be submitted in a sealed envelope clearly marked on the outside that it contains a bid for the Valley and Owens Drainage Improvements and with the hour and date of bid opening shown thereon. The name, address, and Arkansas Contractor's License Number of the Bidder shall appear in the upper left hand corner of the envelope. If forwarded by mail, the sealed envelope containing the bid must be enclosed in another envelope properly addressed as noted in the NOTICE TO CONTRACTORS.

A bid which obviously is unbalanced may be rejected.

2. INTERPRETATIONS AND ADDENDA

No oral interpretation will be made to any Bidder as to the meaning of the Contract Documents or any part thereof. Every request for such an interpretation shall be made in writing to NRS Consulting Engineers. Any inquiry received 48 hours prior to the opening of bids will be given consideration. Every interpretation made to a Bidder will be in the form of an Addendum to the contract Documents, and when issued, will be on file in the office of the Engineer at least twenty-four (24) hours before bids are opened. In addition, all Addenda will be mailed to each person holding Contract Documents, but it shall be the Bidder's responsibility to make inquiry as to the Addenda issued. All such Addenda shall become part of the Contract and all Bidders shall be bound by such Addenda, whether or not received by the Bidders.

3. INSPECTION OF SITE

Each Bidder shall visit the site of the proposed work and fully acquaint himself with the existing conditions there relating to construction and labor, and shall fully inform himself as to the facilities involved, and the difficulties and restrictions attending the performance of the Contract. The Bidder shall thoroughly examine and familiarize himself with the Plans, Technical Specifications, and other Contract Documents. The Contractor by the execution of the Contract shall not be relieved of any obligation under it due to his failure to receive or examine any form or legal instrument or to visit the site and acquaint himself with the conditions there existing. The Owner will be justified in rejecting any claim based on facts regarding which the contractor should have been on notice as a result thereof.

4. BID GUARANTY

The bids must be accompanied by a Bid Guaranty which shall not be less than five (5%) percent of the amount of the bid. At the option of the Bidder, the guaranty may be a certified check, or may be a bid bond (substantially in the form attached). No bid will be considered unless it is accompanied by the required guaranty. Certified check must be payable to the City of Jonesboro, Arkansas. Cash deposits will not be accepted. The Bid Guaranty shall insure the execution of the Contract and the furnishing of the surety bond or bonds by the successful Bidder, all as required by the Contract Documents.

Certified checks, or bid bonds, of unsuccessful Bidders, will be returned upon request as soon as feasible after the opening of the bids.

5. COLLUSION; SUBCONTRACTS

A Bidder submitting a Proposal to the Owner for the work contemplated by the Documents on which bidding is based shall not collude with any other person, firm, or corporation in regard to any bid submitted.

Before executing any subcontract, the successful Bidder shall submit the name of any proposed Subcontractor for prior approval of the Owner.

6. STATEMENT OF BIDDER'S QUALIFICATIONS

Each Bidder shall, upon request of the Owner, submit on the form furnished for that purpose (a copy of which is included in the Contract Documents), a statement of the Bidder's qualifications, his experience record in construction of work similar to that which here is involved, and his organization and equipment available for the work contemplated; and when specifically requested by the Owner, the Bidder shall provide a detailed financial statement. The Owner shall have the right to take such steps as it deems necessary to determine the ability of the Bidder to perform his obligations under the Contract, and the Bidder shall furnish the Owner all such information and data for this purpose as it may request. The right is reserved to reject any bid where an investigation of the available evidence or information does not satisfy the Owner that the Bidder is qualified to carry out properly the terms of the Contract.

7. BALANCED BIDS; VARIATIONS IN QUANTITIES

The lump sum price and unit price for each of the several items in the Proposal of each Bidder shall be balanced and shall include its pro rata share of overhead.

The Owner shall have the right to increase or decrease the extent of the work, to change the location or gradient, or the dimensions of any part of the work, provided that the contract time of the improvement is not increased or decreased in excess of twenty-five (25%) percent of the length as determined by the Contract, or that the quantities of work to be done or the materials to be furnished are not increased or decreased in money value in excess of twenty-five (25%) percent of the total as determined by the Contract. Such changes shall not be considered as a waiver of any conditions of the Contract nor invalidate any of the provisions thereof. The Contractor shall perform the work as increased or decreased within the qualifying limits named and no allowance will be made for anticipated profits or increases or decreases so incurred. Change in length or in money value, within the twenty-five (25%) percent limits set out, shall not be cause for adjustment of any lump sum or unit price. Changes in items of work covered by unit prices and/or lump sum prices, within the twenty-five (25%) percent limits set out, shall not be cause for adjustment of any other (non-involved) lump sum or unit price.

Increases or decreases in items of work, and the cost thereof, shall be done in accordance with the Section entitled, CHANGES IN THE WORK under GENERAL CONDITIONS.

8. TIME FOR RECEIVING BIDS

A bid received prior to the advertised time of opening will be kept securely, and will remain sealed until the time of opening. The officer whose duty it is to open them will decide when the specified time has arrived, and any bid received subsequent to that time will be returned unopened.

9. OPENING OF BIDS

At the time and place fixed for the opening of bids, the Owner first will cause the bid guarantees to be checked as stipulated above. The Owner then will cause the qualified bids to be opened and publicly read aloud, irrespective of any irregularities therein. Bidders and other persons properly interested may be present, in person or by representative.

10. WITHDRAWAL OF BIDS

Bids may be withdrawn on written request if the request is received prior to the time fixed for the opening of bids.

11. AWARD OF CONTRACT; REJECTION OF BIDS

The Contract will be awarded to the responsible Bidder submitting the lowest total bid complying with the conditions of the Notice to Contractors and other parts of these Contract Documents. The Bidder to whom the award is made will be notified at the earliest possible date.

The Owner, however, reserves the right to reject any or all bids and to waive any informality in bids received whenever such rejection or waiver is in its interests.

The Owner reserves the right to consider as unqualified to do the work any Bidder who does not habitually perform with his own forces the major portions of such work as is involved in construction of these improvements.

12. EXECUTION OF AGREEMENT; PERFORMANCE AND PAYMENT BOND

Subsequent to the award and within ten days after the prescribed forms are presented for signature, the successful Bidder shall execute and deliver to the Owner a Contract in the form included in the Contract Documents in such number of copies as the Owner may require.

Having satisfied all conditions of award as set forth elsewhere in these Documents, the successful Bidder shall, within the period specified above, furnish a surety bond in a penal sum not less than the amount of the Contract as awarded, as security for the faithful performance of the Contract, and for the payment of all persons, firms or corporations to whom the Contractor may become legally indebted for labor, materials, tools, equipment, or services of any nature, including utility and transportation services employed or used by him in performing the work. Such bond shall be as included in the Contract Documents and shall bear the same date as, or a date subsequent to, that of the Contract. The current power of attorney for the person who signs for any surety company shall be attached to such bond.

The failure of the successful Bidder to execute such Contract and to supply the required bond or bonds within ten (10) days after the prescribed forms are presented for signature, or within such extended period as the Owner may grant, based upon reasons determined insufficient by the Owner, shall constitute a default, and the Owner may either award the Contract to the next lowest responsible Bidder or readvertise for bids.

13. BONDS AND INSURANCE

Attention of Bidders is called to Act 82 of the 1935 Acts of the Arkansas General Assembly, which has certain requirements pertaining to performance bonds, labor bonds, employer's liability insurance, public liability insurance, workmen's collective insurance, and property damage insurance.

All companies furnishing bid bonds and performance bonds shall furnish evidence of being on the U.S. Treasury Department's most current list (Circular 570, as amended) and be authorized to transact business in the State of Arkansas.

14. LEGAL QUALIFICATIONS

All Bidders, in order to submit a bonafide Proposal, must comply with the terms of Act 150 of the 1965 Acts of the Arkansas General Assembly, as amended.

The successful Bidder, if a corporation created under the laws of a state other than the State of Arkansas, will be required to qualify, or to have qualified, with the Secretary of State of Arkansas to do business in the State of Arkansas.

15. MODIFICATION OF BID

No modification of any bid already submitted will be considered unless such modification is received prior to the time set for opening of bids.

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PROPOSAL

Place Jonesboro AR
Date 7-5-07

Proposal of Gillis Farms Inc,

a corporation organized and existing under the laws of the State of Arkansas.

or

Proposal of _____,

a partnership consisting of _____.

or

Proposal of _____,

an individual doing business as _____.

TO: City of Jonesboro

This bid results from your advertisement for bids for the construction of the Valley and Owens Drainage Improvements (BID # 2007:38).

The undersigned Bidder, having visited the site of the work, having examined the Plans, Specifications, and other Contract Documents including all Addenda, and being familiar with all of the conditions relating to the construction of the proposed project, hereby agrees to comply with all other conditions or requirements set forth in the Plans, Specifications, and other Contract Documents, and further proposes to furnish all material, supplies, equipment, and appliances specified for incorporation into the project and to furnish all labor, tools, equipment, and incidentals to complete the work in accordance with the Plans, Specifications, and other Contract Documents at and for the lump sum and unit prices proposed in the attached Unit Price Schedule. The attached Unit Price Schedule consists of pages numbered P-3 through P-9.

The undersigned Bidder agrees to begin work within ten (10) calendar days after the issuance by the Owner of a "Work Order" or "Notice to Proceed" and to complete the work within ~~Ninety (90)~~ One hundred twenty (120) 50 calendar days thereafter (except as modified in the GENERAL CONDITIONS of these Contract Documents). Should the work fail to be completed within the time herein stated, the Contractor shall pay to the Owner, as fixed and agreed liquidated damages, and not as a penalty, the sum, for each consecutive day of delay until the work is completed and accepted, as stipulated in the SPECIAL CONDITIONS of these Contract Documents. It is understood that additional time for the completion of the project is to be

allowed only for delays as stipulated in the GENERAL CONDITIONS of these Contract Documents.

Bidder acknowledges receipt of the following addendum (addenda):

Addendum no 1 Dated 6-26-07

Addendum no 2 Dated 7-2-07

The undersigned Bidder agrees that this bid shall be good and shall not be withdrawn for a period of sixty (60) calendar days after the opening thereof. If written notice of the acceptance of this Proposal is mailed, telegraphed, or delivered to the undersigned within sixty (60) days after the opening thereof, or at any time thereafter before this Proposal is withdrawn, the undersigned agrees to execute and deliver a Contract in the prescribed form, and furnish the required Performance and Payment Bond, within ten (10) days after the Contract is presented to him for signature.

It is understood by the undersigned Bidder that the Owner reserves the right to reject any or all bids.

Accompanying this Proposal as bid security is certified check/bid bond (Strike One) in the amount of _____ Dollars ($_____), being not less than five (5%) percent of the total of the bid. If the undersigned Bidder is the successful Bidder, but fails or refuses to execute the contract and furnish the required bond within the prescribed ten (10) days of the notification of award, then this bid security is to become the property of the Owner as liquidated damages for the delay and additional expense to the Owner caused by such failure or refusal.

Jackie Brien
(Witness)

1335 E. Parker
Jonesboro, AR 72404
(Address)

SEAL (If Bidder is a corporation)

Gillis Farms Inc
(Name of Bidder)

By _____

Jim Gillis, Pres.
(Print Name and Title)

1335 E. Parker
Jonesboro AR 72401
(Office Address of Bidder)

NOTES: Sign in ink. Do not detach.
Items must be bid upon as specified
In the Unit Price Schedule.

four\proposal

CITY OF JONESBORO, ARKANSAS

VALLEY AND OWENS DRAINAGE IMPROVEMENTS

BID PROPOSAL

ITEM	QTY/UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
1.	1 L.S.	Furnish all materials, equipment, labor, and related appurtenances to perform the necessary site preparation for construction of the improvements shown on the Drawings and described in the specifications for the lump sum price of Twenty-one thousand one hundred six Dollars and fifty-five Cents/L.S.	$XXXXX	$21,106.55
2.	1. L.S.	Furnish all materials, equipment, labor, and related appurtenances to perform the necessary earth work to bring the project to grade as shown on the Drawings and described in the Specifications for the lump sum price of Eighty-three thousand Seven hundred eighty-five Dollars and forty-one Cents/L.S.	$XXXXX	$83,785.41

BID PROPOSAL
(Cont'd)

ITEM	QTY/UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
3.	1 L.S.	Furnish and Install concrete retaining walls including all materials, equipment, labor, and related appurtenances as shown on the Drawings and described in the Specifications for the lump sum price of four thousand five hundred Dollars and no Cents/L.S.	$XXXXX	$4500.00
4.	1 L.S.	Furnish and Install Valley Pond Inlet/Outlet Structures including all materials, equipment, labor, and related appurtenances as shown on the Drawings and described in the Specifications for the lump sum price of forty-six thousand nine hundred sixty Dollars and forty-four Cents/L.S.	$XXXXX	$46,960.44

BID PROPOSAL
(Cont'd)

ITEM	QTY/UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
5.	1. L.S.	Furnish all materials, equipment, labor and related appurtenances to install drainage structure under Owens Avenue as shown on the drawings and Described in the Specifications for the lump sum of Ninty-nine thousand four hundred nine Dollars and Sixty ——— Cents/L.S.	$XXXXX	$ 99409.60
6.	1. L.S.	Furnish and install Owens pond Outlet Structure including all materials, equipment, labor and related appurtenances as shown on the Drawings and described in the Specifications for the lump sum price of Twenty-three thousand Eighty Dollars and no ——— Cents/L.S.	$XXXXX	$ 23,080.00

BID PROPOSAL
(Cont'd)

ITEM	QTY/UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
7.	1 L.S.	Furnish all materials, equipment, labor and related appurtenances to perform the necessary final grading and establish final vegetative cover as shown on the Drawings and described in the Specifications for the lump sum of Twenty-Seven thousand — Dollars and no — Cents/L.S.	$XXXXX	$ 27,000.00
8.	1 L.S.	Furnish all materials, equipment, labor and related appurtenances to install cellular concrete blocks as shown on the Drawings and described in the Specifications for the lump sum of Nine thousand — Dollars and no — Cents/L.S.	$XXXXX	$ 9,000.00

BID PROPOSAL
(Cont'd)

ITEM	QTY/UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
9.	1 L.S.	Furnish all materials, equipment, labor and related appurtenances to install turf reinforcement mat as shown on the Drawings and described in the Specifications for the lump sum of Thirty Thousand Eight Hundred forty Dollars and no Cents/L.S.	$XXXXX	$30,840.00
10.	1 L.S.	Furnish all materials, equipment, labor and related appurtenances to install perimeter fencing and gates as shown on the Drawings and described in the Specifications for the lump sum of forty-eight thousand — Dollars and no Cents/L.S.	$XXXXX	$48,000.00

BID PROPOSAL
(Cont'd)

ITEM	QTY/UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
11.	1 L.S.	Furnish all materials, equipment, labor and related appurtenances to install 40 L.F. D.I. piping as shown on the Drawings and Described in the Specifications for the lump sum of One Thousand Eight Hundred Dollars and no — Cents/L.S.	$XXXXX	$ 1800.00
12.	1 L.S.	Act 291, 1993 Trench and Excavation Safety System One Thousand — Dollars and no — Cents/L.S.	$XXXXXX	$ 1000.00
		TOTAL BID		$ 396,482.00

The Ohio Casualty Insurance Company

BID OR PROPOSAL BOND

KNOW ALL MEN BY THESE PRESENTS, That we,

Gillis Farms, Inc.

(hereinafter called the Principal) as Principal, and The Ohio Casualty Insurance Company , with its principal office in the City of Hamilton, Ohio (hereinafter called the Surety), as Surety, are held and firmly bound unto City of Jonesboro

Valley and Owen Drainage Improvement

(hereinafter called the Obligee) in the penal sum of

5% of amount bid Dollars $

lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas, the Principal has submitted the accompanying bid dated July 5, 2007 for

City of Jonesboro-Valley and Owen Drainage Improvement

Excavation of two ponds - install outlet structures - channel excavation

Please refer to attached bid

NOW, THEREFORE, if the Obligee shall make any award according to the terms of said bid and the Principal shall enter into a contract with said Obligee in accordance with the terms of said bid and give bond for the faithful performance thereof within the time specified; or if no time is specified within thirty days after the date of said award; or if the Principal shall, in the case of failure so to do, indemnify the Obligee against any loss the Obligee may suffer directly arising by reason of such failure, not exceeding the penalty of this bond, then this obligation shall be null and void: otherwise to remain in full force and virtue.

Signed, sealed and dated: July 5, 2007

Gillis Farms, Inc.
(Principal)

By: _____

The Ohio Casualty Insurance Company

By: _____
Steve Standridge (Attorney-in-Fact)

S-137-Rev.

STEVE STANDRIDGE INS., INC.
P. O. BOX 555
MT. IDA, AR 71957
PHONE 870-867-4111

CERTIFIED COPY OF POWER OF ATTORNEY

THE OHIO CASUALTY INSURANCE COMPANY
WEST AMERICAN INSURANCE COMPANY

No. 39-481

Know All Men by These Presents: That THE OHIO CASUALTY INSURANCE COMPANY, an Ohio Corporation, and WEST AMERICAN INSURANCE COMPANY, an Indiana Corporation, pursuant to the authority granted by Article III, Section 9 of the Code of Regulations and By-Laws of The Ohio Casualty Insurance Company and West American Insurance Company, do hereby nominate, constitute and appoint: **Steve Alan Standridge, Philip Harold Standridge, Kent O' Neal, Michael Brandon Mc Caslin or Candice S. Young of Mount Ida, Arkansas** its true and lawful agent (s) and attorney (s)-in-fact, to make, execute, seal and deliver for and on its behalf as surety, and as its act and deed **any and all** BONDS, UNDERTAKINGS, and RECOGNIZANCES excluding, however, any bond(s) or undertaking(s) guaranteeing the payment of notes and interest thereon

And the execution of such bonds or undertakings in pursuance of these presents, shall be as binding upon said Companies, as fully and amply, to all intents and purposes, as if they had been duly executed and acknowledged by the regularly elected officers of the Companies at their administrative offices in Fairfield, Ohio, in their own proper persons.
The authority granted hereunder supersedes any previous authority heretofore granted the above named attorney(s)-in-fact.

In WITNESS WHEREOF, the undersigned officer of the said The Ohio Casualty Insurance Company and West American Insurance Company has hereunto subscribed his name and affixed the Corporate Seal of each Company this **25th day of July, 2006.**

SEAL SEAL

Sam Lawrence

Sam Lawrence, Assistant Secretary

STATE OF OHIO,
COUNTY OF BUTLER

On this **25th day of July, 2006** before the subscriber, a Notary Public of the State of Ohio, in and for the County of Butler, duly commissioned and qualified, came Sam Lawrence, Assistant Secretary of THE OHIO CASUALTY INSURANCE COMPANY and WEST AMERICAN INSURANCE COMPANY, to me personally known to be the individual and officer described in, and who executed the preceding instrument, and he acknowledged the execution of the same, and being by me duly sworn deposes and says that he is the officer of the Companies aforesaid, and that the seals affixed to the preceding instrument are the Corporate Seals of said Companies, and the said Corporate Seals and his signature as officer were duly affixed and subscribed to the said instrument by the authority and direction of the said Corporations.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal at the City of Hamilton, State of Ohio, the day and year first above written.

NOTARIAL SEAL BUTLER COUNTY, OHIO

Cheryl S. Gregory

Notary Public in and for County of Butler, State of Ohio
My Commission expires **August 6, 2007.**

This power of attorney is granted under and by authority of Article III, Section 9 of the Code of Regulations and By-Laws of The Ohio Casualty Insurance Company and West American Insurance Company, extracts from which read:

Article III, Section 9. Appointment of Attorneys-in-Fact. The Chairman of the Board, the President, any Vice-President, the Secretary or any Assistant Secretary of the corporation shall be and is hereby vested with full power and authority to appoint attorneys-in-fact for the purpose of signing the name of the corporation as surety to, and to execute, attach the seal of the corporation to, acknowledge and deliver any and all bonds, recognizances, stipulations, undertakings or other instruments of suretyship and policies of insurance to be given in favor of any individual, firm, corporation, partnership, limited liability company or other entity, or the official representative thereof, or to any county or state, or any official board or boards of any county or state, or the United States of America or any agency thereof, or to any other political subdivision thereof

This instrument is signed and sealed as authorized by the following resolution adopted by the Boards of Directors of the Companies on October 21, 2004:

RESOLVED, That the signature of any officer of the Company authorized under Article III, Section 9 of its Code of Regulations and By-laws and the Company seal may be affixed by facsimile to any power of attorney or copy thereof issued on behalf of the Company to make, execute, seal and deliver for and on its behalf as surety any and all bonds, undertakings or other written obligations in the nature thereof; to prescribe their respective duties and the respective limits of their authority; and to revoke any such appointment. Such signatures and seal are hereby adopted by the Company as original signatures and seal and shall, with respect to any bond, undertaking or other written obligations in the nature thereof to which it is attached, be valid and binding upon the Company with the same force and effect as though manually affixed.

CERTIFICATE

I, the undersigned Assistant Secretary of The Ohio Casualty Insurance Company and West American Insurance Company, do hereby certify that the foregoing power of attorney, the referenced By-Laws of the Companies and the above resolution of their Boards of Directors are true and correct copies and are in full force and effect on this date.
IN WITNESS WHEREOF, I have hereunto set my hand and the seals of the Companies this **5th** day of **July, 2007.**

SEAL SEAL

Mark E. Schmidt

Assistant Secretary

STATEMENT OF BIDDER'S QUALIFICATIONS

(To be submitted by the Bidder only upon the specific request by the Owner).

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

1. Name of Bidder.

2. Permanent main office address.

3. When organized.

4. If a corporation, where incorporated.

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

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

7. General character of work performed by your company.

8. Have you ever failed to complete any work awarded to you?

9. Have you ever defaulted on a Contract?

   If so, where and why?

10. Have you ever been fined or had your license suspended by a Contractor's Licensing Board?

    If so, where and why?

11. List the more important projects recently completed by your company, stating the approximate cost for each, and the month and year completed.

12. List your major equipment available for this Contract.

13. Experience in construction work similar in importance to this project.

14. Background and experience of the principal members of your organization, including the officers.

15. Credit available: $_____.

16. Give Bank reference: _____.

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

18. The undersigned hereby authorizes and requests any person, firm, or corporation to furnish any information requested by the Owner, in verification of the recitals comprising this statement of Bidder's Qualifications.

Dated at _____ this _____

day of _____, 20_____.

_____
(Name of Bidder)

By_____

Title_____

_

STATE OF _____)
) SS.
COUNTY OF _____)

_____ being duly sworn deposes and says that

he is _____ of _____
(Name of Organization)

and that the answers to the foregoing questions and all statements therein contained are true and correct.

SUBSCRIBED AND SWORN TO BEFORE ME this _____ day of _____, 20___.

_____
(Notary Public)

My Commission Expires:

_____

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NOTICE OF AWARD

TO:

Mr. Jim Gillis
Gillis Farms Inc
1335 E. Parker
Jonesboro, AR 72401

Project Description:

Valley and Owens Drainage Improvements

The Owner considered the Bid submitted by you for the above-described Work in response to its Advertisement for Bids dated June 20 and Information for Bidders.

You are hereby notified that your Bid has been accepted for items in the amount of Three hundred ninety six thousand four hundred eighty two and 0/100 Dollars ($396,482.00).

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 this 27th day of July, 2007.

City of Jonesboro
Owner

By _____

Title ASST. CITY ENGINEER

Acceptance of Notice

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

Gills Farms Inc

this the 30 day of July, 2007.

By _____

Title Pres

CONTRACT

THIS AGREEMENT made this _____ day of _____, 20___, by and between _Gillis Farms Inc._____

a Corporation organized and existing under the laws of the State of ___Arkansas_____

Hereinafter called the "Contractor" and the City of Jonesboro, Arkansas, hereinafter call the "Owner".

W I T N E S S E T H

That the Contractor and the Owner for the consideration stated herein mutually agree as follows:

ARTICLE 1. Statement of Work. The Contractor shall furnish all supervision, technical personnel, labor, materials, machinery, tools, equipment, incidentals and services, including utility and transportation services and perform and complete all work required for the construction of the Valley and Owens Drainage Improvements in strict accordance with the Contract Documents, including all Addenda thereto

Addendum 1	dated	June 26, 2007
Addendum 2	dated	July 2, 2007
_____	dated	_____

as prepared by the Engineer.

ARTICLE 2. The Contract Price. The Owner will pay the Contractor, because of his performance of the Contract, for the total quantities of work performed at the lump sum and unit prices stipulated in the Proposal, subject to additions and deductions as provided in the Section entitled "CHANGES IN THE WORK" under the GENERAL CONDITIONS.

ARTICLE 3. Contract Time. The Contractor agrees to begin work within ten (10) calendar days after issuance by the Owner of a "Work Order" or "Notice to Proceed" and to complete the work within One Hundred Twenty (120) calendar days thereafter (except as modified in the GENERAL CONDITIONS of these Contract Documents). If the Contractor shall fail to complete the work within the time specified, he and his Surety shall be liable for payment to the Owner, as liquidated damages ascertained and agreed, and not in the nature of a penalty, the amount specified in the SPECIAL CONDITIONS of these Contract

Documents for each day of delay. To the extent sufficient in amount, liquidated damages shall be deducted from the payments to be made under this Contract.

ARTICLE 4. Contract. The executed Contract Documents shall consist of the following:

a. This Agreement (Contract)
b. Addenda
c. Advertisement for Bids
d. Instructions to Bidders
e. Proposal
f. General Conditions
g. Supplemental General Conditions
h. Special Conditions
i. Technical Specifications including Special Provisions
j. Drawings (Plans)
k. Performance-Payment Bond

This Contract, together with other Documents enumerated in this Article 4, which said other Documents are as fully a part of the Contract as if hereto attached or herein repeated, form the Contract between the parties hereto. In the event that any provisions in any component part of this Contract conflicts with any provision of any other component part, the conflict shall be resolved by the Engineer whose decision shall be final.

ARTICLE 5. Surety. The Surety on the Performance-Payment Bond shall be a surety company of financial resources satisfactory to the Owner, authorized to do business in the State of Arkansas, and shall comply with applicable Arkansas laws.

IN WITNESS WHEREOF, the parties hereto have caused this CONTRACT to be executed in seven (7) counterparts, each of which shall be considered and original on the day and year first above written.

ATTEST:

Gillis Farms Inc.
(Contractor)

By _____

Title Pres

1335 E. Parker

(Street)

Jonesboro AR 72404

(City)

City of Jonesboro
(Owner)

By _____

(Print the names underneath all signatures).

four\contract

ARKANSAS PERFORMANCE-PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS:

THAT WE, _____

as Principal, hereinafter call Principal, and _____

of _____ State of _____, as Surety, hereinafter called the Surety, are held and firmly bound unto the City of Jonesboro as Obligee, hereinafter called Owner, in the amount of Three hundred ninety six thousand four hundred eighty two and 0/100 Dollars ($396,482.00) in lawful money of the United States of America, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly, severally, and firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH THAT:

WHEREAS, the Principal entered into a Contract with the Owner by written Agreement dated the _____ day of _____, 20____, a copy of which is attached hereto and made a part hereof, hereinafter referred to as the Contract, for the construction of the Valley and Owens Drainage Improvements.

NOW THEREFORE, if the Principal shall well and truly perform and complete in good, sufficient, and workmanlike manner all of the work required by said Contract and within the time called for thereby to the satisfaction of the Owner, and shall pay all persons for labor, materials, equipment, and supplies furnished by said Principal in accordance with said Contract (failing which such persons shall have a direct right to action against the Principal and Surety under this obligation, but subject to the Owner's priority) and shall hold and save harmless the Owner from any and all claims, loss, and expense of every kind and nature arising because of or resulting from the Principal's operation under said Contract, except payments to the Principal rightly due the Principal for work under this Contract, then this obligation shall be null and void; otherwise to remain in full force and effect.

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

PROVIDED, FURTHER, that it is expressly agreed that this BOND shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the contract price more than 20 percent, so as

to bind the PRINCIPAL and the SURETY to the full and faithful performance of the Contract as so amended. The term "Amendment", wherever used in this BOND and whether referring to this BOND or the contract shall include any alteration, addition, extension or modification of any character whatsoever.

PROVIDED, FURTHER, 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 (6) months from the date on which final payment to the Contractor falls due. No suit, action, or proceeding shall be brought by the Owner after two (2) years from the date on which final payment to the Contractor falls due.

This BOND is executed pursuant to the terms of Arkansas Code Ann. §§ 18-44-501 et. seq.

Executed on this _____ day of _____, 20____.

SEAL

_____
(Principal)

By_____

Title_____

SEAL

_____
(Surety)

By_____
(Attorney-in-Fact)

NOTES:

1. This bond form is mandatory. No other forms will be acceptable.
2. The date of the Bond must not be prior to the date of the Contract.
3. Any surety executing this Bond must appear on the U.S. Treasury Department's most current list (Circular 570, as amended) and be authorized to transact business in the State of Arkansas.
4. Attach Power of Attorney.

four\pb

The Ohio Casualty Insurance Company

OHIO CASUALTY GROUP

Bond # 3-948-028

PERFORMANCE AND PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned
Gillis Farms, Inc.

1335 E. Parker Jonesboro, AR

(Full Name [top line] and Address [bottom line] of Principal)

as Principal (hereinafter called Principal) and The Ohio Casualty Insurance Company , as Surety, (hereinafter called Surety) are held and firmly bound unto
City of Jonesboro

515 W. Washington Avenue Jonesboro, AR

(Full Name [top line] and Address [bottom line] of Obligee)

(hereinafter called Obligee) in the penal sum of

Three Hundred Ninety Six Thousand Four Hundred Eighty Two and 00/100 Dollars $396,482.00

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

THE CONDITION OF THIS OBLIGATION IS SUCH THAT whereas the above Principal did on

enter into a contract with the Obligee for
Valley and Owens Drainage Improvements

which contract is made a part of this bond the same as though set forth herein;

NOW THEREFORE, if the said Principal shall

(1) well and faithfully do and perform the things agreed by said Principal to be done and performed according to the terms of said contract and, failing to do and perform such things, shall indemnify the Obligee against direct pecuniary loss resulting therefrom; and shall

(2) pay all lawful claims of subcontractors, materialmen and laborers (hereinafter called claimants) for labor performed and material furnished and incorporated in said work, we agreeing and assenting that this undertaking shall be for the benefit of any claimant having a just claim as well as for the Obligee herein, subject however, to the priority and with the written consent of the Obligee.

then this obligation shall be void; otherwise to remain in full force and effect; it being expressly understood and agreed that the liability of the Principal and Surety for any and all claims hereinunder shall in no event exceed the penal sum of this obligation as herein stated.

No suit, action or proceeding shall be brought hereunder by the Obligee unless commenced within two years from the date of completion of said contract; and no suit, action or proceeding shall be brought hereunder by any claimant unless, as a condition precedent thereto, written notice shall have been given by such claimant to the Surety at its home office in the City of Hamilton, Ohio within ninety (90) days after the last of the material or labor was furnished or performed; and, subject to the foregoing with respect to giving written notice, no suit, action or proceeding shall be brought by any claimant hereunder unless commence within twelve (12) months from the completion of said contract.

Signed, sealed and dated:

Gillis Farms, Inc.

By: _____

Jim Gillis, President (Principal)

The Ohio Casualty Insurance Company

By: _____

Kent O'Neal (Attorney-In-Fact)

S-4213 (9/99)

STEVE STANDRIDGE INS., INC.
P. O. BOX 555
MT. IDA, AR 71957
PHONE 870-867-4111

CERTIFIED COPY OF POWER OF ATTORNEY

THE OHIO CASUALTY INSURANCE COMPANY
WEST AMERICAN INSURANCE COMPANY

No. 39-481

Know All Men by These Presents: That THE OHIO CASUALTY INSURANCE COMPANY, an Ohio Corporation, and WEST AMERICAN INSURANCE COMPANY, an Indiana Corporation, pursuant to the authority granted by Article III, Section 9 of the Code of Regulations and By-Laws of The Ohio Casualty Insurance Company and West American Insurance Company, do hereby nominate, constitute and appoint: **Steve Alan Standridge, Philip Harold Standridge, Kent O' Neal, Michael Brandon Mc Caslin or Candice S. Young of Mount Ida, Arkansas** its true and lawful agent (s) and attorney (s)-in-fact, to make, execute, seal and deliver for and on its behalf as surety, and as its act and deed **any and all** BONDS, UNDERTAKINGS, and RECOGNIZANCES excluding, however, any bond(s) or undertaking(s) guaranteeing the payment of notes and interest thereon

And the execution of such bonds or undertakings in pursuance of these presents, shall be as binding upon said Companies, as fully and amply, to all intents and purposes, as if they had been duly executed and acknowledged by the regularly elected officers of the Companies at their administrative offices in Fairfield, Ohio, in their own proper persons.
The authority granted hereunder supersedes any previous authority heretofore granted the above named attorney(s)-in-fact.

In WITNESS WHEREOF, the undersigned officer of the said The Ohio Casualty Insurance Company and West American Insurance Company has hereunto subscribed his name and affixed the Corporate Seal of each Company this **25th day of July, 2006.**

SEAL SEAL

Sam Lawrence

Sam Lawrence, Assistant Secretary

STATE OF OHIO,
COUNTY OF BUTLER

On this **25th day of July, 2006** before the subscriber, a Notary Public of the State of Ohio, in and for the County of Butler, duly commissioned and qualified, came Sam Lawrence, Assistant Secretary of THE OHIO CASUALTY INSURANCE COMPANY and WEST AMERICAN INSURANCE COMPANY, to me personally known to be the individual and officer described in, and who executed the preceding instrument, and he acknowledged the execution of the same, and being by me duly sworn deposes and says that he is the officer of the Companies aforesaid, and that the seals affixed to the preceding instrument are the Corporate Seals of said Companies, and the said Corporate Seals and his signature as officer were duly affixed and subscribed to the said instrument by the authority and direction of the said Corporations.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal at the City of Hamilton, State of Ohio, the day and year first above written.

NOTARIAL SEAL BUTLER COUNTY, OHIO

Cheryl S. Gregory

Notary Public in and for County of Butler, State of Ohio
My Commission expires **August 6, 2007.**

This power of attorney is granted under and by authority of Article III, Section 9 of the Code of Regulations and By-Laws of The Ohio Casualty Insurance Company and West American Insurance Company, extracts from which read:

Article III, Section 9. Appointment of Attorneys-in-Fact. The Chairman of the Board, the President, any Vice-President, the Secretary or any Assistant Secretary of the corporation shall be and is hereby vested with full power and authority to appoint attorneys-in-fact for the purpose of signing the name of the corporation as surety to, and to execute, attach the seal of the corporation to, acknowledge and deliver any and all bonds, recognizances, stipulations, undertakings or other instruments of suretyship and policies of insurance to be given in favor of any individual, firm, corporation, partnership, limited liability company or other entity, or the official representative thereof, or to any county or state, or any official board or boards of any county or state, or the United States of America or any agency thereof, or to any other political subdivision thereof

This instrument is signed and sealed as authorized by the following resolution adopted by the Boards of Directors of the Companies on October 21, 2004:

RESOLVED, That the signature of any officer of the Company authorized under Article III, Section 9 of its Code of Regulations and By-laws and the Company seal may be affixed by facsimile to any power of attorney or copy thereof issued on behalf of the Company to make, execute, seal and deliver for and on its behalf as surety any and all bonds, undertakings or other written obligations in the nature thereof; to prescribe their respective duties and the respective limits of their authority; and to revoke any such appointment. Such signatures and seal are hereby adopted by the Company as original signatures and seal and shall, with respect to any bond, undertaking or other written obligations in the nature thereof to which it is attached, be valid and binding upon the Company with the same force and effect as though manually affixed.

CERTIFICATE

I, the undersigned Assistant Secretary of The Ohio Casualty Insurance Company and West American Insurance Company, do hereby certify that the foregoing power of attorney, the referenced By-Laws of the Companies and the above resolution of their Boards of Directors are true and correct copies and are in full force and effect on this date.

IN WITNESS WHEREOF, I have hereunto set my hand and the seals of the Companies this day of , 2007

SEAL SEAL

Mark E. Schmidt

Assistant Secretary

AUG 01 2007 09:30 STEVE STANDRIDGE INS

ACORD CERTIFICATE OF LIABILITY INSURANCE

OP ID JM GILLI-3 | DATE (MM/DD/YYYY) 08/01/07

PRODUCER

Steve Standridge Insurance-MTI
P.O. Box 555
Mount Ida AR 71957
Phone: 870-867-4111 Fax: 870-867-4160

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

INSURED

GILLIS FARMS INC
DBA NE ARK CONTRACTORS
1335 EAST PARKER ROAD
JONESBORO AR 72404

INSURERS AFFORDING COVERAGE		NAIC #
INSURER A:	Bituminous	20095
INSURER B:	First Comp	
INSURER C:		
INSURER D:		
INSURER E:		

COVERAGES

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	ADD'L INSRD	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS	
A		GENERAL LIABILITY [X] COMMERCIAL GENERAL LIABILITY [ ] CLAIMS MADE [X] OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: [X] POLICY [ ] PRO-JECT [ ] LOC	CLP3223837B	01/26/07	01/26/08	EACH OCCURRENCE	$ 1,000,000
						DAMAGE TO RENTED PREMISES (Ea occurrence)	$ 100,000
						MED EXP (Any one person)	$ 5,000
						PERSONAL & ADV INJURY	$ 1,000,000
						GENERAL AGGREGATE	$ 2,000,000
						PRODUCTS - COMP/OP AGG	$ 2,000,000
A		AUTOMOBILE LIABILITY [ ] ANY AUTO [ ] ALL OWNED AUTOS [X] SCHEDULED AUTOS [X] HIRED AUTOS [X] NON-OWNED AUTOS	CAP3503454	01/26/07	01/26/08	COMBINED SINGLE LIMIT (Ea accident)	$ 1,000,000
						BODILY INJURY (Per person)	$
						BODILY INJURY (Per accident)	$
						PROPERTY DAMAGE (Per accident)	$
		GARAGE LIABILITY [ ] ANY AUTO				AUTO ONLY - EA ACCIDENT	$
						OTHER THAN AUTO ONLY: EA ACC	$
						AGG	$
		EXCESS/UMBRELLA LIABILITY [ ] OCCUR [ ] CLAIMS MADE [ ] DEDUCTIBLE [ ] RETENTION $				EACH OCCURRENCE	$
						AGGREGATE	$
							$
							$
							$
B		WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? If yes, describe under SPECIAL PROVISIONS below	WC0012354-03	01/26/07	01/26/08	WC STATU-TORY LIMITS / OTH-ER	
						E.L. EACH ACCIDENT	$ 100,000
						E.L. DISEASE - EA EMPLOYEE	$ 100,000
						E.L. DISEASE - POLICY LIMIT	$ 500,000
A		OTHER Rented & leased eq	CLP3223837B	12/26/07	01/26/08		$50,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES / EXCLUSIONS ADDED BY ENDORSEMENT / SPECIAL PROVISIONS

VALLEY AND OWENS DRAINAGE IMPROVEMENTS

CERTIFICATE HOLDER

CITY OF JONESBORO
515 W. WASHINGTON
JONESBORO AR 72401

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT.

AUTHORIZED REPRESENTATIVE

Jane K. Wilson

ACORD CERTIFICATE OF LIABILITY INSURANCE

OP ID JM GILLI-3

DATE (MM/DD/YYYY) 08/01/07

PRODUCER
Steve Standridge Insurance-MTI
P.O. Box 555
Mount Ida AR 71957
Phone: 870-867-4111 Fax: 870-867-4160

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

INSURED
GILLIS FARMS INC
DBA NE ARK CONTRACTORS
1335 EAST PARKER ROAD
JONESBORO AR 72404

INSURERS AFFORDING COVERAGE	NAIC #
INSURER A: Bituminous	20095
INSURER B: First Comp	
INSURER C:	
INSURER D:	
INSURER E:	

COVERAGES

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	ADD'L INSRD	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS	
		GENERAL LIABILITY				EACH OCCURRENCE	$ 1,000,000
A		[ ] COMMERCIAL GENERAL LIABILITY	OEPBINDER	08/01/07	08/01/08	DAMAGE TO RENTED PREMISES (Ea occurence)	$
		[ ] CLAIMS MADE [X] OCCUR				MED EXP (Any one person)	$
A		OWNERS & ENGINEER PROTECTIVE				PERSONAL & ADV INJURY	$
		GEN'L AGGREGATE LIMIT APPLIES PER:				GENERAL AGGREGATE	$ 2,000,000
		[X] POLICY [ ] PRO-JECT [ ] LOC				PRODUCTS - COMP/OP AGG	$
		AUTOMOBILE LIABILITY					
		[ ] ANY AUTO				COMBINED SINGLE LIMIT (Ea accident)	$ 1,000,000
		[ ] ALL OWNED AUTOS					
A		[X] SCHEDULED AUTOS	CAP3503454	01/26/07	01/26/08	BODILY INJURY (Per person)	$
		[X] HIRED AUTOS					
		[X] NON-OWNED AUTOS				BODILY INJURY (Per accident)	$
						PROPERTY DAMAGE (Per accident)	$
		GARAGE LIABILITY				AUTO ONLY - EA ACCIDENT	$
		[ ] ANY AUTO				OTHER THAN AUTO ONLY: EA ACC	$
						AGG	$
		EXCESS/UMBRELLA LIABILITY				EACH OCCURRENCE	$
		[ ] OCCUR [ ] CLAIMS MADE				AGGREGATE	$
							$
		[ ] DEDUCTIBLE					$
		[ ] RETENTION $					$
		WORKERS COMPENSATION AND EMPLOYERS' LIABILITY				WC STATU-TORY LIMITS / OTH-ER	
B		ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED?	WC0012354-03	01/26/07	01/26/08	E.L. EACH ACCIDENT	$ 100,000
		If yes, describe under SPECIAL PROVISIONS below				E.L. DISEASE - EA EMPLOYEE	$ 100,000
						E.L. DISEASE - POLICY LIMIT	$ 500,000
		OTHER					
A		Rented & leased eq	CLP3223837B	12/26/07	01/26/08		$50,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES / EXCLUSIONS ADDED BY ENDORSEMENT / SPECIAL PROVISIONS
VALLEY AND OWENS DRAINAGE IMPROVEMENTS

ENGINEER: NRS CONSULTING ENGINEERS, 1220 STONE STREET, JONESBORO, AR 72401

CERTIFICATE HOLDER
CITY OF JONESBORO
515 W. WASHINGTON
JONESBORO AR 72401

CANCELLATION
SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT,

AUTHORIZED REPRESENTATIVE
[signature]

ACORD 25 (2001/08)

GENERAL CONDITIONS

GENERAL CONDITIONS

TABLE OF CONTENTS

GC.1 DEFINITIONS

Wherever used in any of the Contract Documents, the following meanings shall be given to the terms herein defined:

(1) The term "Addendum" means any change, revision, or clarification of the Contract Documents which has been duly issued by the Local Public Agency, or the Engineer, to prospective Bidders prior to the time of receiving bids.

(2) The term "Award" means the acceptance by the owner of the successful bidder's proposal.

(3) The term "Bidder" means any individual, partnership, firm, or corporation, acting directly or through a duly authorized representative, who submits a proposal for the work contemplated.

(4) The term "Calendar Day" means every day shown on the calendar.

(5) The term "Change Order" means a written order to the contractor covering changes in the plans, specifications, or proposal quantities and establishing the basis of payment and contract time adjustment, if any, for the scope of work affected by the change. The work covered by the change order shall be within the scope of the contract.

(6) The term "Contract" means the Contract executed by the Local Public Agency and the Contractor of which these GENERAL CONDITIONS form a part.

(7) The term "Contract Documents" means and shall include the following: Executed Contract, Addenda (if any), Advertisement For Bids, Instructions to Bidders, Proposal, Performance-Payment Bond, General Conditions, Supplemental General Conditions, Special Conditions, Supplemental Special Conditions, Technical Specifications, and Drawings.

(8) The term "Contractor" means the person, firm, or corporation entering into the Contract with the Local Public Agency to construct and install the improvements embraced in this project.

(9) The term "Engineer" means NRS Consulting Engineers or its duly authorized representative, serving the Local Public Agency with engineering services, its successor, or any other person or persons employed by said Local Public Agency to furnish engineering services in connection with the construction embraced in the Contract.

(10) The term "Local Government" means the City of Jonesboro, Arkansas, within which the Project is situated.

(11) The term "Local Public Agency" or "Owner" means the City of Jonesboro, which is authorized to undertake this Contract.

(12) The term "Plans" or "Drawings" means the official drawings or exact

reproductions which show the location, character, and details of the work contemplated, and which are to be considered part of the contract, supplementary to the specifications.

(13) The term "Proposal" means the written offer of the Bidder (when submitted on the approved proposal form) to perform the contemplated work and furnish the necessary materials in accordance with the provisions of the Plans and Specifications.

(14) The term "Specifications" means a part of the contract containing the written directions and requirements for completing the contract work. Standards for specifying materials, or testing, which are sited in the specifications by reference shall have the same force and effect as if included in the contract physically.

(15) The term "Subcontractors" shall mean the individual, partnership or corporation entering into an agreement with the Contractor to perform any portion of the work covered by the Plans and Specifications.

(16) The term "Surety" shall mean any person, firm, or corporation that has executed, as Surety, the Contractor's Performance Bond securing the performance of the Contract.

(17) The term "Technical Specifications" means that part of the Contract documents which describes, outlines and stipulates the quality of the materials to be furnished; the quality of workmanship required; and the controlling requirements to be met in carrying out the construction work to be performed under this Contract. This also includes Special Provisions.

(18) The term "Work" shall mean the furnishing of all necessary labor, tools, equipment, appliances, supplies, and material other than materials furnished by the Owner as specified to complete the construction covered by the Plans and Specifications.

GC.2 SUPERINTENDENCE BY CONTRACTORS

Except where the Contractor is an individual and gives his personal superintendence to the work, the Contractor shall provide a competent superintendent, satisfactory to the Local Public Agency and the Engineer, on the work at all times during working hours with full authority to supervise and direct the work and who shall be the Contractor's agent responsible for the faithful discharge of the Contractor's obligations under the Contract.

The Owner shall have the authority to require the Contractor to remove from the work any incompetent or insubordinate superintendent.

GC.3 CONTRACTOR'S EMPLOYEES

The Contractor shall employ only competent skillful workers and shall at all times enforce strict discipline and good order among the employees.

The Contractor shall neither permit nor suffer the introduction or use of alcoholic beverages or controlled substances upon or about the work embraced in this Contract.

The Owner may require the Contractor to dismiss from the work such employee or employees as the Owner or the Engineer may deem incompetent, or careless, or insubordinate.

GC.4 SAFETY OF CONTRACTOR'S EMPLOYEES

The Contractor shall be responsible for the safety of his employees during the progress of the work as well as the safety, efficiency, and adequacy of his plant, appliances, and methods, and for any damage which may result from their failure or their improper construction, maintenance or operation.

GC.5 SUBCONTRACTS

The Contractor is responsible to the Owner for the acts and omissions of his subcontractors and of persons either directly or indirectly employed by the subcontractors and is aware that nothing contained in the Contract Documents shall create any contractual relation between any subcontractor and the Owner.

GC.6 OTHER CONTRACTS

The Local Public Agency may award, or may have awarded other Contracts for additional work, and the Contractor shall cooperate fully with such other Contractors, by scheduling his own work with that to be performed under other Contracts as may be directed by the Local Public Agency. The Contractor shall not commit or permit any act which will interfere with the performance of work by any other Contractor as scheduled.

GC.7 CONTRACTOR'S INSURANCE

Before any work is commenced, the Contractor shall furnish an approved certificate of insurance addressed to the Owner, showing that he carries the following insurance which shall be maintained throughout the term of the Contract.

(1) Workmens Compensation	- Statutory Limit
(2) Employer's Liability for Hazardous Work	- If Needed
(3) Public Liability (Bodily Injury)	- $1,000,000/occurrence
and Property Damage	- $2,000,000/aggregate
(4) Builder's Risk	- Insurable Portion

The Contractor shall carry or require that there be carried the insurance listed in (1) through (3) above for the protection of all his employees and those of his Subcontractors engaged in work under this Contract, and for the protection of the public.

If the work includes pipelines or other underground structures, the Property Damage Liability shall include explosion, collapse, and underground coverage.

The premiums for all insurance and the bond required herein shall be paid by the Contractor.

It shall be the obligation of the Contractor to complete and deliver to the Owner the structure required by these Contract Documents regardless of any loss, damage to, or destruction of the structure prior to delivery.

GC.8 OWNER'S AND ENGINEER'S PROTECTIVE LIABILITY INSURANCE

The Contractor shall obtain Owner's and Engineer's Protective Liability insurance, which shall be in force for the entire project period, naming as the insured therein, the City of Jonesboro and NRS Consulting Engineers. Such insurance shall be provided as a separate policy from the Contractor's insurance as listed above. Limits of liability shall be the following:

Bodily Injury Liability (Including Death) - $1,000,000/occurrence
and Physical Damage Liability (Damage to or
Destruction of Property) - $2,000,000/aggregate

A copy of the insurance policy shall be delivered to the Owner and Engineer.

GC.9 FITTING AND COORDINATION OF THE WORK

The Contractor shall be responsible for the proper fitting of all work and for the coordination of the operations of all trades, Subcontractors, or materialmen engaged upon this Contract. He shall be prepared to guarantee to each of his Subcontractors the locations and measurements which they may require for the fitting of their work to all surrounding work.

GC.10 MUTUAL RESPONSIBILITY OF CONTRACTORS

If, through acts of neglect or through failure to comply with any applicable Government regulations by the Contractor, any other Contractor or any Subcontractor shall suffer loss or damage on the work, the Contractor shall 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 shall assert any claim against the Local Public Agency on account of any damage alleged to have been so sustained, the Local Public Agency will notify this Contractor, who shall defend at his own expense any suit based upon such claim, and, if any judgement or claims against the Local Public Agency shall be allowed, the Contractor shall pay or satisfy such judgement or claim and pay all costs and expenses in connection therewith.

GC.11 PAYMENT TO CONTRACTOR

The Engineer will prepare (with the required assistance from the Contractor) the application for partial payment. If the bid contains lump sum prices, the Contractor shall furnish to the Engineer, upon request, a detailed cost breakdown of the several items of work involved in the lump sum prices. The Engineer will use this cost breakdown to determine the amount due the Contractor as progress payment. A cut-off time shall be established near the last day of the month such as to allow sufficient time for the application to be prepared, approved by the

Contractor, and submitted by the Engineer to the Owner by the first day of the successive month. The amount of the payment due to the Contractor shall be determined by the total value of work completed to date, deducting ten (10%) percent for retainage, adding the value of submitted paid invoices covering construction materials, properly stored on the site, and deducting the amount of all previous payments. After the project is fifty (50%) percent complete, no additional retainage beyond ten (10%) percent of the first fifty (50%) percent of the project cost will be withheld provided that the Contractor is making satisfactory progress and there is no specific cause for greater withholding until completion of the project at which time the retainage will be released with the final payment. The total value of work completed to date shall be based on the estimated quantities of work completed and on the unit and lump sum prices contained in the Proposal. The value of materials properly stored on the site shall be based upon the estimated quantities of such materials and the invoice prices. Copies of paid invoices, covering construction materials for which material payments are made, shall be furnished to the Engineer before such material payments are made.

NOTE: It has been the policy of the Owner to make payments for properly stored materials/equipment based upon invoice price and allow the Contractor to submit paid invoices within 30 days (or next partial payment period). If paid invoices are not provided within the time allowed then the materials/equipment so paid for will be removed from the next partial payment.

Monthly or partial payments made by the Owner to the Contractor are monies advanced for the purpose of assisting the Contractor to expedite the work of construction. All material and complete work covered by such monthly or partial payments shall remain the property of the Contractor, and he shall be responsible for the care and protection of all materials and work upon which payments have been made. Such payments shall not constitute a waiver of the right of the Owner to require the fulfillment of all terms of the Contract and the delivery of all improvements embraced in this Contract complete and satisfactory to the Owner in all details.

GC.11.1 Withholding Payments: The Local Public Agency may withhold from any payment otherwise due the Contractor so much as may be necessary to protect the Local Public Agency and if it so elects may also withhold any amounts due from the Contractor to any Subcontractors or material dealers, for work performed or material furnished by them. The foregoing provisions shall be construed solely for the benefit of the Local Public Agency and will not require the Local Public Agency to determine or adjust any claims or disputes between the Contractor and his Subcontractors or material dealers, or to withhold any monies for their protection unless the Local Public Agency elects to do so. The failure or refusal of the Local Public Agency to withhold any monies from the Contractor shall not impair the obligations of any Surety or Sureties under any bond or bonds furnished under this Contract. Such withholding may also occur as a result of the Contractor's failure or refusal to prosecute the work with such diligence as will insure its completion within the time specified in these Contract Documents, or as modified as provided in these Contract Documents, or if the Contractor fails to comply with any applicable regulations promulgated by the U.S. Government or any other Government agencies.

GC.11.2 Final Payment: After final inspection and acceptance by the Local Public Agency of all work under the Contract, the application for final payment shall be prepared which shall be based upon the carefully measured or computed quantity of each item of work at the applicable unit and lump sum prices stipulated in the Unit Price Schedule. The total number of the final

payment due the Contractor under this Contract shall be the amount computed as described above less all previous payments. All prior payments shall be subject to correction in the final payment. Final payment to the Contractor shall be made subject to his furnishing the Local Public Agency with a release in satisfactory form of all claims against the Local Public Agency arising under and by virtue of his Contract, other than such claims, if any, as may be specifically excepted by the Contractor from the operation and the release as provided under the section entitled DISPUTES under GENERAL CONDITIONS.

The Local Public Agency, before paying the final estimate, may require the Contractor to furnish releases or receipts from all Subcontractors having performed any work and all persons having supplied materials, equipment (installed on the Project), and services to the Contractor, if the Local Public Agency deems the same necessary in order to protect its interest. The Local Public Agency, however, may, if it deems such action advisable, make payment in part or in full to the Contractor without requiring the furnishing of such releases or receipts and any payments so made shall not impair the obligations of any Surety or Sureties furnished under this Contract.

Withholding of any amount due the Local Public Agency under the section entitled LIQUIDATED DAMAGES FOR DELAY under SPECIAL CONDITIONS, shall be deducted from the payments due the Contractor.

All equipment warranties and general guarantee and maintenance bond provisions shall become effective for one year upon date of final acceptance of the completed project by the Local Public Agency.

GC.11.3 Payments Subject to Submission of Certificates: Each payment to the Contractor by the Local Public Agency shall be made subject to submission by the Contractor of all written certifications required of him.

GC.12 USE OF COMPLETED PORTIONS

The Owner shall have the right to use any completed or partially completed portion of the work and such use shall not be considered as an acceptance of any work.

GC.13 CHANGES IN THE WORK

The Local Public Agency may make changes in the scope of the work required to be performed by the Contractor under the Contract or make additions thereto, or omit work therefrom without invalidating the Contract, and without relieving or releasing the Contractor from any of his obligations under the Contract or any guarantee given by him pursuant to the Contract provisions, and without affecting the validity of the Guaranty Bonds, and without relieving or releasing the Surety or Sureties of said bonds. All such work shall be executed under the terms of the original Contract unless it is expressly provided otherwise.

Except for the purpose of affording protection against any emergency endangering life or property, the Contractor shall make no change in the materials used or in the specified

manner of constructing and/or installing the improvements, or supply additional labor, services or materials beyond that actually required for the execution of the Contract, unless in pursuance of a written order from the Local Public Agency authorizing the Contractor to proceed with the change. No claim for an adjustment of the Contract price will be valid unless so ordered.

After the work is complete, a final change order may be prepared to be accepted by the Owner and Contractor to adjust final payment as required to cover the actual units of work acceptably completed.

If the applicable unit prices are contained in the Proposal (established as a result of either a unit price or a Supplemental Schedule of Unit Prices) the Local Public Agency may order the Contractor to proceed with desired changes in the work, the value of such changes to be determined by the measured quantities involved and the applicable unit and lump sum prices specified in the Contract; provided that in case of a unit price Contract the net value of all changes does not increase or decrease the original total amount shown in the Agreement by more than twenty-five (25%) percent in accordance with the section entitled BALANCED BID; VARIATION IN QUANTITIES under INSTRUCTIONS TO BIDDERS.

If applicable unit prices are not contained in the Unit Price Schedule as described above or if the total net change increases or decreases the total Contract price more than twenty-five (25%) percent, the Local Public Agency shall, before ordering the Contractor to proceed with a desired change, request an itemized Proposal from him covering the work involved in the change after which the procedure shall be as follows:

(1) If the Proposal is acceptable the Local Public Agency will prepare the Change Order in accordance therewith for acceptance by the Contractor and

(2) If the Proposal is not acceptable and prompt agreement between the two (2) parties cannot be reached, the Local Public Agency may order the Contractor to proceed with the work on a Force Account basis, under which the net cost shall be the sum of the actual costs that follow:

(A) Labor, including foremen;

(B) Materials entering permanently into the work;

(C) The ownership or rental cost of construction plant and equipment during the time of use on the extra work;

(D) Power and consumable supplies for the operation of power equipment;

(E) Insurance;

(F) Social Security and old age and unemployment contributions.

To the net cost shall be added a fixed fee agreed upon, but not to exceed fifteen (15%) percent of the net cost, to cover supervision, overhead, bond, and any other general

expense, and profit.

Each Change Order shall include in its final form:

(1) A detailed description of the change in the work.

(2) The Contractor's Proposal (if any) or a conformed copy thereof.

(3) A definite statement as to the resulting change in the Contract price and/or time.

(4) The statement that all work involved in the change shall be performed in accordance with Contract requirements except as modified by the Change Order.

GC.14 CLAIMS FOR EXTRA COST

If the Contractor claims that any instructions by Drawings or otherwise involve extra cost or extension of time, he shall, within ten (10) days after the receipt of such instructions, and in any event before proceeding to execute the work, submit his protest thereto in writing to the Local Public Agency, stating clearly and in detail the basis of his objections. No such claim will be considered unless so made.

Claims for additional compensation for extra work, due to alleged errors in ground elevations, contour lines, or bench marks, will not be recognized unless accompanied by certified survey data made prior to the time the original ground was disturbed, clearly showing that errors exist which resulted or would result in handling more material, or performing more work, than would be reasonably estimated from the Drawings and maps issued.

Any discrepancies which may be discovered between actual conditions and those represented by the Drawings and maps shall at once be reported to the Local Public Agency, and work shall not proceed except at the Contractor's risk, until written instructions have been received by him from the Local Public Agency.

If, on the basis of the available evidence, the Local Public Agency determines that an adjustment of the Contract Price and/or Time is justifiable, the procedure shall then be as provided in the Section entitled CHANGES IN THE WORK under GENERAL CONDITIONS.

GC.15 OWNER'S RIGHT TO TERMINATE CONTRACT

If the Contractor shall be adjudged as bankrupt or shall file a petition for an arrangement or reorganization under the Bankruptcy Act, or if he should make a general assignment for the benefit of his creditors, or if a receiver should be appointed on account of his insolvency, or if he should persistently or repeatedly refuse or should fail, except under conditions where extension of time is approved, to supply adequate workmen, equipment and material, or disregard laws, ordinances, or the instructions of the Engineer, or otherwise be guilty of a violation of any provisions of the Contract; provided further that if the Contractor at any time fails to comply with any applicable Federal or State regulation which prevents either the

Local Public Agency or the Contractor from fulfilling its obligations under these Contract Documents, then the Owner upon certification of the Engineer that sufficient cause exists to justify such action may, without prejudice to any other right or remedy, and after giving the Contractor ten (10) days' written notice, terminate the employment of the Contractor.

At the expiration of the said ten (10) days, the Owner may immediately serve notice upon the Surety to complete the work.

In the case the Surety fails to comply with the notice within thirty (30) days after service of such notice, the Owner may complete the work and charge the expense of the completion, including labor, materials, tools, implements, machinery, or apparatus, to said Contractor; and the expense so charged shall be deducted and paid by the Owner out of such monies as may be due, or that may thereafter at any time become due to the Contractor under and by virtue of this Contract. And 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 be entitled to receive the difference. And 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 his Surety shall pay the amount of such excess to the Owner, on demand from said Owner or Engineer of the amount so due.

GC.16 SUSPENSION OF WORK

Should contingencies arise to make such action necessary, the Owner shall have the right to suspend the whole or any part of the work for a period not to exceed sixty (60) days by giving the Contractor notice in writing three (3) days prior to the suspension.

The Contractor after written notice to resume work shall begin within ten (10) days from the date of such notice.

If the work or any part thereof shall be stopped by the Owner's notice and the Owner fails to notify the Contractor to resume work within sixty (60) days, the Contractor may abandon that portion of the work so suspended and the Contractor shall be paid for all work performed on the portion so suspended at unit prices quoted in the Unit Price Schedule for completed work involved, at agreed prices on any extra work involved, and at a fair and equitable price for partially completed work involved.

The Engineer may suspend work pending the settlement of any controversy. The Contractor shall not be entitled to any claim for loss or damage by reason of such delay, nor shall he be entitled to any extension of time; but an extension may be granted by the Owner at his discretion.

GC.17 DELAYS - EXTENSION OF TIME - LIQUIDATED DAMAGES

If the Contractor is delayed at any time in the progress of the work by any act or neglect of the Owner, the Owner's Engineer or employees, or by any separate contractor employed by the Owner, or by changes ordered in the work, or by strikes, lock-outs, fire, unusual delay in transportation, unavoidable casualty, or any other cause beyond the Contractor's

control, then the time of completion shall be extended for such reasonable time as the Owner may decide; provided, however, said time of completion shall be extended upon the following conditions and no other.

(1) Requests for extension of time shall be in writing. No extension of time shall be granted automatically.

(2) The Contractor claiming an extension of time because of any of the contingencies hereinabove mentioned, shall, within ten (10) days of the occurrence of the contingency which justifies the delay, notify the Owner in writing of his claim and the reasons therefor.

(3) In event of a continuing cause of delay, only one claim is necessary.

GC.17.1 Excusable Delays: The right of the Contractor to proceed shall not be terminated nor shall the Contractor be charged with liquidated damages for any delays in the completion of the work due:

(1) To any acts of the Government, including controls or restrictions upon requisitioning of materials, equipment, tools, or labor by reason of war, National Defense, or any other national emergency;

(2) To any acts of the Owner;

(3) To causes not reasonable foreseeable by the parties of this Contract which are beyond the control and without the fault or negligence of the Contractor, including, but not restricted to, acts of God or of the public enemy, acts of another Contractor in the performance of some other Contract with the Owner, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and weather of unusual severity such as hurricanes, tornadoes, cyclones, and other extreme weather conditions.

(4) To any delay of any subcontractor occasioned by any of the causes specified in subparagraphs (1), (2), and (3) of this paragraph.

It is acknowledged between the parties to this Contract that the work to be performed by the Contractor will result in a benefit to the Owner and that a delay in completion of the work will be detrimental to the Owner. It is further acknowledged that, while work is in progress, the Owner shall incur an indeterminable amount of expense as a result of necessary supervision of the work and other overhead and administrative expenses.

It is, therefore, agreed that if there is a delay in the completion of the work beyond the period elsewhere herein specified which has not been authorized by the Owner as set forth above, then the Owner may deduct from the Contract price the amount stated in the Special Conditions, bound herewith, as liquidated damages.

GC.18 DISPUTES

All disputes arising under this Contract or its interpretation, whether involving law or fact or both, or extra work, and all claims for alleged breach of Contract shall within ten (10) days of commencement of the dispute be presented by the Contractor to the Local Public Agency for decision. All papers pertaining to claims shall be filed in quadruplicate. Such notice need not detail the amount of the claim, but shall state the facts surrounding the claim in sufficient detail to identify the claim, together with its character and scope. In the meantime, the Contractor shall proceed with the work as directed. Any claim not presented within the time limit specified within this paragraph shall be deemed to have been waived, except that if the claim is of a continuing character and notice of the claim is not given within ten (10) days of its commencement, the claim will be considered only for a period commencing ten (10) days prior to the receipt by the Local Public Agency of notice thereof.

The Contractor shall submit in detail his claim and his proof thereof. Each decision by the governing body of the Local Public Agency will be in writing and will be mailed to the Contractor by registered mail, with return of receipt requested.

If the Contractor does not agree with any decision of the Local Public Agency, he shall in no case allow the dispute to delay the work, but shall notify the Local Public Agency promptly that he is proceeding with the work under protest, and he may then except the matter in question from the final release.

GC.19 ASSIGNMENT OR NOVATION

The Contractor shall not assign or transfer, whether by an assignment or novation, any of its rights, duties, benefits, obligations, liabilities, or responsibilities under this Contract without the written consent of the local Public Agency; provided, however, that assignments to banks, trust companies, or other financial institutions may be made without the consent of the Local Public Agency. No assignment or novation of this Contract shall be valid unless the assignment or novation expressly provides that the assignment of any of the Contractor's rights or benefits under the Contract is subject to a prior lien for labor performed, services rendered, and materials, tools, and equipment, supplied for the performance of the work under this Contract in favor of all persons, firms, or corporations rendering such labor or services or supplying such materials, tools, or equipment.

GC.20 TECHNICAL SPECIFICATIONS AND DRAWINGS

The Drawings and this Specification are to be considered cooperative. All work necessary for the completion of the facility shown on the Drawings, but not described in this Specification, or described in this Specification but not shown on the Drawings, OR REASONABLY IMPLIED BY EITHER OR BOTH, shall be executed in the best manner, the same as if fully shown and specified. When no figures or memoranda are given, the Drawings shall be accurately followed, according to their scale, but in all cases of discrepancy in figures or details, the decision of the Engineer shall be obtained before proceeding with the Work. If the Contractor adjusts any such discrepancy without first having obtained the approval of the Engineer, it shall be at his own risk, and he shall bear any extra expense resulting therefrom.

GC.21 SHOP DRAWINGS

Shop Drawings shall be required for all equipment, materials, and as required by the Engineer. All Shop Drawings, Machinery Details, Layout Drawings, etc., shall be submitted to the Engineer in four (4) copies for review (unless otherwise specified) sufficiently in advance of requirements to afford ample time for checking, including time for correcting, resubmitting, and rechecking if necessary. The Contractor may proceed, only at his own risk, with manufacture or installation of any equipment or work covered by said Shop Drawings, etc. until they are reviewed, and approved; and no claim, by the Contractor, for extension of the Contract time will be granted by reason of his failure in this respect.

Any Drawings submitted without the Contractor's stamp of approval will not be considered and will be returned to him for proper resubmission. If any Drawings show variations from the requirements of the Contract because of standard shop practice or other reason, the Contractor shall make specific mention of such variation in his letter of transmittal in order that, if acceptable, suitable action may be taken for proper adjustment of Contract price and/or time; otherwise, the Contractor will not be relieved of the responsibility for executing the work in accordance with the Contract even though the Drawings have been reviewed.

The review of Shop Drawings by the Engineer shall be considered an accommodation to the Contractor to assist him in the execution of the Contract. The Engineer's review of such Drawings shall not relieve the Contractor of his responsibility to perform the work in strict accordance with the Plans and Specifications, and approved changes.

If the Shop Drawing is in accordance with the Contract or involves only a minor adjustment in the interest of the Local Public Agency not involving a change in Contract price or time, the Engineer shall so stamp the Drawing and shall contain in substance the following:

> "Corrections or comments made on the shop drawings during this review do not relieve contractor from compliance with requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for: confirming and correlating all quantities and dimensions; selecting fabrication processes and techniques of construction; coordinating his work with that of all other trades; and performing his work in a safe and satisfactory manner".

GC.22 REQUESTS FOR SUPPLEMENTARY INFORMATION

It shall be the responsibility of the Contractor to make timely requests of the Local Public Agency for any additional information not already in his possession which should be furnished by the Local Public Agency under the terms of this Contract, and which he will require in the planning and execution of the work. Such requests may be submitted from time to time as the need is approached, but each shall be filed in ample time to permit appropriate action to be taken by all parties involved so as to avoid delay. Each request shall be in writing, and shall list the various items and the latest date by which each will be required by the Contractor. The first list shall be submitted within two (2) weeks after the Contract award and shall be as complete as

possible at that time. The Contractor shall, if requested, furnish promptly any assistance and information the Engineer may require in responding to these requests of the Contractor. The Contractor shall be fully responsible for any delay in his work or to others arising from his failure to comply fully with the provisions of this Section.

GC.23 REFERENCE TO MANUFACTURER OR TRADE NAME - "OR EQUAL CLAUSE"

If the Plans, Specifications, or Contract Documents, laws, ordinances or applicable rules and regulations permit the Contractor to furnish or use a substitute that is equal to any material or equipment specified, and if the Contractor wishes to furnish or use a proposed substitute, he shall make written application to the Engineer for approval of such a substitute certifying in writing that the proposed substitute will perform adequately the functions called for in the general design, be similar and of equal substance to that specified, and be suited to the same use and capable of performing the same functions as that specified; the use of such substitute will not require revisions of related work. No substitute shall be ordered or installed without the written approval of the Engineer who will be the judge of equality and may require the Contractor to furnish such other data regarding the proposed substitute as he considers pertinent. No substitute shall be ordered or installed without such performance guarantee and bonds as the Owner may require which shall be furnished at Contractor's expense.

Where such substitutions alter the design or space requirements indicated on the Contract Drawings, detailed drawings shall be prepared and submitted by the Contractor delineating any changes in, or additions to, the work shown on the Contract Drawings, and such drawings and changes or additions to the work shall be made by the Contractor at no additional expense to the City. In all cases, the burden of proof that the material or equipment offered for substitution is equal in construction, efficiency, and service to that named on the Contract Drawings and in these Contract Documents shall rest on the Contractor, and unless the proof is satisfactory to the Engineer, the substitution will not be approved.

GC.24 SAMPLES, CERTIFICATES, AND TESTS

The Contractor shall submit all material, product, or equipment samples, descriptions, certificates, affidavits, etc., as called for in the Contract Documents or required by the Engineer, promptly after award of the Contract and acceptance of the Contractor's bond. No such material or equipment shall be manufactured or delivered to the site, except at the Contractor's own risk, until the required samples or certificates have been approved in writing by the Engineer. Any delay in the work caused by late or improper submission of samples or certificates for approval shall not be considered just cause for an extension of the Contract time. Submit four (4) copies of data for Engineer's review.

Each sample submitted by the Contractor shall carry a label giving the name of the Contractor, the project for which it is intended, and the name of the producer. The accompanying certificate or letter from the Contractor shall state that the sample complies with Contract requirements, shall give the name and brand of the product, its place of origin, the name and address of the producer, and all specifications or other detailed information which will assist the Engineer in passing upon the acceptability of the sample promptly. It shall also include the statement that all materials or equipment furnished for use in the project will comply with the

samples and/or certified statements.

Approval of any materials shall be general only and shall not constitute a waiver of the Local Public Agency's right to demand full compliance with Contract requirements. After actual deliveries, the Engineer will have such check tests made as he deems necessary in each instance and may reject materials and equipment and accessories for cause, even though such materials and articles have been given general approval. If materials, equipment or accessories which fail to meet check tests have been incorporated in the work, the Engineer will have the right to cause their removal and replacement by proper materials or to demand and secure such reparation by the Contractor as is equitable, at the Contractor's expense.

Except as otherwise specifically stated in the Contract, the costs of sampling and testing will be divided as follows:

(1) The Contractor shall furnish without extra cost, including packing and delivery charges, all samples required for testing purposes, except those samples taken on the project by the Engineer;

(2) The Contractor shall assume all costs of re-testing materials which fail to meet Contract requirements;

(3) The Contractor shall assume all costs of testing materials offered in substitution for those found deficient; and

(4) The Local Public Agency will pay all other expenses.

GC.25 PERMITS AND CODES

The Contractor shall give all notices required by and comply with all applicable laws, ordinances, and codes of the Local Government. All construction work and/or utility installations shall comply with all applicable ordinances, and codes including all written waivers.

Should the Contractor fail to observe the foregoing provisions and proceed with the construction and/or install any utility at variance with any applicable ordinance or code, including any written waivers, the Contractor shall remove such work without cost to the Local Public Agency.

The Contractor shall at his own expense, secure and pay to the appropriate department of the Local Government the fees or charges for all permits for street pavements, sidewalks, sheds, removal of abandoned water taps, sealing of house connection drains, pavement cuts, building, electrical, plumbing, water, gas, and sewer permits required by the local regulatory body or any of its agencies.

The Contractor shall comply with applicable local laws and ordinances governing the disposal of surplus excavation, materials, debris, and rubbish on or off the site of the work, and commit no trespass on any public or private property in any operation due to or connected with the Improvements embraced in this Contract.

GC.26 CARE OF WORK

The Contractor alone shall be responsible for the safety, efficiency, and adequacy of his plant, appliances, and methods, and for any injury, including death, to any person, and for any damage to property which may result from their failure, or from their improper construction, maintenance, or operation. He shall indemnify and save harmless the Local Public Agency and the Engineer and their employees and agents, against any judgement with costs, which may be obtained as a result of such injury or property damage, because of the alleged liability of the Local Public Agency or of the Engineer.

The Contractor shall be responsible for the proper care and protection of all materials delivered and work performed until completion and final acceptance, whether or not the same has been covered in whole or in part by payments made by the Local Public Agency.

The Contractor shall provide sufficient competent watchmen, as required to protect the work both day and night, including Saturdays, Sundays, and holidays, from the time the work is commenced until final completion and acceptance.

In an emergency affecting the safety of life or property, including adjoining property, the Contractor, without special instructions or authorization from the Local Public Agency, is authorized to act at his discretion to prevent such threatened loss or injury, and he shall so act. He shall likewise act if instructed to do so by the Local Public Agency. Any compensation claimed by the Contractor on account of such emergency work will be determined by the Local Public Agency as provided in the Section entitled CHANGES IN THE WORK under GENERAL CONDITIONS.

The Contractor shall avoid damage, as a result of his operations, to existing sidewalks, streets, curbs, pavements, utilities (except those which are to be replaced or removed), adjoining property, etc., and he shall at his own expense completely repair any damage thereto caused by his operations, to the satisfaction of the Owner.

The Contractor shall shore up, brace, underpin, secure, and protect as may be necessary, all foundations and other parts of existing structures adjacent to, adjoining, and in the vicinity of the site, which may be in any way affected by the excavations or other operations connected with the construction of the Improvements embraced in this Contract. The Contractor shall be responsible for the giving of any and all required notices to any adjoining or adjacent property owner or other party before the commencement of any work. The Contractor shall indemnify and save harmless the Local Public Agency, and the Engineer, from any damages on account of settlements or the loss of lateral support of adjoining property and from all loss or expense and all damages for which it may be claimed that the Local Public Agency, or the Engineer, is liable in consequence of such injury or damage to adjoining and adjacent structures and their premises.

GC.27 QUALITY OF WORK AND PROPERTY

All property, materials, and equipment shall be new and free of defects upon

completion of the Contractor's performance and, unless different standards are specified elsewhere in the Contract Documents, shall be of the best type and quality available for the purpose. All of the Contractor's work shall be performed with the highest degree of skill and completed free of defects and in accordance with the Contract Documents. Any work, property, materials, or equipment not in conformance with these standards shall be considered defective. If any work, property, materials or equipment is discovered to have been defective or not in conformance with the Contract Documents, whether said discovery is made before or after completion of performance, the Contractor, at his expense, after written notice from the Owner or Engineer, shall promptly replace or correct the deficiency and pay any engineering costs and consequential expense or damage incurred by the Owner in connection therewith. If the Contractor fails to promptly correct all deficiencies, the Owner shall have the option of remedying the defects at the Contractor's cost. If the Contractor is required to furnish shop drawings or designs, the above provisions shall apply to such drawings or designs.

Neither the Owner's payment, acceptance, inspection or use of the work, property, materials, or equipment, nor any other provision of the Contract Documents shall constitute acceptance of work, property, materials, or equipment which are defective or not in accordance with the Contract Documents. If the Contractor breaches any provision of the Contract Documents with respect to the quality of the work, property, materials, equipment or performance, whether initial or corrective, his liability to the Owner shall continue until the statute of limitations with respect to such breach of contract has expired following discovery of the defect. All parts of this section are cumulative to any other provisions of the Contract Documents and not in derogation thereof. If it is customary for a warranty to be issued for any of the property to be furnished hereunder, such warranty shall be furnished, but no limitations in any such warranty shall reduce the obligations imposed under the Contractor in the Contract Documents or by Arkansas Law; but if any greater obligations than imposed in this Contract are specified in any such warranty or by Arkansas Law, those greater obligations shall be deemed a part of this Contract and enforceable by the Owner.

GC.28 ACCIDENT PREVENTION

The Contractor shall exercise proper precaution at all times for the protection of persons and property and shall be responsible for all damages to persons or property, either on or off the site, which occur as a result of his prosecution of the work. The safety provisions of applicable laws and building and construction codes, including applicable parts of the Arkansas Department of Labor Safety Code, shall be observed. The Contractor shall take or cause to be taken such safety and health measures, additional to those herein required, as he may deem necessary or desirable. Machinery, equipment, and all hazards shall be guarded in accordance with the safety provisions of the "Manual of Accident Prevention in Construction" published by the Associated General Contractors of America, Inc., to the extent that such provisions are not in conflict with applicable local laws.

The Contractor shall maintain an accurate record of all cases of death, occupational disease, and injury requiring medical attention or causing loss of time from work, arising out of and in the course of employment on work under the Contract. The Contractor shall promptly furnish the Local Public Agency with reports concerning these matters.

The Contractor shall indemnify and save harmless the Local Public Agency, and the Engineer, from any claims for damages resulting from personal injury and/or death suffered or alleged to have been suffered by any person as a result of any work conducted under this Contract.

GC.29 SANITARY FACILITIES

The Contractor shall furnish, install, and maintain ample sanitary facilities for the workers. As the needs arise, a sufficient number of enclosed temporary toilets shall be conveniently placed as required by the sanitary codes of the State and Local Government. Drinking water shall be provided from an approved source, so piped or transported as to keep it safe and fresh and served from single service containers or satisfactory types of sanitary drinking stands or fountains. All such facilities and services shall be furnished in strict accordance with existing and governing health regulations.

GC.30 USE OF PREMISES

The Contractor shall confine his equipment, storage of materials, and construction operations to the Rights-of-Way to accommodate the permanent construction furnished by the Local Public Agency, or as may be directed otherwise by the Local Public Agency, and shall not unreasonably encumber the site of other public Rights-of-Way with his materials and construction equipment. In case such Rights-of-Way furnished by the Local Public Agency are not sufficient to accommodate the Contractor's operations, he shall arrange with the Local Government, or with the owner or owners of private property for additional area or areas, and without involving the Local Public Agency in any manner whatsoever.

The Contractor shall comply with all reasonable instructions of the Local Public Agency and the ordinances and codes of the Local Government (including but not limited to those) regarding signs, advertising, traffic, fires, explosives, danger signals, and barricades.

GC.31 REMOVAL OF DEBRIS, CLEANING, ETC.

The Contractor shall periodically or as directed during the progress of the work, remove and legally dispose of all surplus excavated material and debris, and keep the project site and public Rights-of-Way reasonably clear. Upon completion of the work, he shall remove all temporary construction facilities, debris, and unused materials provided for the work, thoroughly clean all drainage pipes, structures, ditches, and other features, and put the whole site of the work and public Rights-of-Way in a neat and "broom" clean condition. Trash burning on the site of the work will be subject to prior approval of the Local Public Agency and existing State and local regulations.

GC.32 RETURN OF OWNER'S MATERIALS, EQUIPMENT OR PROPERTY

Any materials, equipment or other property which belongs to the Owner, removed by the Contractor, shall be delivered to the Owner's designated warehouse unless its re-use is specified in the Plans and Specifications. If the Contractor fails to deliver the materials, equipment, or other property, the value, as determined by the Engineer, shall be deducted from

amounts due the Contractor.

GC.33 OBSERVATION OF WORK

The Engineer, his authorized representative, and any Federal, State, County, or local authority representative having jurisdiction over any part of the work, or area through which the work is located, shall at all times have access to the work in progress.

The detailed manner and method of performing the work shall be under the direction and control of the Contractor, but all work performed shall at all times be subject to the observation of the Engineer or his authorized representative to ascertain its conformance with the Contract Documents. The Contractor shall furnish all reasonable aid and assistance required by the Engineer for the proper observation and examination of the work and all parts thereof.

The Engineer is not responsible for the Contractor's means, methods, techniques, sequences, or procedures of construction, or safety precautions and programs incident thereto.

Observers may be appointed by the Engineer or Owner. Observers shall have no authority to permit any deviation from the Plans and Specifications except on written order from the Engineer and the Contractor will be liable for any deviation except on such written order. Observers shall have authority, subject to the final decision of the Engineer, to condemn and reject any defective work and to suspend the work when it is not being performed properly.

The observer shall in no case act as superintendent or foreman or perform other duties for the Contractor, nor interfere with the management of the work by the latter. Any advice which the observer may give the Contractor shall in no way be construed as binding to the Engineer in any way or releasing the Contractor from fulfilling all of the terms of the Contract.

Any defective work may be rejected by the Engineer at any time before final acceptance of the work, even though the same may have been previously overlooked and estimated for payment and payment therefore made by the Owner.

The Contractor shall notify the Engineer sufficiently in advance of backfilling or concealing any facilities to permit proper observation. If the facilities are concealed without approval or consent of the Engineer, the Contractor shall uncover for observation and recover such facilities all at his own expense, when so requested by the Engineer.

Should it be considered necessary or advisable by the Engineer at any time before final acceptance of the entire work to make an examination of work already completed, by uncovering the same, the Contractor shall on request promptly furnish all necessary facilities, labor, and material. If such work is found to be defective in any important or essential respect, due to fault of the Contractor or his Subcontractors, he shall defray all the expenses of such examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the Contract, the actual cost of labor and material necessarily involved in the examination and replacement, plus fifteen (15%) percent of such costs to cover superintendence, general expenses and profit, shall be allowed the Contractor and he shall, in addition, if

completion of the work of the entire Contract has been delayed thereby, be granted a suitable extension of time on account of the additional work involved.

Observation of materials and appurtenances to be incorporated in the Improvements embraced in this Contract may be made at the place of production, manufacture or shipment, whenever the quantity justifies it, and such observation and acceptance, unless otherwise stated in the Technical Specifications, shall be final, except as regards (1) latent defects, (2) departures from specific requirements of the Contract, (3) damage or loss in transit, or (4) fraud or such gross mistakes as amount to fraud. Subject to the requirements contained in the preceding sentence, the observation of materials as a whole or in part will be made at the project site.

All condemned or rejected work shall be promptly taken out and replaced by satisfactory work. Should the Contractor fail or refuse to comply with the instructions in this respect, the Owner may, upon certification by the Engineer, withhold payment, proceed to terminate the Contract, or perform work as provided herein.

GC.34 REVIEW BY LOCAL PUBLIC AGENCY OR OWNER

The Local Public Agency, its authorized representatives and agents, shall at all times during work hours have access to and be permitted to observe and review all work, materials, equipment, payrolls, and personnel records pertaining to this Contract, provided, however, that all instructions and approval with respect to the work will be given to the Contractor only by the Local Public Agency through its authorized representatives or agents. Representatives of Federal, State, and local government agencies also have the right of physical inspection of the work during work hours.

GC.35 PROHIBITED INTERESTS

No official of the Owner who is authorized in such capacity and on behalf of the Owner to negotiate, make, accept or approve, or to take part in negotiating, making, accepting, or approving any architectural, engineering, inspection, construction or material supply contract or any subcontract in connection with the construction of the project, shall become directly or indirectly interested personally in this Contract or in any part thereof. No officer, employee, architect, attorney, engineer, or inspector of or for the Owner who is authorized in such capacity and on behalf of the Owner to exercise any executive, supervisory, or other similar functions in connection with the construction of the project, shall become directly or indirectly interested personally in this Contract or in any part thereof.

GC.36 FINAL INSPECTION

When the Improvements embraced in this Contract are substantially completed, the Contractor shall notify the Local Public Agency in writing that the work will be ready for final inspection on a definite date which shall be stated in the notice. The notice will be given at least ten (10) days prior to the date stated for final inspection, and bear the signed concurrence of the representative of the Local Public Agency having charge of observation. If the Local Public Agency determines that the status of the Improvements is as represented, it will make the arrangements necessary to have final inspection commenced on the date stated in the notice, or

as soon thereafter as practicable. The inspection party will also include the representatives of each Department of the Local Government and any other involved government agencies when such improvements are later to be accepted by the Local Government and/or other government agencies.

GC.37 PATENTS

The Contractor shall hold and save harmless the Local Public Agency, its officers, employees, and the Engineer, from liability of any nature or kind, including costs and expenses, for, or on account of, any patented or unpatented invention, process, article, or appliance manufactured or used in the performance of the Contract, including its use by the Local Public Agency, unless otherwise specifically stipulated in the Technical Specifications.

GC.38 WARRANTY OF TITLE

No material, supplies, or equipment for the work shall be purchased subject to any chattel mortgage or under a conditional sale or other agreement by which an interest therein or in any part thereof is retained by the seller or supplier. The Contractor shall warrant good title to all materials, supplies, and equipment installed or incorporated in the work and upon completion of all work, shall deliver the same together with all improvements and appurtenances constructed or placed thereon by him to the Local Public Agency free from any claims, liens, or charges. Neither the Contractor nor any person, firm or corporation furnishing any material or labor for any work covered by this Contract shall have any right to a lien upon any improvement or appurtenance thereon. Nothing contained in this paragraph, however, shall defeat or impair the right of persons furnishing materials or labor to recover under any bond given by the Contractor for their protection or any rights under any law permitting such persons to look to funds due the Contractor in the hands of the Local Public Agency. The provisions of this paragraph shall be inserted in all subcontracts and material Contracts and notice of its provisions shall be given to all persons furnishing materials for the work when no formal Contract is entered into for such materials.

GC.39 GENERAL GUARANTY

Neither the final certificate of payment nor any provision in the Contract nor partial or entire use of the Improvements embraced in this Contract by the Local Public Agency or the public shall constitute an acceptance of work not done in accordance with the Contract or relieve the Contractor of liability in respect to any express warranties or responsibility for faulty materials or workmanship. The Contractor shall promptly remedy any defects in the work and pay for any damage to other work resulting therefrom which shall appear within a period of twelve (12) months from the agreed upon day of final acceptance of the work. The Local Public Agency will give notice of defective materials and work with reasonable promptness.

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SUPPLEMENTAL GENERAL CONDITIONS

SUPPLEMENTAL GENERAL CONDITIONS

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SGC.1 PROGRESS SCHEDULE

The Contractor shall submit a construction contract schedule of the bar graph (or other approved) type seven (7) calendar days prior to the preconstruction conference showing the following information as a minimum:

(1) Actual date construction is scheduled to start if different from the date of notice to proceed.

(2) Planned contract completion date.

(3) Beginning and completion dates for each phase of work.

(4) Respective dates for submission of shop drawings and the beginning of manufacture, the testing of, and the installation of materials, supplies, and equipment.

(5) All construction milestone dates.

(6) A separate graph showing work placement in dollars versus contract time. The schedule shall incorporate contract changes as they occur. The schedule shall be maintained in an up-to-date condition and shall be available for inspection at the construction site at all times.

The construction contract schedule shall be submitted in conjunction with and/or in addition to any other specification requirements concerning schedules.

SGC.2 DRAWINGS

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.

The Contractor shall keep one (1) copy of all drawings and Contract Documents in good condition readily accessible at the site of the work available to the Engineer and his authorized representatives.

SGC.3 RECORD DRAWINGS

Before any work is started, the Contractor shall obtain at his own expense one set of Plans to be used for Record Drawings. The Engineer will supply the Plans at printing cost to the Contractor. Record Drawings will be kept on full-size plan sheets; no half-size sheets will be permitted. The Record Drawings shall be stored and maintained in good condition at all times by the Contractor and shall be made available to the Engineer at the work site immediately at the Engineer's request. All writing, notes, comments, dimensions, etc. shall be legible. The Record Drawings shall be stored flat and shall not be rolled. The Record Drawings shall be submitted to the Engineer before the project can be accepted.

The Contractor shall accurately identify and document the locations of all underground and/or concealed work that he has performed and/or has been affected by his work. This shall include all equipment, conduits, pipe lines, valves, fittings and other appurtenances and underground structures that are part of the Contractor's work and their proximity to existing underground structures and utilities to the extent known. The Contractor will certify accuracy of the Record Drawings by endorsement.

The Contractor's work shall be documented on the Record Drawings in an on-going manner. Distances, offsets, depths, etc. shall be accurately measured from permanent fixed objects so that the Owner can expose any item of the work in the future with a minimum of effort. All such measurements shall be made before the items of work are covered or backfilled. The Contractor shall be required to expose and recover/backfill the work at his own expense if, in the Engineer's opinion, the measurements need to be verified.

SGC.4 TRENCH AND EXCAVATION SAFETY SYSTEM

This section covers trench and excavation safety system required for constructing improvements that necessitate open excavations on the project. All work under this item shall be in accordance with the current edition of the "Occupational Safety and Health Administration Standard for Excavation and Trenches Safety System, 29 CFR 1926, Subpart P.

The Contractor, prior to beginning any excavation, shall notify the State Department of Labor (Safety Division) that work is commencing on a project with excavations greater than five feet.

The Contractor shall notify all Utility Companies and Owners in accordance with OSHA Administration 29 CFR 1926.651(b) (2) for the purpose of locating utilities and underground installations.

Where the trench or excavation endangers the stability of a building, wall, street, highway, utilities, or other installation, the Contractor shall provide support systems such as shoring, bracing, or underpinning to ensure the stability of such structure or utility.

The Contractor may elect to remove and replace or relocate such structures or utilities with the written approval of the Owner of the structure or utility and the Project Owner.

The work required by this item will be paid for at the price bid for "Trench and Excavation Safety Systems". After award of the contract, the Contractor shall submit to the Engineer a breakdown of cost for work involved in the price bid for "Trench and Excavation Safety Systems" and shall, with each periodic payment request, submit a certification by the Contractor's "competent person" as defined in Subpart "P" 1926.650(b) that the Contractor has complied with the provisions of "Occupational Safety and Health Administration Standard for Excavation and Trenches Safety System", 29 CFR 1926 Subpart P for work for which payment is requested.

SGC.5 MINIMUM WAGES

The Contractor shall comply with the provisions of the Arkansas Prevailing Wage Law, Arkansas Code Annotated '' 22-9-301 to 22-9-313 (1987) and the administrative regulations promulgated thereunder, as they apply under this Contract.

It shall be the responsibility of each Bidder to determine the consequences of the applicable provisions of the Arkansas Prevailing Wage Law, and include in his bid any costs made necessary because of them. No additional payment will be made, and no extension of Contract time will be allowed because of the provisions of the Law.

The Contractor shall comply with all applicable provisions of the Arkansas Prevailing Wage Law including the following:

(1) Pay wage rates not less than the prevailing hourly wage for each craft or type of workman needed to execute the Contract, as determined by the Arkansas Department of Labor, such determination covering rates for regular hours, and rates for holidays and overtime work (Arkansas Code Ann. '' 22-9-308(b)(2) and '' 22-9-308(c)).

(2) Post on the site of the work, in a conspicuous and accessible place, a copy of the prevailing wage rates as determined (Arkansas Code Ann. '' 22-9-309(a)).

(3) Keep an accurate record of workman employed by him, and by each subcontractor, if any, including the wage payments made. Such record, or records, shall be available for inspection by the Arkansas Department of Labor, and the Owner, during reasonable hours.

(4) The Contractor's bond shall guarantee the payment of wages as herein specified.

Wage rates as established by the Arkansas Department of Labor are minimum for wage payments under this Contract.

There is no assurance on the part of the Owner that mechanics and laborers can be obtained for the rates herein bound. Each Bidder shall determine for himself the availability of laborers and mechanics, and the rates he must pay to obtain employees. Such rates of pay may be greater than, but cannot be less than, the wage rates bound herein.

INSERT WAGE RATES HERE

SPECIAL CONDITIONS

SPECIAL CONDITIONS

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SC.1 GENERAL

The provisions of this section of the Specifications shall govern in the event of any conflict between them and the "General Conditions".

SC.2 LOCATION OF PROJECT

This project is located in the vicinity of 711 Owens and 738 Valley Drive.

SC.3 SCOPE OF WORK

The work to be performed under this Contract consists of furnishing all materials, labor, supervision, tools and equipment necessary to construct 3 detention ponds.

SC.4 TIME ALLOTTED FOR COMPLETION

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The time allotted for completion of the work shall be One Hundred twenty (120) consecutive calendar days, which time shall begin with ten (10) days of the work order or notice to proceed, or upon the date the Contractor moves on the site to begin the work, whichever is the earliest date. After award of the Contract is made and the Contract Documents are completed, the Engineer shall issue a Notice to Proceed, notifying the Contractor to proceed with the construction of the project, subject to the provisions of this paragraph.

SC.5 FORMS, PLANS AND SPECIFICATIONS

Forms of Proposal, Contract and Bonds, and Plans and Specifications may be examined at the Community Economic Development Office, 519 West Washington, Jonesboro, Arkansas 72403, and obtained from NRS Consulting Engineers, 1220 Stone Street, Jonesboro, Arkansas (Phone – 870-972-5316), upon payment of $75.00 for each. No refunds will be made.

SC.6 LIQUIDATED DAMAGES FOR DELAY

The number of calendar days allowed for completion of the project is stipulated in the Proposal and in the Contract and shall be known as the Contract Time.

1. It is understood and agreed by and between the Owner and the Contractor that the time of completion herein set out is a reasonable time. The Contractor shall perform fully, entirely, and in an acceptable manner, the work contracted for within the contract time stated in the Contract. The contract time shall be counted from ten days after the effective date of the "Notice to Proceed", or the date work commences, whichever occurs first; and shall include all Sundays, holidays, and non-work days. All calendar days elapsing between the effective dates of any orders of the Engineer for suspension of the prosecution of the work, due to the fault of the Contractor, shall be counted as elapsed contract time, and shall not be considered for an extension of time.

2. Extensions of time for completion, under the condition of 2(a) next below, will be granted; extensions may be granted under other stated conditions:

a. If the satisfactory execution and completion of the Contract shall require work or

material in greater amounts or quantities than those set forth in the Contract, then the Contract time shall be increased in the same proportion as the additional work bears to the original work contracted for.

b. An average or usual number of inclement weather days, when work cannot proceed, is to be anticipated during the construction period and is not to be considered as warranting extension of time. If, however, it appears that the Contractor is delayed by conditions of weather, so unusual as not to be reasonably anticipated, extensions of time may be granted.

c. Should the work under the Contract be delayed by other causes which could not have been prevented or contemplated by the Contractor, and which are beyond the Contractor's power to prevent or remedy, an extension of time may be granted. Such causes of delay shall include but not necessarily be limited to the following:

(1) Acts of God, acts of the public enemy, acts of the Owner except as provided in these Specifications, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and unusually severe weather.

(2) Any delays of Subcontractors or suppliers occasioned by any of the causes specified above.

3. The Resident Project Representative or other authorized representative of the City shall keep a written record sufficient for determination as to the inclusion of that day in the computation of Contract time. This record shall be available for examination by the Contractor during normal hours of work as soon as feasible after the first of each construction month. In case of disagreement between the representative of the City and the Contractor, as to the classification of any day, the matter shall be referred to the City whose decision shall be final.

4. The amount of all extensions of time for whatever reason granted shall be determined by the Owner. In general, only actual and not hypothetical days of delay will be considered. The Owner shall have authority to grant additional extensions of time as the Owner may deem justifiable.

The amount of Liquidated Damages to be assessed shall be in accordance with the schedule that follows:

Amount of Contract	Liquidated Damages Per Day
Less than $25,000.00	$100.00
Not less than $ 25,000.00 but less than $ 50,000.00	150.00
Not less than $ 50,000.00 but less than $ 100,000.00	200.00
Not less than $100,000.00 but less than $ 500,000.00	250.00
Not less than $500,000.00 but less than $1,000,000.00	350.00
Over $1,000,000.00	500.00

1. Time is an essential element of the Contract and it is important that the work be pressed vigorously to completion. Loss will accrue to the public due to delayed completion of the facility; and the cost to the Owner of the administration of the Contract, including engineering, inspection and supervision, will be increased as the time occupied in the work is lengthened.

2. Should the Contractor fail to complete the work as set forth in the Specifications and within the time stipulated in the Contract, there shall be deducted the amount shown in the schedule above, for each day of delay, from any monies due or which may thereafter become due him, not as a penalty, but as ascertained and liquidated damages.

3. Should the amount otherwise due the Contractor be less than the amount of such ascertained and liquidated damages, the Contractor and his Surety shall be liable to the Owner for such deficiency.

If the Contractor finds it impossible for reasons beyond his control to complete the work within the Contract time as specified, or as extended in accordance with the provisions of this subsection, he may, at any time prior to the expiration of the Contract time as extended, make a written request to the Engineer for an extension of time setting forth the reasons which he believes will justify the granting of his request. The Contractor's plea that insufficient time was specified is not a valid reason for extension of time. If the Engineer finds that the work was delayed because of conditions beyond the control and without the fault of the Contractor, he may recommend to the Owner that the contract time be extended as conditions justify. If the Owner extends the contract, the extended time for completion shall then be in full force and effect, the same as though it were the original time for completion.

SC.7 KNOWLEDGE OF CONDITIONS

The Contractor states that he has examined all the available records and has made a field examination of the site and right-of-way and that he has informed himself about the character, quality, and quantity of surface and subsurface materials and other conditions to be encountered; the quantities in various sections of the work; the character of equipment and facilities needed for the prosecution of the work; the location and suitability of all construction materials; the local labor conditions; and all other matters in connection with the work and services to be performed under this

contract.

SC.8 PERMITS AND RIGHTS-OF-WAY

The Owner will secure easements across public or private property permanently required for the project at no cost to the Contractor.

The Contractor shall lease, buy, or otherwise make satisfactory provision, without obligating the Owner in any manner, for any land required outside the land provided by the Owner.

State Highway and Railroad Crossing Permits will be secured by the Owner. All other permits and licenses necessary for the prosecution of the work shall be secured and paid for by the Contractor.

SC.9 REFERENCE SPECIFICATIONS

Where reference is made in these Specifications to the Standard Specifications of the Arkansas State Highway and Transportation Department, such reference is made for expediency and standardization, and such specifications (latest edition thereof) referred to are hereby made a part of these Specifications.

More specifically, if any items or materials required for completion of the work required for this project are not specified in these Contract Documents, such items or materials and requirements for installation shall conform to the latest edition of the Arkansas State Highway and Transportation Department Standard Specifications for Highway Construction.

SC.10 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.

SC.11 USED 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.

SC.12 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.

The Contractor shall be responsible for protection of all existing structures, and any damage caused by his operations shall be repaired immediately without cost to the Owner. It shall be the responsibility of the prospective Contractor to examine the site completely before submitting his bid.

SC.13 BARRICADES, LIGHTS, AND WATCHMEN

Where the work is performed on or adjacent to any street, alley, or public place, the Contractor shall, at his own 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 a 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 to provide barricades, signs, lights, and watchmen to protect it. Whenever evidence is found of such damage, the Engineer may order the damaged portion immediately removed and replaced by the Contractor at his expense. The Contractor's responsibility for the maintenance of barricades, signs, and lights, and for providing watchmen, shall not cease until the project shall has been accepted by the Owner.

SC.14 FENCES AND DRAINAGE CHANNELS

Boundary fences or other improvements removed to permit the installation of the work shall be replaced in the same location and left in a condition as good or better than that in which they were found except as indicated on the Drawings.

Where surface drainage channels are disturbed or blocked during construction, they shall be restored to their original condition of grade and cross section after the work of construction is completed.

SC.15 WATER FOR CONSTRUCTION

Water used for the mixing of concrete, testing, or any other purpose incidental to this project, shall be furnished by the Contractor. The Contractor shall make the necessary arrangements for securing and transporting such water and shall take such water in a manner and at such times that will not produce a harmful drain or decrease of pressure in the Owners' water system. No separate payment will be made for water used but the cost thereof shall be included in the Unit Price Schedule.

SC.16 MATERIAL STORAGE

Materials delivered to the site of the work in advance of their use shall be stored so as to

cause the least inconvenience and in a manner satisfactory to the Engineer.

SC.17 EXISTING UTILITIES AND SERVICE LINES

The Contractor shall be responsible for the protection of all existing utilities or improvements crossed by or adjacent to his construction operations. Where existing utilities or service lines are cut, broken, or damaged, the Contractor shall replace or repair immediately the utilities or service lines with the same type of original material and construction or better, at his own expense.

SC.18 TESTING, INSPECTION AND CONTROL

Testing and control of all materials used in the work shall be done by an approved commercial laboratory employed and paid directly by the Contractor, unless otherwise specified in the Technical Specifications. The Contractor shall furnish, at his own expense, all necessary specimens for testing of the materials, as required by the Engineer.

SC.19 BOND

Coincident with the execution of the Contract, the Contractor shall furnish a good and sufficient surety bond, in the full amount of the Contract sum, guaranteeing the faithful performance of all covenants, stipulations, and agreements of the Contract, the payment of all bills and obligations arising from the execution of the Contract, (which bills or obligations might or will in any manner become a claim against the Owner), and guaranteeing the work included in this Contract against faulty materials and/or poor workmanship for one (1) year after the date of completion of Contract.

All provisions of the bond shall be complete and in full accordance with Statutory requirements. The bond shall be executed with the proper sureties through a company licensed and qualified to operate in the state and approved by the Owner. The issuing agent's power of attorney shall be attached to the bond and the bond shall be signed by an agent resident in the state and date of bond shall be the date of execution of the Contract. If at any time during the continuance of the Contract the surety on the Contractor's bond becomes irresponsible, the Owner shall have the right to require additional and sufficient sureties which the Contractor shall furnish to the satisfaction of the Owner within ten (10) days after notice to do so. In default thereof, the Contract may be suspended and all payments or money due the Contractor withheld.

SC.20 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. At the time the Owner obtains beneficial occupancy of any of the facilities placed in satisfactory service, charges for power and light for regular operation of those involved facilities will become the responsibility of the Owner.

SC.21 LINES AND GRADES

The Contractor will be furnished baselines and benchmarks to control the work. The

Contractor shall be responsible for the additional instrument control necessary to lay out and construct the improvements. The Contractor's instrument control of the work shall not be measured for separate payment.

As a minimum, the Contractor shall provide the following instrument control for the work:

a. The Contractor shall set intermediate line and grade stakes and final grade stakes, "blue tops," as required to control the construction of the detention ponds.

SC.22 LEGAL HOLIDAYS

January 1, Memorial Day, July 4, Labor Day, Thanksgiving, and December 25 will be considered as being legal holidays; no other days will be so considered. Should any holiday fall on Sunday, the holiday shall be observed on the following Monday. No engineering observation will be furnished on legal holidays or Sundays, except in an emergency. The Contractor shall observe the legal holidays and Sundays, and no work shall be performed on these days except in an emergency. However, these days shall not be excluded from Contract time.

SC.23 SEQUENCE OF CONSTRUCTION

Sequence of all phases of work shall be such as to provide for the least possible inconvenience to the Owner. Scheduling of work which would interfere with normal traffic operation shall be coordinated with the Owner. Material and equipment received on the project prior to time of installation shall be stored at such locations designated by the Owner.

The Contractor shall furnish a proposed work schedule to the Engineer for review and approval as soon as possible after award of the Contract. This schedule shall show anticipated equipment delivery schedules and times of beginning and completing of the several work tasks.

SC.24 TEST BORINGS

The Contractor may rely upon the general accuracy of the test pit or soil boring data contained in reports or drawings, but such reports and drawings are not Contract Documents. The Contractor may not rely upon or make any claim against Owner, Engineer, or Engineer's Consultants with respect to (1) the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by the Contractor and safety precautions and programs incident thereto, (2) other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings, (3) any Contractor interpretation of or conclusion drawn from any data, interpretations, opinions, or information.

SC.25 RELEASE AND CONTRACTOR'S AFFIDAVIT

At the project's completion, the Contractor shall execute the attached Release and Lien Waiver to release all claims against the Owner arising under and by virtue of his Contract. The date of the Release shall be that agreed to for the final acceptance of the project with the Owner.

SC.26 MAINTENANCE BOND

The Contractor shall execute the attached Maintenance Bond guaranteeing the work included in the Contract against faulty materials and/or prior workmanship for one year after completion of the Contract. The date of the Maintenance Bond shall be that agreed to for the final acceptance of the project with the Owner. The Maintenance Bond shall be for 100% of the final contract amount.

At the end of the applicable maintenance period, the Owner and/or the Engineer, with the Contractor, shall make an inspection of the work. The Contractor immediately shall repair and correct any and all defects which have resulted from faulty workmanship, equipment, or materials, following which repair and correction the Local Public Agency will accept full maintenance of the work.

RELEASE

FROM: Contractor's Name _____

Address _____

_____

TO: City of Jonesboro

DATE OF CONTRACT: _____

Upon receipt of the final payment and in consideration of that amount, the undersigned does hereby release the Owner and its agents from any and all claims arising under or by virtue of this Contract or modification thereof occurring from the undersigned's performance in connection with the construction of the

Valley and Owens Drainage Improvements _____

_____

project.

_____
Contractor's Signature

_____
Title

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

_____
Notary Public

My Commission Expires:

_____

CONTRACTOR'S AFFIDAVIT

FROM: Contractor's Name _____

Address _____

_____

TO: City of Jonesboro

DATE OF CONTRACT: _____

I hereby certify that all claims for material, labor, and supplies entered into contingent and incident to the construction or used in the course of the performance of the work on the construction of the

Valley and Owens Drainage Improvements

_____

have been fully satisfied.

_____
Contractor's Signature

_____
Title

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

_____
Notary Public

My Commission Expires:

_____

The Surety Company consents to the release of the retained percentage on this project with the understanding that should any unforeseen contingencies arise having a right of action on the bond that the Surety Company will not waive liability through the consent to the release of the retained percentage.

Dated _____

_____
Surety Company

By_____
Resident Agent, State of Arkansas

MAINTENANCE BOND

KNOW ALL MEN BY THESE PRESENTS:

That we, _____,

as Principal, and _____,

as Surety, are held and firmly bound unto the City of Jonesboro, as Obligee, in the full and

just sum of _____

($_____) DOLLARS, lawful money of the United States of America, to be paid to the said Obligee, its successors or assigns, for the payment of which, well and truly to be made, we and each of us, bind ourselves, our heirs, executors and assigns, themselves, and their successors and assigns, jointly and severally, firmly by these presents.

Dated this _____ day of _____, 20 _____.

The conditions of this obligation are such, that whereas, said Principal,

has by a certain contract with the City of Jonesboro, Arkansas dated the_____ day of _____, 20____, agreed to construct the Valley and Owens Drainage Improvements and to maintain the said Improvement in good condition for a period of one (1) year from the date of acceptance of the improvements.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the said Principal shall indemnify and hold harmless the said Obligee from and against all loss, costs, damages, and expenses whatsoever which it may suffer or be compelled to pay by reason of failure of the said Principal to keep said work in repair for a one year period beginning _____ against any and all defects of faulty workmanship or inferior material, then this obligation shall be void; otherwise to remain in full force and effect.

It is further agreed that if the said Principal or Surety herein shall fail to maintain said improvements in good condition for the said period of 1 year, and at any time repairs shall be necessary, that the cost of making said repairs shall be determined by the Owner, or some person or persons designated by the Owner to ascertain the same, and if, upon thirty (30) days notice, the said amount ascertained shall not be paid by the Principal or Surety herein, or if the necessary repairs are not made, that said amount shall become due upon the expiration of thirty (30) days, and suit may be maintained to recover the amount so determined in any Court of competent jurisdiction; and that the amount so determined shall be conclusive upon the parties as to the amount due on this bond for the repair or repairs included therein; and that the cost of all repairs shall be so determined from time to time during the life of this bond, as the condition of the improvements may require.

Signed, sealed and delivered the day and year first above written.

SEAL _____
Principal

ATTEST:

_____ BY:_____

_____ _____

SEAL _____
Surety

ATTEST:

_____ BY:_____
Attorney in Fact

_____ _____

four\sc

TECHNICAL SPECIFICATIONS

SECTION 01100

SUMMARY OF WORK

PART 1. GENERAL

1.01 SCOPE

A. The work to be performed under the provisions of these contract documents consists of furnishing all materials, equipment, labor, installation, and finishing needed to construct and place in complete operation the proposed detention ponds as shown on the Drawings and specified herein.

1.02 SCOPE, NATURE, AND INTENT OF SPECIFICATIONS AND PLANS

A. The specifications and plans are intended to supplement, but not necessarily duplicate each other. Any work exhibited in the one, and not in the other, shall be executed as if it had been set forth in both.

Should anything necessary for a clear understanding of the work be omitted from the specifications and plans, or should the requirements appear to be in conflict, the Contractor shall secure written instructions from the Engineer before proceeding with the construction affected thereby.

Dimensions and elevations shown on the plans shall be accurately followed even though they differ from scaled measurements. No work shown on the plans, the dimensions of which are not indicated, shall be executed until necessary dimensions have been obtained from the Engineer.

The Contractor shall check all dimensions, elevations, and quantities shown on the plans and schedules given to him by the Engineer, and shall notify the Engineer of any discrepancy between the plans and the conditions on the ground, or any error or omission in the plans, or in the layout or instructions, which he may discover in the course of the work. The Contractor will not be allowed to knowingly and intentionally take advantage of any error or omission in the plans or contract documents that he could have reasonably provided notice to the Engineer about. Full instruction will be furnished by the Engineer should such error or omission be discovered, and the Contractor shall carry out such instructions as if originally specified.

It is expected that prospective bidding contractors will completely review the Plans and Specifications prior to bidding and notify the Engineer prior to bid date of any perceived conflicts, errors, omissions, or clarifications anticipated.

These will be addressed by written Addendum to all Bidders. Prospective bidding Contractors are encouraged to visit the project location to assure their complete understanding of the project requirements.

1.03 MATERIALS

A. These specifications are intended to be so written that only materials of the best quality and grade will be furnished. The fact that the specifications may fail to be sufficiently complete in some detail will not relieve the Contractor of full responsibility for providing materials of high quality and protecting them adequately until incorporation in the structure. The specifications for materials set out the minimum standard of quality which the Engineer believes is necessary to procure a satisfactory project. No substitutions will be permitted until the Contractor has received written permission of the Engineer to make a substitution for materials which have been specified.

1.04 WORKMANSHIP

A. The specifications contain detailed instructions and descriptions covering the major items of construction and workmanship necessary for building and completing the various units or elements of the project. The specifications are intended to be so written that only first class workmanship and finish of the best grade and quality will result. The fact that these specifications may fail to be so complete as to cover all details will not relieve the Contractor of full responsibility for providing a completed project of high quality, first class finish and appearance, and satisfactory for operation.

1.05 LAND FOR CONSTRUCTION PURPOSES

A. The Contractor will be permitted to use available space belonging to the Owner, on or near the site of work, for construction purposes and for the storage of materials and equipment. The location and extent of the areas so used shall be as designated and approved by the Owner.

The Contractor shall be solely responsible for obtaining and shall pay all costs in connection with any additional storage or work area sites which may be required for proper completion of the work.

1.06 PROTECTING EXISTING STRUCTURES AND UTILITIES

A. Where excavation or demolition endangers adjacent structures and utilities, the Contractor shall at his own expense carefully support and protect all such structures and/or utilities so that there will be no failure or settlement. Where it is necessary to move services, poles, guy wires, pipelines, or other obstructions, the Contractor shall notify and cooperate

with the utility owner. In case damage to an existing structure or utility occurs, whether failure or settlement, the Contractor shall restore the structure or utility to its original conditions and position without compensation from the Owner.

Contractor shall repair or replace all damaged street surfaces, driveways, sidewalks, curb and gutter, fences, drainage structures, or other structures, to the satisfaction of the Engineer and the Owner. Structures shall be restored to a condition equal to or better than the original condition and of a similar material and design. The costs of such repair or replacement shall be borne by the Contractor and shall be included in the Proposal.

The Contractor shall verify the type, size, and location of all existing piping and valves in the construction area. All piping, valves, electrical conduit, etc., in the construction area shall be removed or relocated as necessary in a manner acceptable to the Engineer.

B. Contractor shall maintain access to existing operating units affected by his construction activities and coordinate with the Utility regarding times of limited access. Contractor shall coordinate with Utility regarding time and extent of any plant shut downs. Contractor is advised that shut down periods may be limited to four (4) hours and 12:00 A.M. to 6:00 A.M. time frames.

1.07 HANDLING MATERIALS NOT APPROVED

A. The Contractor shall remove from the site any materials found to be damaged, or not meeting the specifications. These materials shall be removed promptly, unless the Engineer will accept the materials after repairing. Inspection before installation shall not relieve the Contractor from any responsibility to furnish good quality materials. Review of shop drawings and submittals is for the Contractor's benefit. Any equipment that has been installed without approval by the Engineer prior to installation and found not to be in accordance with the specifications shall be removed and replaced with approved items at the Contractor's sole expense.

1.08 PUMPING AND DEWATERING OPERATIONS

A. Work to be performed may require draining, pumping and dewatering, and certain cleaning operations necessary to complete the work as specified and as indicated on the drawings. It is the intent of these specifications that such draining, pumping and dewatering, and cleaning operations shall be the obligation of the Contractor.

1.09 SANITATION FACILITIES

A. The Contractor shall provide portable toilet facilities in sufficient number for the Contractor's use throughout the course of the project and in accordance with OSHA requirements.

1.10 UNFAVORABLE CONSTRUCTION CONDITIONS

A. During unfavorable weather, wet ground, or other unsuitable construction conditions, the Contractor shall confine his operations to work which will not be adversely affected. No portion of the work shall be constructed under conditions which would adversely affect the quality, unless special means or precautions are taken by the Contractor to perform the work in a proper and satisfactory manner.

1.11 FINAL TESTING AND OPERATION

A. Prior to presentation for final acceptance of the work under this contract, the Contractor shall have started and operated all units of the project for a sufficient duration of time to permit the Engineer to observe overall performance of the respective units and equipment. Such operation shall be properly coordinated with the Owner's operating personnel.

1.12 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly conditions.

B. Where work is performed in residential and commercial areas, cleanup sufficient to permit normal access and use by property owners shall be performed daily. Final cleanup shall be performed once the extension has been installed. Failure to perform clean-up work as described above may result in retainage of an additional ten (10%) percent of the cost of the work completed until the cleanup work has been completed or non-processing of additional pay requests.

END OF SECTION

SECTION 01290

MEASUREMENT AND PAYMENT
UNIT PRICE

PART 1. GENERAL

1.01 SECTION INCLUDES

A. Scope of Payment.
B. Unit Price Items.

1.02 RELATED SECTIONS

A. Bid.
B. General Conditions.
C. Section 01100 – Summary of Work.

1.03 SCOPE OF PAYMENT

A. The Bid for each item of Work listed in the Unit Price Bid of the Bid, whether lump sum amount or unit price based on the approximate quantity listed, shall include all costs as specified in the BID.
B. Reasonably implied parts of the Work shall be included in the Bid, as specified in Section 01100.
C. Payments for lump sum items shall be made in proportion to the amount of Work accomplished as determined by the Engineer as of the period ending date of each Application for Payment.
D. Measurement of unit price items will be made by Engineer of actual quantities installed as of the period ending date of each Application for Payment.

1.04 UNIT PRICE ITEMS

A. Base Bid

1. Item No. 1 – Site Preparation.

a. Unit of Measure: Lump Sum
b. This item shall compensate the Contractor for providing all of the materials, equipment, and labor to prep the site including clearing and grubbing, installing and maintaining storm water BMPs, installing temporary perimeter fencing and signs limiting site access, construction stakeout, and other appurtenances as shown on the Drawings and described in these Specifications.

2. Item No. 2 – Earth Work

a. Unit of Measure: Lump Sum.

b. This item shall compensate the Contractor for providing all of the materials, equipment, and labor to perform the necessary earthwork, to bring the project to grade as shown on the Drawings and describe in the specifications, and to haul the excess excavation material offsite for disposal and/or placement by others.

3. Item No. 3 – Retaining Wall

   a. Unit of Measure: Lump Sum
   b. This item shall compensate the Contractor for providing all of the materials, equipment, and labor to construct the concrete retaining walls and appurtenances including railings as shown on the Drawings and described in these Specifications.

4. Item No. 4 – Valley Pond Inlet/Outlet Structures

   a. Unit of Measure: Lump Sum.
   b. This item shall compensate the Contractor for providing all of the materials, equipment, and labor to install the proposed junction boxes, 38”x60” Horizontal Elliptical RCP, mitered end section, Guard Rail, Sidewalk, and all other appurtenances as shown on the Drawings and described in these Specifications.

5. Item No. 5 – Owens Avenue Structure

   a. Unit of Measure: Lump Sum.
   a. This item shall compensate the Contractor for providing all of the materials, equipment, and labor to install eight (8) 40 L.F. of 34”x53” Horizontal Elliptical Reinforced Concrete Pipe with mitered end sections as shown on the Drawings and described in these Specifications.

6. Item No. 6 – Owens Pond Outlet Structure

   a. Unit of Measure: Lump Sum.
   b. This item shall compensate the Contractor for providing all of the materials, equipment, and labor to install the Owens Outlet structure including box culverts, junction box, end sections, and other appurtenances as shown on the Drawings and described in these Specifications.

7. Item No. 7 – Final Grading

   a. Unit of Measure: Lump Sum.
   b. This item shall compensate the Contractor for providing all of the materials, equipment, and labor to perform final grading and establish final vegetative cover as shown on the Drawings and described in these Specifications.

8. Item No. 8 – Cellular Concrete Block

    a. Unit of Measure: Lump Sum.
    b. This item shall compensate the Contractor for providing all of the materials, equipment, and labor to install cellular concrete as shown on the Drawings and described in these Specifications.

9. Item No. 9 – Turf Reinforcement Mat

    a. Unit of Measure: Lump Sum.
    b. This item shall compensate the Contractor for providing all of the materials, equipment, and labor to install turf reinforcement mat as shown on the Drawings and described in these Specifications.

10. Item No. 10 – Perimeter Fencing and Gates

    a. Unit of Measure: Lump Sum.
    b. This item shall compensate the Contractor for providing all of the materials, equipment, and labor to install perimeter fencing and gates as shown on the Drawings and described in these Specifications.

11. Item No. 10 – Ductile Iron Piping

    a. Unit of Measure: Lump Sum.
    b. This item shall compensate the Contractor for providing all of the materials, equipment, and labor to install 40 L.F. of 8" D.I. piping as shown on the Drawings and described in these Specifications.

12. Item No. 8– Act 291, 1993 Trench and Excavation Safety System

    b. Unit of Measure: Lump Sum.
    a. Self explanatory.

PART 2. PRODUCTS

Not Used.

PART 3. EXECUTION

Not Used.

END OF SECTION

SECTION 01310

GENERAL CONSTRUCTION REQUIREMENTS

PART 1. GENERAL

1.01 RELATIONSHIP WITH EXISTING FACILITIES

A. The Contractor shall notify, in writing, the Engineer 14-days in advance of the time that is necessary to take out of service an existing facility.
B. The Contractor shall repair or replace, without delay, any and all damage to existing structures, surfaces, equipment, controls, or systems resulting from his operations that are required to put the facility back in operation upon completion of the project.

1.02 BYPASSING

A. Whenever existing facilities have to be temporarily dammed and dewatered, the work will be done by the Contractor in a manner acceptable to the Engineer. The Contractor shall notify the Engineer and the Owner prior to any such activities.
B. The General Contractor shall also be responsible for removal of all temporary earthen, steel, or concrete structures required to accomplish this work and returning the sites of these structures to the same or an improved condition as when this project was initiated by the Contractor.
C. The Contractor shall be responsible for all bypass pumping required to maintain flow during construction.

1.03 TEMPORARY FLOW STOPPAGE

A. In cases where the construction requires connections to live conduits, or the plugging of pipelines, provisions for temporarily halting flow as required will be planned and coordinated with the Owner and conducted by the Contractor.

1.04 CLEAN UP

A. The Contractor shall not allow the site of the work to become littered with trash and waste material, but shall maintain the site of the work in a neat and orderly condition throughout the construction period. On or before the completion of the work, the Contractor shall carefully clean out all pits, drain lines and drains, chambers or conduits and shall remove all temporary structure built by him and rubbish of all kinds from any of the grounds which he has occupied and leave them in first-class condition to the satisfaction of the Engineer.

1.05 AS-BUILT DRAWINGS

A. Concurrent with performance of contract work, each Contractor shall prepare and maintain one neat and legible set of full-size contract drawings indicating “as-built”, including but not limited to changes in type, location, length, or size for any item of work. “As-built” drawing mark-ups shall be prepared at the time the applicable item of work is constructed or installed. The preparation of “as-built” drawings shall be as required by the Engineer. Prior to the final acceptance of contract work, the Contractor shall submit to the Engineer one complete set of drawings showing all “as-built” work modifications.

1.06 TESTS AND INSPECTIONS

A. All materials, equipment, installation, and workmanship included in this contract, if so required by the Engineer, shall be tested and inspected to prove compliance with the contract requirements.

B. No tests specified herein shall be applied until the item to be tested has been inspected and approval given for the application of such test by an authorized representative of the manufacturer of the equipment.

C. Acceptance Tests and Inspection

1. The acceptance tests shall be at the Contractor’s expense for any materials or equipment specified herein. This is to include test of items during the process of manufacture and on completion of manufacture, comprising material tests, hydraulic pressure tests, electric tests, performance and operating tests and inspections in accordance with the relevant standards of the industry, and more particularly as detailed in individual clauses of these specifications, or as may be required by the Engineer to satisfy himself that the items tested and inspected comply with the requirements of this contract.
2. All items delivered at the site shall be inspected in order that the Engineer may be satisfied that such items are of the specified quality and workmanship and are in good order and condition at the time of delivery.

D. Installed Tests and Inspection

1. If under test, any portion of the work shall fail to fulfill the contract requirements and is altered, renewed, or replaced, tests on that portion when so altered, removed, or replaced, together with all other portions of the work as are affected thereby, shall if so required by the Engineer, be repeated within reasonable time and in accordance with the specified conditions, and the Contractor shall refund to the Owner all reasonable expenses incurred by the Owner as a result of the carrying out of such tests.
2. Where, in the case of an otherwise satisfactory installed test, any doubt, dispute, or difference should arise between the Engineer and the Contractor regarding the test results or the methods or

equipment used in the carrying out by the Contractor such a test, then the Engineer may order the test to be repeated. If the repeat test using such modified methods or equipment as the Engineer may require substantially confirms the previous test, then all costs in connection with the repeat test will be paid by the Owner, otherwise the costs shall be borne by the Contractor. Where the results of any installed test fail to comply with the contract requirements for such test, then such repeat tests as may be necessary to achieve the contract requirements shall be made by the Contractor at his own expense.

END OF SECTION

SECTION 01330

SUBMITTAL REQUIREMENTS

PART 1. GENERAL

1.01 SUBMITTALS

A. Shop Drawings

The Contractor shall submit to the Engineer six (6) copies of all shop drawings, erection drawings, schedules, certified dimension prints, schematic or system diagrams, data sheets, catalog cuts, bulletins, and other descriptive material as is customary or as may be specifically required by the Engineer prior to purchase, fabrication, or shipment to the Project Site.

B. Format

The drawings and data shall have been reviewed and approved by the Contractor prior to submittal and each bound submittal submitted shall bear the Contractor's approval stamp and signature. Submittal data shall be in such form and so presented that the Engineer may readily review the data. This means that submittals must be bound in an 8½" by 11" format. Engineering drawings are to be reduced to an 11" by 17" format, folded and bound with the submittal. No 24" by 36" drawings will be accepted. Bound submittals shall be for individual specification sections and shall be complete by section.

C. Qualifications

The Contractor is directed to specific specification sections where specific requirements for submittals may be described in more detail. The drawings, or other required descriptive material, will be examined and approved, corrected, or rejected by the Engineer with reasonable promptness. All rejected material shall be revised and resubmitted until approval is obtained. Each submittal shall be accompanied by a letter of qualification stating that the proposed equipment meets the specifications; or, clearly itemizes and explains any proposed exceptions. Delays caused by such rejections will not be considered cause for extension of the contract time. Approval by Engineer indicates general compliance or acceptability; however, it does not relieve the Contractor of final responsibility for proper dimensions, character, quantity, quality, strength, or sufficiency of the items involved. Waivers, or exceptions, to the Plans and Specifications may be validated only in writing by the Engineer. Written validation will specifically identify the feature in question and no such waiver or exception shall be assumed as a result of omissions or oversights in examining and approving the above drawings or other materials.

Any equipment installed by the Contractor, not formally approved by the Engineer, shall be at the Contractor's risk if it is found that the installed equipment does not conform to the specifications.

1.02 OPERATIONS AND MAINTENANCE MANUALS

A. Operation and Maintenance Manuals

The Contractor shall provide six (6) copies of all required operation and maintenance instructions and manuals for individual equipment items. This information shall be completely up-to-date and reflect actual field installed equipment.

B. Format

The O&M information shall be furnished in bound sets as described for the Submittals.

C. Minimum Requirements

1. Name, address, and phone number of nearest competent service organization who can supply parts and service. If this is not the manufacturer's own service department, then furnish letters confirming that the named organization has been factory authorized to represent the manufacturer of the equipment furnished.
2. Complete descriptive literature and drawings of all material furnished. This is to include "as-built" wiring diagrams of all electrical equipment, "as-built" erection drawings providing up-to-date information on the actual construction of the equipment furnished and any field modifications made during installation, start-up, and testing.
3. Installation, operation, and maintenance brochures from the original manufacturers of all mechanical components such as gear reducers, drive couplings, etc., shall be incorporated into the completed installation.
4. Complete Electrical Motor information (name plate date).
5. Recommended spare parts list.
6. Guide to "troubleshooting".
7. All required assembly, installation, alignment, adjustment, and checking instructions.
8. All required operating instructions.
9. All required maintenance instructions including schedules of all required routine maintenance and lubrication checks.

D. Payment

The Owner and Engineer reserve the right to withhold final payment until acceptable O&M information is received for all equipment specified.

1.03 TESTS AND INSPECTIONS

A. All materials, equipment, installation, and workmanship included in this contract, if so required by the Engineer, shall be tested and inspected to prove compliance with the contract requirements.

B. No tests specified herein shall be applied until the item to be tested has been inspected and approval given for the application of such test by an authorized representative of the manufacturer of the equipment.

C. General Requirements: Tests and inspection shall include:

1. The delivery acceptance tests and inspections.
2. The installed tests and inspections of items as installed.

Tests and inspections, unless otherwise specified or accepted, shall be in accordance with the recognized standards of the industry.

The form of evidence of satisfactory fulfillment of delivery acceptance test and of installed test and inspection requirements shall be, at the discretion of the Engineer, either by tests and inspections carried out in his presence or by certificates or reports of tests and inspections carried out by approved persons or organizations.

D. Delivery Acceptance Tests and Inspections: The delivery acceptance tests and inspections shall be at the Contractor's expense for any materials or equipment specified herein and shall include the following:

1. Test of items during the process of manufacture and/or on completion of manufacture, comprising material tests, hydraulic pressure tests, electric tests, performance and operating tests, and inspections in accordance with the relevant standards of the industry and more particularly as detailed in individual clauses of the specifications, or as may be required by the Engineer to satisfy himself that the items tested and inspected comply with the requirements of this contract.
2. Inspection of all items delivered at the site in order that the Engineer may be satisfied that such items are of the specified quality and workmanship and are in good order and condition at the time of delivery.

END OF SECTION

SECTION 01720

PROJECT RECORD DOCUMENT

PART 1. GENERAL

1.01 SCOPE

A. General

Prepare and maintain record documents for the project to accurately reflect the construction as built. Documents must be submitted upon completion as a condition of final acceptance.

1.02 MAINTENANCE OF RECORD DOCUMENTS

A. Maintain at the job site during construction activities, one copy of:

1. Contract drawings. As-built drawings.
2. Specifications.
3. Addenda.
4. Reviewed Shop drawings.
5. Change Orders and Field Orders.
6. Other contract modifications.
7. Field test records.
8. Manufacturers' Certifications.
9. Correspondence.

B. Storage

Store record documents in an approved location apart from documents used for construction. Do not use record documents for construction purposes. Provide files and racks for orderly storage. Maintain documents in clean, dry, legible condition. Make documents and samples available at all times for inspection by the Engineer.

1.03 RECORDING

A. Drawing Requirements

Legibly mark contract drawings to record actual construction:

1. Depths of various elements of foundation in relation to the baseline and project benchmark.
2. Horizontal and vertical location of underground and under-slab utilities and appurtenances referenced to permanent surface improvements.
3. Location of internal utilities and appurtenances referenced to permanent surface improvements.

4. Field changes of dimension and detail.
5. Changes made by change order or field order.
6. Details not on original contract drawings.

B. Specifications

Legibly mark specifications and addenda to record:

1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.
2. Changes made by change order or field order.
3. Other matters not originally specified.

1.04 SUBMITTAL

A. At project completion, deliver record documents to the Engineer. Place all letter-sized material in a 3-ring binder, neatly indexed. Bind contract drawings and shop drawings in rolls of convenient size for ease of handling.

B. Accompany the submittal with a transmittal letter containing:

1. Date.
2. Project title and number.
3. Contractor's name and address.
4. Title and number of each record document.
5. Certification that each document as submitted is complete and accurate.
6. Signature of Contractor.

C. Sufficient retainage will be withheld from final payment until acceptable Project Record Documents are submitted to the Engineer.

END OF SECTION

SECTION 01890

PROJECT CLOSE-OUT

PART 1. GENERAL

1.01 SCOPE

A. Provide all labor, material, equipment, services, papers, documents, and incidentals necessary to effectively close-out the project.

PART 2. DETAIL REQUIREMENTS

2.01 DETAIL

A. Cleaning-up – As the project draws to a close, a program of total clean-up will be initiated by the Contractor. All trades will effectively take care of their areas of responsibilities to insure a clean and ready to occupy work environment both inside and out. This will take place prior to the issuance of the Letter of Substantial Completion.

B. Guarantees, Bonds, and Affidavits – Prior to project close-out, the Contractor shall submit to the Engineer, three (3) copies of all guarantees, bonds, affidavits, testing reports, color selections, etc., as appropriate to material, service or equipment installation affecting the project. List General Contractor and all major subs and suppliers as well as Project Engineer. List addresses and telephone numbers for each. Bind into three (3) loose-leaf binders and organize by Section.

C. Project Record Drawings – The Contractor shall maintain and then furnish the Engineer with "as-built" reproducible mylar drawings upon completion of project, showing actual location, in line and elevations, of all exterior utility lines and of any relocation of piping or conduit within the limits of the site from that shown on the drawings. Any changes to the details, plans or elevations should also be recorded on these drawings. All copies of drawings and specifications, except the Contractor's executed contract sets, remain the property of the Engineer and shall be returned to him at the completion of the project.

   If required, the drawings may be returned to the Contractor where more information is necessary prior to acceptance of the drawings.

D. Final Inspection – At Final Inspection, prior to the issuance of the final Certificate for Payment and in compliance with the General Conditions, all previous punch-list items will be verified by the Contractor in writing that he has corrected said items to conform to the plans and specifications. Also, at this time, individual affidavits from ALL subcontractors stating that they have been paid in full for their services by the General Contractor shall be presented to the Engineer.

The Final Inspection will be made in company with a representative of the Owner, the Engineer, and the Contractor.

END OF SECTION

SECTION 02060

RIPRAP

PART 1. GENERAL

1.01 SCOPE

A. This section shall consist of a protective layer of stone laid to a minimum thickness of one (1') foot, placed in accordance with these Specifications, and to the line, grade, and location shown on the Drawings or as directed by the Engineer.

PART 2. PRODUCTS

2.01 MATERIALS

A. Materials and work for riprap shall be in accordance with Section 816 – Filter Blanket and Riprap of the Arkansas Highway and Transportation Department's Standard Specifications (latest edition), unless modified as augmented herein. The type of riprap shall be in accordance with Article 816.02(a) and as directed by the Engineer.

B. Material for riprap shall consist of field stone, or rough unhewn quarry stone, rectangular or nearly rectangular in section, and otherwise shall conform to the applicable portion of Article 816.02, Materials, Standard Specifications.

PART 3. EXECUTION

3.01 CONSTRUCTION METHODS

A. Placing riprap shall be done in accordance with Article 816.03, Construction Requirements, Standard Specifications, for Dumped Riprap, unless placing by hand is necessary to properly protect the surrounding ground.

END OF SECTION

SECTION 02200

SITE PREPARATION

PART 1. GENERAL

1.01 SUMMARY

A. Remove interfering or objectionable material from construction site.
B. Preserve vegetation and existing objects designated to remain from injury or defacement.

1.02 DEFINITIONS

A. Clearing:

1. Cutting, removing, and disposing of trees, snags, stumps, shrubs, brush, limbs, and other vegetation growth.
2. Removing evidence of their presence from the surface, inclusive of sticks and branches greater than 2” in diameter or thickness.
3. Removing and disposing of trash piles, rubbish, and fencing.

B. Grubbing:

1. Removing and disposing of wood or root matter below the ground surface remaining after clearing.
2. Includes stumps, trunks, roots, or root systems greater than 2” in diameter or thickness to a depth of 18” below the ground surface.

PART 2. MATERIALS

2.01 GENERAL

A. Provide materials, suitable and in adequate quantity, required to accomplish Work of this Section.

PART 3. EXECUTION

3.01 PREPARATION

A. Review with Engineer’s representative the location, limits, and methods to be used prior to commencing Work under this Section.

3.02 CUTTING TIMBER

A. Exercise care when clearing near the clearing limits to avoid damage to existing trees, vegetation, structures, or utilities which are outside of the clearing limits.
B. Trees shall to be leveled into the area to be cleared.

C. Flush cut stumps not designated for grubbing by cutting to within 2” of the ground surface.
D. Timber is the property of the Contractor.
E. Dispose of stumps, limbs, brush, snags, non-marketable timber, and other vegetative growth off-site.

3.03 PRESERVATION OF TREES, SHRUBS, AND OTHER VEGETATION

A. Protect trees, shrubbery, and other vegetation from damage that is not designated for removal.
B. Cut and remove tree branches only where, in the opinion of the Engineer, that cutting is necessary to effect construction operation.
C. Remove branches other than those required to affect the Work to provide a balanced appearance of any tree, as approved prior to removal.
D. Treat scars resulting from the removal of branches with an approved tree sealant.

3.04 CLEARING AND GRUBBING LIMITS

A. Clear and grub areas within the limits of construction.
B. Clear and grub in stages as the construction area is increased to avoid unnecessary clearing and grubbing.

3.05 DISPOSAL OF CLEARING AND GRUBBING DEBRIS

A. Haul the material from the Work site and dispose of in accordance with state, federal, and local laws. Off-site disposal shall be at the Contractor’s sole expense.

END OF SECTION

SECTION 02260

CONTRACTOR'S TRENCH EXCAVATION SYSTEM AND SHORING
SAFETY PLAN

PART 1. GENERAL

1.01 SCOPE

A. This section shall cover the Contractor furnishing a Trench Safety System Plan and all labor and materials for installation and maintenance of the Trench Safety System.

1.02 APPLICATION

A. For any trench excavation at a depth of five (5') feet or greater or where shown on the plans, provide trench safety system. Trench safety system shall be in accordance with details shown on Contractor's Trench Excavation and Shoring Safety Plan.

1.03 QUALITY ASSURANCE

A. Trench safety system to meet appropriate requirements established in the Occupational Safety and Health Administration (OSHA) Safety & Health Regulations, 29 CFR 1926, Subpart P – Excavations, Trenching and Shoring, as may be amended, and OSHA's proposed standards on trenching excavation published in Volume 54, No. 209 of the Federal Register, October 31, 1989; Pages 45959-45991. Those standards are incorporated into these specifications by reference. Should the applicable OSHA standards be modified or amended, the more stringent standards shall apply.

1.04 SUBMITTALS

A. The Contractor shall provide Trench Safety System Plan for Project. The Plan shall incorporate the detailed plans and specifications for a Trench Safety System conforming to OSHA standards. The Plan shall account for project site conditions, Contractor's trench construction means, methods, techniques or procedures, the relationship of spoil to the edge of the trench, and Contractor's equipment to be used in the construction of the project facilities requiring Trench Safety System(s). Contractor shall submit a certificate signed and sealed by a Registered Professional Engineer licensed in the State of Arkansas stating that Contractor's Trench Safety System Plan has been designed in conformance with appropriate OSHA standards and applicable specifications as required by this item. Contractor's Trench Safety System Plan shall demonstrate the type(s) of Trench Safety System to be used on the project.

1.05 MATERIALS

A. The materials used in the Trench Safety System shall be furnished by the Contractor, as approved by the Owner, to comply with the requirements of the work of the Contractor as specified herein.

B. Timber – Trench sheeting materials to be full size, a minimum of two (2") inches in thickness, solid and sound, free from weakening defects such as loose knots and splits.

C. Steel Sheet Piling – Steel sheet piling shall at a minimum conform to one of the following specifications:

1. ASTM A328.
2. ASTM A572, Grade 50.
3. ASTM A690.

Steel for stringers (wales) and cross braces shall conform to ASTM A588.

D. Steel Trench Boxes – Portable steel trench box shall at a minimum be constructed of steel conforming to ASTM Specification A-36. Connecting bolts used shall conform to Specifications ASTM A-307. Welds to conform to requirements of AWS Specification D1.1.

E. Other Materials – Other materials to be utilized shall at a minimum conform to applicable ASTM standards.

1.06 INSTALLATION

A. Trench safety system shall be constructed, installed, and maintained in accordance with the Trench Safety System Plan prepared by the Contractor's Registered Professional Engineer.

B. Timber Sheeting – Timber sheeting and size of uprights, stringers (wales), and cross bracing to be installed in accordance with Contractor's plan. In no case shall the sizes of the timber sheeting members be less than, or the spacing greater than, those given in Table P-2 in OSHA Part 1926, Sub-part P – Excavation, Trenching, and Backfilling. Place cross braces in true horizontal position, spaced vertically, and secured to prevent sliding, falling, or kickouts. Cross-braces to be placed at each end of the stringers (wales), in addition to other locations required. Cross braces and stringers (wales) to be placed at splices of uprights, in addition to other locations required.

C. Steel Sheet Piling – Steel sheet piling of equal or greater strength may be used in lieu of timber shoring shown in the OSHA tables (proposed standards). Drive steel sheet piling to at least minimum depth below trench bottom as recommended by Contractor's Registered Professional Engineer providing design. Place cross braces in true horizontal position, spaced vertically, and secured to prevent sliding, falling, or kickouts. Cross braces to be placed at each end of stringers (wales), in addition to other locations required.

D. Trench Boxes – Portable trench box may be used in lieu of timber trench shoring shown in the OSHA tables (proposed standards) and shall be

designed to provide equal or greater protection than timber trench shoring shown in the OSHA tables. In cases where top of portable trench box will be below top of trench, the trench must be sloped to the maximum allowable slope for the soil conditions existing on the Project. In areas where a sloped trench will affect the integrity of existing structures, Contractor to protect structures prior to sloping trench.

E. Trench Jacks – When trench jacks are used for cross bracing and/or stringers (wales), the trench jacks shall provide protection greater than or equal to the timber cross bracing shown in the OSHA tables (proposed standards). Trench jacks to be placed at each end of stringers (wales) in addition to other locations required.

1.07 SUPERVISION

A. Contractor must provide competent supervisory personnel at each trench while work is in progress to ensure Contractor's methods, procedures, equipment, and materials pertaining to the safety systems in this Item are sufficient to meet requirements of Arkansas Law and OSHA Standards.

1.08 MAINTENANCE OF SAFETY SYSTEM

A. The safety system shall be maintained in the condition as shown on the Trench Excavation and Shoring Safety Plan as designed by the Contractor's Registered Professional Engineer. The Contractor shall take all necessary precautions to ensure the safety systems are not damaged during their use. If at any time during its use a safety system is damaged, personnel shall be immediately removed from the trench excavation area and the safety system repaired. The Contractor shall take all necessary precautions to ensure no loads, except those provided for in the plan, are imposed upon the trench safety system.

1.09 INSPECTION

A. Contractor shall make daily inspection of trench safety system to ensure that the system meets OSHA requirements. Daily inspection to be made by competent personnel. If evidence of possible cave-ins or slides is apparent, all work in the trench shall cease until necessary precautions have been taken to safeguard personnel entering the trench. Contractor shall maintain permanent record of daily inspection.

1.10 REMOVAL

A. Bed and backfill pipe to a point at least one (1') foot above top of pipe or other embedded items prior to removal of any portion of trench safety system. Bedding and backfill to be in accordance to other applicable specifications items. Backfilling and removal of trench supports shall be in accordance with Contractor's Trench Excavation and Shoring Safety Plan. Removal of trench safety system to be accomplished in such a

manner to cause no damage to pipe or other embedded items. Remove no braces or trench supports until all personnel have evacuated the trench. Backfill trench to within five (5') feet of natural ground prior to removal of entire trench safety system.

END OF SECTION

SECTION 02300

EARTHWORK

PART 1. GENERAL

1.01 SUMMARY

A. Perform earthwork.
B. Meet requirements for excavation safety, or to facilitate construction due to wet conditions.
C. Perform excavation regardless of type, nature, or condition of materials encountered.
D. Contractor shall make his own estimate of the type and extent of the various materials to be excavated in order to accomplish the work.
E. There will be no extra compensation for dewatering.

1.02 RELATED SECTIONS

A. Section 01330 – Submittal
B. Section 02200 – Site Preparation.
C. Section 02315 – Trench Excavation, Backfill, and Compacting.
D. Section 02950 – Site Restoration and Rehabilitation.

1.03 REFERENCES

A. Arkansas State Highway and Transportation Department, Standard Specifications for Highway Construction, 1996.

1. AHTD Section 303 – Aggregate Base Course.

B. American Society for Testing and Materials, 1916 Race St. Philadelphia, PA 19103.

1. ASTM D698 – Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5-lb. (2.49-kg) Rammer and 12" (304.8-mm) Drop.
2. ASTM D1556 – Test Method for Density of Soil Placed by the Sand-Cone Method.
3. ASTM D1557 – Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 10-lb. (4.54-kg) Rammer and 18" (457-mm) Drop.
4. ASTM D2216 – Method for Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures.
5. ASTM D2922 – Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
6. ASTM D3017 – Test Method for Moisture Content of Soil and Soil Aggregate in Place of Nuclear Methods (Shallow Depth).

C. Occupational Safety and Health Administration (OSHA) Standard for Excavation and Trenches Safety System, 29 CFR 1926, Subpart P = Excavations.
D. Arkansas Statute 291 of 1993.

1.04 DEFINITIONS

A. Relative Compaction:

1. The ratio, in percent, of the as-compacted field dry density to the laboratory maximum dry density as determined by the Standard Proctor Test, ASTM D698, or as determined by the Modified Procter Test, ASTM D1557, as applicable.
2. Corrections for oversize material may be applied to either the as-compacted field dry density or the maximum dry density, as determined by the Engineer.

B. Optimum Moisture Content:

1. Moisture content of the material for which the maximum dry density is obtained as determined by ASTM D698 or D1557.
2. Field moisture contents shall be determined on the basis of the fraction passing the ¾" sieve.

C. Completed Course: A course or layer that is ready for the next layer or the next phase of construction.

1.05 SUMBITTALS

A. Submit in accordance with Section 01330.
B. Provide the following:

1. Samples of imported material.
2. Samples of onsite material to be used as fill.
3. Certification that imported materials conform to the Specification requirements along with copies of the test results from a qualified commercial testing laboratory.
4. Proctor curves on fill material as prepared by approved laboratory.

1.06 PROJECT CONDITIONS

A. Beginning work of this Section means acceptance of existing conditions.

PART 2. PRODUCTS

2.01 FILL

A. Free from roots, organic matter, trash, and debris with maximum particle size of 1½".

B. It is intended that structural backfill material be obtained from on site to the maximum extent possible.

2.02 IMPORTED GRANULAR FILL

A. Provide granular fill beneath structures as noted on Drawings.
B. Imported granular fill to consist of a natural or artificial mixture of gravel and soil mortar, uniformly well graded from coarse to fine.
C. Conform to the AHTD Section 303 classifications for Class 7 as designated on the Drawings.

2.03 TOPSOIL

A. Selected topsoil at the site, properly stored and protected, free from roots, sticks, hard clay, and stones which will not pass through a 2" square opening.
B. Provide imported topsoil of equal quality if required to accomplish the work.

2.04 COMPACTION EQUIPMENT

A. Provide compaction equipment of suitable type and adequate to obtain the densities specified.
B. Operate compaction equipment in strict accordance with the manufacturer's instructions and recommendations.
C. Hand-operated equipment shall be capable of achieving the specified densities.

2.05 MOISTURE CONTROL EQUIPMENT

A. Provide equipment for applying water of a type and quality adequate for the work; it shall not leak; and be equipped with a distributor bar or other approved device to assure uniform application.
B. Provide equipment for mixing and drying out material consisting of blades, discs, or other approved equipment.

2.06 WATER REMOVAL EQUIPMENT

A. Provide and operate equipment adequate to keep excavation and trenches free of water.

2.07 IMPORTED MATERIAL ACCEPTANCE

A. Import only if insufficient material is available on-site.
B. Locate and arrange use of a site near the construction area for obtaining borrow material.
C. Additional tests required at the borrow area:

1. Standard Proctor.
2. Remolded permeability
3. Atterberg limits.

D. Upon completion of removal of borrow material, grade the site to drain, place topsoil on disturbed areas, and establish grass as outlined in Section 02950.
E. Costs shall be the responsibility of the Contractor.

2.08 SELECTED MATERIAL ACCEPTANCE

A. Provide samples for testing representative of the actual material to be installed in the work. Take samples from each 2,000 cubic yards of material stockpiled. Depending on the uniformity of the material, Engineer may request more frequent samples.
B. Forward test results to the Engineer at least 10 days before the material is required for use. If tests indicate that the material does not meet Specification requirements, the material shall not be installed in the work.
C. Material which is placed in the work but does not conform to the Specification requirements shall be removed and replaced at the Contractor's sole expense.

PART 3. EXECUTION

3.01 CLEARING AND GRUBBING

A. Complete clearing and grubbing work as specified in Section 02200 prior to beginning work in this Section.

3.02 STRIPPING TOPSOIL

A. Remove existing grass and overburden before excavating topsoil.
B. Prior to beginning excavation or fill, strip the topsoil to a depth of at least 6" or to a depth sufficient to remove organic material and stockpile for future use.
C. In general, remove topsoil where structures are to be built, trenches dug, and roads, parking lots, walks, and similar improvements constructed within the area presently covered with topsoil.
D. Store topsoil clear of the construction area.
E. Take reasonable care to prevent the topsoil from becoming mixed with subsoil or eroding.

3.03 STRUCTURAL EXCAVATION

A. Contractor shall be solely responsible for trench and excavation safety systems in accordance with ACT 291 of 1993 and OSHA requirements.
B. Identify required lines, levels, and grades.
C. Identify known underground utilities. Contractor will be responsible for locating utilities.
D. The method of excavation is optional; however, no equipment shall be operated in a manner that will endanger existing structures and their integrity.
E. Use excavation support system such as sheet piling where ever necessary.
F. Allow for forms, working space, granular base, and finish topsoil where shown on Drawings or required.

G. Do not carry excavation for footings and slab deeper than the elevation shown on Drawings after allowing for base material.

H. If undercutting occurs below the planned dirt grade, the same fill material as specified for backfill shall be placed and compacted to 95% Standard Proctor Density as defined in this Section up to the planned dirt grade in 8" lifts. Do not attempt to over compact excessively wet soil. Allow to dry first by scarifying and aerating before remolding.

3.04 DEWATERING EXCAVATION

A. Remove water during periods when concrete is being deposited, pipe is being laid, and placing of backfill unless water settling is required, and at other times as required for efficient and safe execution of the work.

B. Accomplish removal of groundwater in a manner that will preserve the strength of the foundation soils, will not cause instability of the excavation slopes, and will not result in damage to existing structures.

C. Where necessary to these purposes, lower the water level in advance of excavation, utilizing wells, well points, or similar methods.

D. Maintain the water level in the gravel stratum as measured in piezometers, a minimum of 3' below the prevailing excavation level or as needed to prevent bottom heave of the excavation.

E. Open pumping, sumps, and ditches: If these result in boils, loss of fines, softening of the ground or instability of slopes, areas shall not be accepted.

F. Install wells and well points with suitable screens and filters so that continuous pumping of fines does not occur.

G. Operate well points continuously to prevent boils and loss of consolidation.

H. Arrange discharge to facilitate collection of samples by Engineer.

I. Avoid settlement or damage to adjacent property.

J. Dispose of water in a manner that will not damage adjacent property, as approved.

3.05 GRANULAR FILL MATERIAL UNDER FACILITIES

A. Place fill granular material as specified in Article 2.02 within the influence area beneath slabs, walks, structures, roads, and parking areas, and as shown on the Drawings.

B. Do not exceed loose lifts of 6".

C. Compact each lift to not less than 95% Modified Proctor Density.

D. Place and compact a 6" layer of granular fill to at least 95 percent Modified Proctor density immediately beneath spread footings, slabs on grade, or other concrete structures.

E. Moisten material as required to aid compaction (± 2 percent optimum moisture).

F. Place material in horizontal lifts and in a manner to avoid segregation.

G. Correct and repair subsequent damage to slabs, piping, concrete structures, facilities, or other structures caused by settlement of fill material.

3.06 BACKFILL AND STRUCTURES

A. Remove form materials and trash from excavation before placing backfill.
B. Do not operate earth-moving equipment within 5' of walls of concrete structures for the purpose of depositing or compacting backfill material.
C. Compact backfill adjacent to concrete walls with hand-operated tampers or similar equipment that will not damage the structure.
D. Backfill water-holding basins only after satisfactory leakage tests have been conducted.
E. Place earth fill in areas not designated to be structural fill or granular fill.
F. Deposit material in maximum 6-inch loose lifts, and compact each lift to not less than 95% Standard Proctor.

3.07 FILL NOT BENEATH STRUCTURES OR FACILITIES

A. Place earthen fill to the lines and grades shown.
B. Place fill material in maximum 6" loose lifts and compact each lift to not less than 95% Standard Proctor.
C. Make proper allowance for topsoil where required.

3.08 MOISTURE CONTROL

A. During compacting operations, maintain optimum practicable moisture content required for compaction purposes in each lift of fill.
B. Maintain moisture content uniform throughout the lift.
C. Add water to the material at the site of excavation. Supplement, if required, by sprinkling the fill.
D. At the time of compaction, maintain the water content of the material at optimum moisture content, ± 2 percentage points, except as otherwise specified for embankments.
E. Do not attempt to compact fill material that contains excessive moisture.
F. Aerate material by blading, discing, harrowing, or other methods, to hasten the drying process.

3.09 FIELD DENSITY TESTS

A. Test Methods: ASTM D2922, D1556, D2216, and D3017.
B. Cooperate with testing work by leveling small test areas designated by the Engineer.
C. Backfill test areas.
D. Field density test shall be performed for every 3,000 cubic yards of fill material placed.
E. Engineer may order testing of lift of fill at any time, location, or elevation.

3.10 SITE GRADING

A. Perform earthwork to lines and grades as shown on Drawings with proper allowance for topsoil where specified or shown on Drawings.

B. Shape, trim, and finish slopes to conform with the lines, grades, and cross sections shown.
C. Slopes shall be free of loose exposed roots and stones exceeding 3" diameter.
D. Round tops of banks to circular curbs, in general, not less than a 6' radius.
E. Neatly and smoothly trim rounded surfaces; over-excavating and backfilling to the proper grade are not acceptable.
F. Finish site grading shall be reviewed by the Engineer.

3.11 DISPOSAL OF EXCESS EXCAVATION

A. Dispose of excess excavated materials, not required or suitable for use as backfill or fill, outside of the area of work.
B. Compact excess material as specified for fill, dress the completed disposal area to slopes no greater than 4:1 (horizontal:vertical), and slope to drain.

3.12 SETTLEMENT

A. Settlement in backfill, fill, or in structures built over the backfill or fill, that may occur within the 1-year guarantee period in the General Conditions shall be considered to be caused by improper compaction methods.
B. Restore structures damaged by settlement to original condition.

END OF SECTION

SECTION 02315

TRENCH EXCAVATION, BACKFILL, AND COMPACTING

PART 1. GENERAL

1.01 SUMMARY

A. Work of this Section also includes:

1. Replacing topsoil that contains regenerative material.
2. Disposal of trees, stumps, brush, roots, limbs, and other waste materials from clearing operations.
3. Imported topsoil.
4. Crush rock backfill required by over-excavation.
5. Imported pipe zone material.
6. Trench settlement repair, including replacing roadway surfacing, sidewalk, or other structures.
7. Replacing damaged culverts.

B. Trench excavation is classified as common excavation and includes removal of material of whatever types encountered to depths shown or as directed by Engineer.

C. Pipe zone includes full width of excavated trench from 4” below bottom of pipe to a point 6” above top outside surface of pipe barrel.

D. Conform to federal, state, and local codes governing safe loading of trenches with excavated material.

E. The right is reserved to modify the use, location, and quantities of the various types of backfill during construction as Engineer considers to be in the best interest of Owner.

F. There shall be no additional payment for rock excavation.

1.02 REFERENCES

A. Arkansas Highway and Transportation Department, P.O. Box 2261, Little Rock, Arkansas 72203

1. AHTD 303 – Aggregate Base Course.

B. American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.

1. ASTM D448 – Classifications for Standard Sizes of Aggregate and Bridge Construction.
2. ASTM D698 – Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, using 5.5-lb. (2.49-kg.) Rammer and 12” (304.8-mm) Drop.

3. ASTM D1557 – Test Methods for Moisture –Density Relations of Soils and Soil-Aggregate Mixtures, Using 10-lb. (4.54-kg.) Rammer and 18" (457-mm) Drop.
4. ASTM D2922 – Test Methods for Density of Soils and Soil-Aggregates in Place by Nuclear Method.

C. Occupational Safety and Health Administration (OSHA) Standard for Excavation and Trenches Safety System, 29 CFR 1926, Subpart P = Excavations.

D. The Contractor shall be solely responsible for trench and excavation safety systems in accordance with Act 291 of 1993.

PART 2. PRODUCTS

2.01 FOUNDATION STABILIZATION

A. Crushed gravel or crushed rock, free from dirt, clay balls, or organic material, well graded from coarse to fine, containing sufficient finer material for proper compactions, and meeting ASTM D448 Size No. 67 (Concrete Aggregate).

2.02 PIPE ZONE MATERIAL

A. Select native material shall consist of fine loose earth or sand free from clods or rocks larger than ¾" in dimension and of proper moisture content for maximum consolidation.

B. Crushed granular material conforming to ASTM D448, Size No. 67.

C. Washed stone bedding size ¼" to ¾".

2.03 COMMON FILL MATERIALS

A. Material shall not contain pieces larger than 3", and shall be free of roots, debris, or organic matter.

2.04 BEDDING MATERIAL

A. Pea gravel, sand, or other locally available bedding material, as approved.

B. Bedding material shall be a maximum of ¾" angular rock and 1½" rounded rock.

2.05 TRENCH BACKFILL

A. Granular Backfill:

1. Natural or artificial mixture of gravel and soil mortar uniformly well graded from coarse to fine.
2. AHTD Section 303 Class 3, Class 4, or Class 7 as specified in this Section.

2.06 REINFORCED CONCRETE PIPE TRENCH

A. Refer to Drawings for trench details.

2.07 COMPACTION EQUIPMENT

A. Suitable type and adequate to obtain the amount of compaction specified.
B. Operate in strict accordance with manufacturer's instructions and recommendations and maintain conditions so that it delivers manufacturer's rated compactive effort.

2.08 IMPORTED TOPSOIL

A. Suitable sandy loam from an approved source.
B. Possess friability and a high degree of fertility.
C. Free of clods, roots, gravel, and other inert material.
D. Free of quackgrass, horsetail, and other noxious vegetation and seed.

PART 3. EXECUTION

3.01 PREPARATION

A. Where clearing or partial clearing of right-of-way is necessary, complete prior to start of trenching.
B. Cut trees and brush as near to surface of ground as practicable, remove stumps, and pile for disposal.
C. Do not permit excavated materials to cover brush or trees prior to disposal.

3.02 DISPOSAL OF CLEARED MATERIAL

A. Dispose of cleared materials in a manner that meets or exceeds requirements of state, county, and local regulations regarding health, safety, and public welfare.
B. Dispose of nonflammable and flammable material off the construction site in an approved location.
C. Do not leave material on the Project site, shove onto abutting private properties, or bury in embankments or trenches.

3.03 REMOVAL OF OBSTRUCTIONS

A. Remove obstructions within trench area or adjacent to trench area, such as tree roots, stumps, abandoned piling, logs, and debris.
B. Engineer may, if requested, make changes in the trench alignment to avoid major obstructions, if such alignment changes can be made within the easement or right-of-way without adversely affecting the intended function of the facility.
C. Dispose of obstructions in accordance with this Section.

3.04 REMOVAL AND REPLACEMENT OF TOPSOIL

A. Where trenches cross lawns, garden areas, pasturelands, cultivated fields, or other areas on which reasonable topsoil conditions exist, remove topsoil for a depth of 6" for full width of trench to be excavated.

B. Use equipment capable of removing a uniform depth of material, such as a scraper or motor grader; a backhoe shall not be considered suitable.
C. Stockpile removed topsoil at regular intervals, and do not mix with other excavated material.
D. Locate stockpiles so that material of one ownership is not transported and stockpiled on property of another ownership.
E. Minimum Finished Depth of Topsoil over Trenches: 5".
F. Imported topsoil may be substituted for stockpiling and replacing topsoil.
G. Maintain finished grade of topsoil level with area adjacent to trench until final acceptance by Engineer.
H. Repair damage to adjacent topsoil caused by work operations.

1. Remove rock, gravel, clay, and other foreign materials from the surface.
2. Regrade.
3. Add topsoil as required.

3.05 TRENCH WIDTH

A. Minimum width of unsheeted trenches where pipe is to be laid shall be 18" greater than the outside diameter of the pipe or as approved.
B. Maximum width at top of trench shall not be limited, except where excess width of excavation would cause damage to adjacent structures or property or cause undue stresses on the pipe.
C. Confine trench widths to dedicated rights-of-way or construction easements, unless special written agreements have been made with affected property owners.

3.06 EXCAVATION

A. Material excavated is defined as unclassified excavation regardless of the material encountered.
B. Excavate trench to lines and grades shown or as established by Engineer with proper allowance for pipe thickness and for pipe base or special bedding when required.
C. If trench is excavated below required grade, correct with foundation stabilization material.
D. Place material over full width of trench in compacted layers not exceeding 6" deep to established grade with allowance for pipe base or special bedding.

3.07 PREPARATION OF TRENCH – LINE AND GRADE

A. Do not deviate more than ½" from line or ½" from grade. Measure for grade at the pipe invert, not at the top of the pipe, because of permissible variation in pipe wall thickness.
B. Grade the bottom of the trench by hand to the line and grade where the pipe is to be laid, with proper allowance for pipe thickness and for pipe base when specified or indicated.
C. Remove hard spots that would prevent a uniform thickness of bedding.

D. Check the grade with a straightedge and correct irregularities found.
E. The trench bottom shall form a continuous and uniform bearing and support for the pipe at every point between bell holes, except that the grade may be disturbed for the removal of lifting tackle.

3.08 SHORING, SHEETING, AND BRACING OF TRENCHES

A. Sheet and brace trench when necessary to prevent caving during excavation in unstable material or to protect adjacent structures, property, workers, and the public.
B. Increase trench widths accordingly by the thickness of the sheeting.
C. Maintain sheeting in place until pipe has been placed and backfilled at pipe zone.
D. Remove shoring and sheeting as backfilling is done in a manner that will not damage pipe or permit voids in backfill.
E. Conform to safety requirements of federal, state, or local public agency having jurisdiction for sheeting, shoring, and bracing of trenches; the most stringent of these requirements shall apply.

3.09 LOCATION OF EXCAVATED MATERIALS

A. Place excavated material only within construction easement, right-of-way, or approved working area.
B. Do not obstruct private or public traveled roadways or streets.

3.10 REMOVAL OF WATER

A. Provide and maintain ample means and devices to promptly remove and dispose of water entering trench during time trench is being prepared for pipe laying, during laying of pipe, and until backfill at pipe zone is completed.

    1. These provisions apply during the noon hour as well as overnight.
    2. Provide necessary means and devices, as approved, to positively prevent water from entering the construction area of another contractor.

B. Dispose of water in a manner to prevent damage to adjacent property.
C. Drainage of trench water through the pipeline under construction is prohibited.

3.11 FOUNDATION STABILIZATION

A. When existing material in bottom of trench is unsuitable for supporting pipe, excavate unsuitable material.
B. Backfill trench to subgrade of pipe base with foundation stabilization material specified.
C. Place foundation stabilization material over the full width of trench and compact in layers not exceeding 6” deep to required grade by making passes with a vibratory compactor (or equivalent).

D. Material shall be considered unsuitable when it contains more than 5 percent organic material by volumetric sampling or when it will not support a reading of 1.5 on a hand penetrometer.

3.12 ROCK IN PIPE TRENCH

A. Where rock is encountered in bottom of trench, support pipe on bedding material.
B. Minimum Bedding Thickness: 4" or one-eighth of the outside diameter of pipe, minimum.
C. Extend bedding up pipe sides one-sixth of outside diameter of the pipe, minimum.
D. Backfill over pipe according to pipe zone type.

3.13 PIPE ZONE BACKFILL

A. Depth of the pipe zone above pipe barrel varies with pipe material.
B. Particular attention shall be given to area of pipe zone from flow line to centerline of pipe to ensure firm support is obtained to prevent lateral movement of pipe during final backfilling of pipe zone.
C. Backfill area of pipe zone from bottom of pipe to horizontal centerline of pipe by hand-placing material around pipe in 4" layers.
D. Achieve continuous support beneath pipe haunches by "walking in" and slicing with shovel.
E. Backfill area of pipe zone from horizontal centerline to top of pipe zone with pipe zone material as shown in trench details on Drawings.

3.14 TRENCH BACKFILL ABOVE PIPE ZONE

A. When backfill is placed mechanically, push backfill material onto slope of backfill previously placed and allow to slide down into trench.
B. Do not push backfill into trench in a way to permit free fall of material until at least 2' of cover is provided over top of pipe.
C. Under no circumstances allow sharp, heavy pieces of material to drop directly onto pipe or tamped material around pipe.
D. Dot not use backfill material of consolidated masses larger than ½ cubic foot.

3.15 EXCESS EXCAVATED MATERIAL

A. Dispose of excess excavated material off project site in an approved area.

3.16 DRAINAGE CULVERTS

A. Place new drainage culverts at the line and grade as shown on the Drawings.
B. Replace drainage culverts that are removed on near right angles to pipe centerline.
C. If pipe cannot be reused or is damaged during removal, dispose of it and provide new pipe.

D. Protect culverts from damage or restore to equivalent condition.
E. Replace culverts to existing lines and grades.

3.17 PIPE COVER

A. Place select material from excavation over pipe to provide minimum coverage, as shown on Drawings or as directed by Engineer.

3.18 DRAINAGE DITCH RESTORATION

A. Undercrossings of minor drainage ditches not covered in another Specification Section shall be backfilled so that upper 1' of material in ditch between ditch banks is clay.
B. Compact material for full ditch width by six (6) passes of vibratory compactor (or equivalent).
C. Where indicated on Drawings, provide concrete arch, or rip rap on ditch banks.

3.19 SETTLEMENT

A. Correct settlement noted in backfill, fill, or in structures built over backfill or fill within warranty period.

3.20 IMPORTED TOPSOIL

A. Should regenerative material be present in soil, remove both surface and root that appears within 1-year following acceptance of Project in a manner satisfactory to Owner.

END OF SECTION

SECTION 02371

CELLULAR CONCRETE BLOCK

PART 1. GENERAL

1.01 SCOPE OF WORK

The contractor shall furnish all labor, materials, equipment, and incidentals required and perform all operations in connection with the installation of cellular concrete erosion control blocks in accordance with the lines, grades, design and dimensions shown on the Contract Drawings and as specified herein.

PART 2. PRODUCTS

2.01 MATERIAL

A. General. All interlocking pre-cast concrete blocks are substantially H-shaped, having a flat bottom and, in its middle, two vertical openings of rectangular cross section and shall be manufactured as individual units which shall be packaged in a manner suitable for transportation to the jobsite. The blocks shall be shaped in such a way that each block keys into four (4) adjacent blocks. Further, the blocks are capable of being connected at the jobsite so that each individual unit is physically interlocked with six (6) surrounding blocks to resist lateral movement and uplift. The gross area of each individual block in direct contact with the protected sub-grades shall be no less than one square foot.

The contractor shall place the interlocking blocks to the lines and grades shown on the Contract Drawings.

B. Cellular Concrete Blocks

1. SCOPE

a. This specification covers concrete blocks for erosion control used in revetments, storm channels, etc. and for soil stabilization.

Note 1 – Concrete units covered by this specification are made from lightweight or normal weight aggregates, or both.

Note 2 – The Values stated in U.S. customary units are to be regarded as the standard.

2. MATERIALS

a. Cementitious Materials – Materials shall conform to the following applicable ASTM specifications:

1. Portland Cements – Specification C 150, for Portland Cement.
2. Blended Cements – Specification C 595, for Blended Hydraulic Cements.
3. Hydrated Lime Types – Specification C 207, for Hydrated Lime Types.
4. Pozzolans – Specification C 618, for Fly Ash and Raw or Calcined Natural Pozzolans for use in Portland Cement Concrete.

b. Aggregates shall conform to the following ASTM specifications, except that grading requirements shall not necessarily apply:

1. Normal Weight – Specifications C 33, for Concrete Aggregates.

3. PHYSICAL REQUIREMENTS

a. At the time of delivery to the work site, the units shall conform to the physical requirements prescribed in Table 1 below.

b. Durability. The manufacturer shall satisfy the purchaser by proven field performance that the concrete units have adequate durability even if they are to be subjected to a freeze-thaw environment.

TABLE 1. PHYSICAL REQUIREMENTS

Compressive Strength Net Area Min. psi (MPa)		Water Absorption Max., LB/FT^3 (Kg/M3)	
Avg. of 3 units	Individual Unit	Avg. of 3 units	Individual Unit
4,000 (27.6)	3,500 (24.1)	10 (160)	12 (192)

4. VISUAL INSPECTION

a. All units shall be sound and free of defects that would interfere with the proper placing of the unit or impair the strength or performance of the construction. Minor cracks incidental to the usual methods of

manufacture, or minor chipping resulting from customary methods of handling in shipment and delivery, shall not be deemed grounds for rejection.

5. SAMPLING AND TESTING

   a. The purchaser or the authorized representative shall be accorded proper facilities to inspect and sample the units at the place of manufacture from lots ready for delivery.

   b. Sample and test units in accordance with ASTM Methods C 140, Sampling and Testing Concrete Masonry Units.

6. MANUFACTURER

   Cellular concrete blocks shall be ARMORLOC® Class 3510 as manufactured by Armortec, or approved equal.

   They shall have the following nominal characteristics:

TABLE 2. STANDARD SIZES OF ARMORLOC® BLOCKS

Nominal Grid Dimensions	Gross Area/Grid Square Ft	Weight/Grid Lbs.	Weight/Grid Lbs./Sq. Ft.	Open Area %
15.9”x11.9”x4.0”	1.0	30-35	30-35	25

C. FILTER FABRIC

Geotextile. The geotextile shall be a pervious sheet of woven monofilament/multifilament plastic yarns. The geotextile shall meet the physical requirements listed in Table No. 3 of the specifications.

The geotextile fiber shall consist of a long-chain synthetic polymer composed of at least 85% by weight of propylene, ethylene, ester, or amide, and shall contain stabilizers and/or inhibitors added to the base plastic, if necessary, to make the filaments resistant to deterioration due to ultraviolet and heat exposure. The edges of the geotextiles shall be finished to prevent the outer fiber from pulling away from the geotextiles.

The Contractor shall finish the Engineer, in duplicate, manufacturer’s certified test results showing actual test values obtained when the physical properties are tested for compliance with the specifications.

During all periods of shipment and storage, the filter fabric shall be protected from direct sunlight, ultraviolet rays and temperatures greater than 140°

Fahrenheit. To the extent possible, the fabric shall be maintained wrapped in its protective covering.

TABLE 3. PHYSICAL REQUIREMENTS		
Physical Property	Test Procedure	Minimum Value
Grab Tensile Strength (Un-aged Geotextile)	ASTM D4632	Warp: 275 Lbs. Fill: 390 Lbs.
Breaking Elongation (Un-aged Geotextile)	ASTM D4632	10% in any principal direction
Burst Strength	ASTM D3786	525 psi
Puncture Strength	ASTM D4833	145 Lbs.
A.O.S., U.S. Std. Sieve	ASTM D4751	60
% Open Area	CWO-22125-86	10
Permittivity	ASTM D4491	.51 sec^{-1}
Water Flow Rate	ASTM D4491	35 gpm/Sq. Ft.

At the time of installation, filter fabric shall be rejected if it has been removed from its protective cover for over 72 hours or has defects, tears, punctures, flow deterioration, or damage incurred during manufacture, transportation or storage. With the acceptance of the Engineer, a torn or punctured section of fabric shall be repaired by placing a filter fabric patch over the damaged area prior to placing the mats. The patch shall be large enough to overlap a minimum of three (3) feet in all directions.

In the event preassembled panels of fabric are required, the panels of filter fabric shall be sewn together at the manufacturer or another approved location to form sections.

PART 3. INSTALLATION

3.01 FOUNDATION PREPARATION

A. Construction Methods. Areas on which filter fabric and interlocking concrete blocks are to be placed shall be constructed to the lines and grades shown on the Contract Drawings. Where such areas are below the allowable grades, they shall be brought to grade and compacted. The depth of layers and amount of compaction shall be as required by the Engineer. All obstructions, such as roots

and projecting stones, must be removed and all of the soft or low density pockets of material removed must be filled with selected material and compacted.

Excavation and preparation for anchor trenches, side trenches, and toe trenches or aprons shall be done in accordance with manufacturer's recommendations.

Immediately prior to placing the filter fabric and interlocking concrete blocks, the prepared area shall be inspected by the Engineer, and no fabric or blocks shall be placed thereon, until that area has been approved.

3.02 PLACEMENT OF FILTER FABRIC

A. General. Filter fabric, as specified elsewhere, shall be placed within the limits shown on the Contract Drawings.

B. Placement. Filter fabric shall be placed directly on the finished graded area. Longitudinal and transverse joints shall be overlapped at least three (3) feet. The fabric shall be placed so that the upstream strip of fabric will overlap the downstream strip.

3.03 PLACEMENT OF INTERLOCKING CELLULAR CONCRETE BLOCKS

A. General. Cellular concrete blocks, as specified in Part 2.01 B of these Specifications, shall be placed within the limits on the Contract Drawings.

B. Placement. The cellular concrete blocks shall be placed on the filter fabric in such a manner as to produce a level surface, and shall be constructed within the specified lines and grades shown on the Contract Drawings.

C. Finishing. The cells or openings in the cellular concrete blocks shall be filled with suitable material.

D. Consultation. The manufacturer of the cellular concrete mats shall provide design and construction advice during the design and installation phases of the project.

END OF SECTION

SECTION 02372

COMPOSITE TURF REINFORCEMENT

PART 1. GENERAL

1.01 SCOPE OF WORK

The contractor shall furnish all labor, materials, equipment, and incidentals required and perform all operations in connection with the installation of erosion control matting in accordance with the lines, grades, design and dimensions shown on the Contract Drawings and as specified herein.

PART 2. PRODUCTS

2.01 MATERIAL

A. General. All composite turf reinforcement mat (C-TRM) shall be machine-produced mat of 100% coconut fiber matrix incorporated into a permanent three-dimensional turf reinforcement matting. The matrix shall be evenly distributed across the entire width of the matting and stitch bonded between a super heavy duty UV stabilized bottom net with 0.50 x 0.50 inch openings and covered by super heavy duty UV stabilized top net with 0.50 x 0.50 inch openings. The corrugated netting shall form prominent closely spaced ridges across the entire width of the mat. The three nettings shall be stitched together on 1.50-inch centers with UV stabilized polypropylene thread to form a permanent three-dimensional turf reinforcement matting.

The composite turf reinforcement shall meet requirements established by the Erosion Control Technology Council Specification and the U.S. Department of Transportation, Federal Highway Administration's *Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects, FP-03 2003 Section 713.18 as a Type 5A, B, and C Permanent Turf Reinforcement Mat.*

Installation staple patterns shall be clearly marked on the turf reinforcement matting with environmentally safe paint. All mats shall be manufactured with a colored thread stitched along both outer edges (approximately 2-5 inches from the edge) as an overlap gude for adjacent mats. The composite turf reinforcement shall be the North American Green C350, or equivalent.

The contractor shall place the erosion control matting to the lines and grades shown on the Contract Drawings.

2. MANUFACTURER

North American Green
14649 Highway 41 North
Evansville, IN 47725
www.nagreen.com

PART 3.00 INSTALLATION

1. The matting shall be applied after the area has been properly shaped, fertilized, and seeded as specified on the plans.
2. The material shall be applied according to manufacturer's recommendations.
3. Size and gage of staples, staple spacing, overlap materials, direction of matting, etc., shall follow the manufacturer's instructions for installation for the site conditions.
4. The Contractor shall supply the Engineer with manufacturer's guidelines before installation.
5. The Contractor shall maintain the matting areas until all work on the entire project has been completed and accepted.

END OF SECTION

SECTION 02510

GENERAL PIPING REQUIREMENTS

PART 1. GENERAL

1.01 WORK INCLUDED

A. This section provides requirements for furnishing and installing piping for facilities. Refer to related work specified in other sections to coordinate the complete installation.

B. All piping is identified on the drawings by its size and service. Unless noted otherwise, pipe, fittings, and general purpose valves shall conform to those specified in the piping system specification sheet for that service. The piping system specification sheets are in alphabetical order at the end of this section. All special valves and other appurtenances shall be as specified herein.

1.02 RELATED WORK

A. Division 1 - General
B. Division 2 - Site Work
C. Division 3 - Concrete
D. Division 15 - Mechanical

1.03 PROJECT RECORD DOCUMENTS

A. Upon completion of all work, furnish prints and tracings showing locations and principal details and modifications of piping systems as built.

B. Furnish all information on buried piping and utilities encountered during construction.

1.04 SUBMITTALS

A. Submit product data and shop drawings on each type of pipe, valves, fittings, fabricated piping, miscellaneous appurtenances, and accessories in accordance with Section 01330.

1.05 WELDERS CERTIFICATION

A. Employ welders qualified by current certification in the positions required, to perform welding operations per American Welding Society requirements. Contractor shall submit documentation for all welders on the job.

PART 2. PRODUCTS

2.01 PIPING

All newly installed pipes and related products must conform to ANSI/NSI Standard 61 and

must be certified by an organization associated with ANSI. All piping shall be manufactured in the United States. No foreign made pipe or fittings shall be allowed on this project.

A. Ductile Iron Pipe

1. Ductile iron pipe shall conform to the requirements of AWWA C-150 and AWWA C-151. Pipe installed above ground or within underground structures will be thickness Class 53 (minimum) for flanged or grooved end pipe. Pipe installed underground will be thickness Class 51 (minimum) for slip-joint pipe with "polywrap" coating applied per the manufacturer's guidelines.

B. Steel Pipe

1. Black steel pipe for pressure less than 150-psi ambient temperatures shall be ASTM A 53 (ANSI B 125.1) or ASTM A 135 (ANSI B125.3), grade B seamless (smaller than 24") or electric-resistance welded (for 24" and larger) black steel or hot dipped galvanized standard weight unless otherwise noted.
2. Stainless steel pipe shall be ASTM A 312 (ANSI B135), Grade TP 304L seamless and welded stainless pipe.

C. Polyvinyl Chloride Pipe (PVC)

1. PVC pipe shall be Type 1, grade 1, manufactured in accordance with ASTM D 1785 (ANSI B72.7) and ASTM D 1784. Underground pressure piping shall meet ASTM D2241-SDR 21 rated at 200-psi or AWWA C900 Class 100 DR-25 or AWWA C900 Class 150 DR-18 or UNI-BELL B-11-DR-25 or better. Gravity sewer lines shall meet ASTM D3034-SDR 35 or ASTM F789-PS46 or ASTM F679-PS46. For water treatment plant sites: all sewer lines shall be AWWA C900 Class 150 DR-18.

   Perforated PVC pipe shall meet ASTM F758-PS46.

2. All PVC pipe shall be manufactured from virgin plastic.

D. Reinforced Concrete Culvert Pipe

1. All reinforced concrete pipe to be used for culverts shall comply with ASTM C76, Class III.

E. Fiberglass Reinforced Polyester Pipe

1. All fiberglass reinforced polyester pipe to be used for culverts shall comply with ASTM D3262 and be a minimum stiffness class (SN) of 36.
2. All fiberglass reinforced polyester pipe to be used for pressured systems or force mains shall comply with AWWA C950 or ASTM D3754 and be a minimum stiffness class (SN) of 36.

F. Copper tubing

1. All copper tubing for water service lines shall be type "K" and shall conform to ASTM Standard "Seamless Copper Water Tube" B1785, latest revision.

2.02 UNIONS

A. Malleable Iron Unions

1. Use 150-pound standard (300-pound WOG) malleable iron, ground joint unions with bronze seat. Provide flanged union joints on piping 2½" and larger. Use service galvanized unions for galvanized pipe. Use insulating unions where indicated or required where joining dissimilar metals.

B. Polyvinyl Chloride (PVC) Unions

1. Use Schedule 80 threaded PVC unions.

2.03 COUPLINGS, GASKETS, AND FITTINGS

A. Flanges, Gaskets and Bolts

Cast iron flanges shall conform to ANSI B16.1. Flange gaskets shall be full-face type, suitable for the intended service. Substitution of other gasket materials shall be only with the express written consent of the Engineer. Thickness shall be 1/16" for pipe 10" and less and ⅛" for larger pipe. Flange assembly bolts shall be standard square head carbon steel machine bolts with heavy, hot pressed, hexagon nuts, ANSI B18.2. Threads shall conform to ANSI B1.1, coarse thread series, Class 2 fit. Bolt length shall be such that after joints are made up the bolt shall protrude through the nut, but not more than ½". Bolts for use in submerged service shall be galvanized. All screwed flanges on cast iron pipe shall be refaced, as required, after fabrication to ensure that pipe ends are flush with face of flange.

Forged steel flanges shall conform to ANSI B16.5, R.F. Flange gaskets shall match raised faces. On 3½" flanges and smaller, gaskets shall be 1/16" thick. On 4" flanges and larger, gaskets shall be ⅛" thick. Flange assembly bolts shall be standard square head carbon steel machine bolts with heavy, hot pressed hexagon nuts, ANSI B18.2. 150-psi steel flanges may be bolted to cast iron valves, fittings or other parts, having either integral Class 125 cast iron flanges or screwed Class 125 companion flanges. When such construction is used, the raised face on the steel flange shall be removed.

B. Pipe Threads

Unless noted otherwise, all pipe threads shall conform in dimensions and limits of size to ANSI B2.1, taper joint thread.

C. Flange Coupling Adapters

Flanged coupling adapters shall be Smith Blair 912-913 or approved equal. Coupling gaskets shall be as recommended by the coupling manufacturer for the service intended.

D. Mechanical Pipe Couplings

Mechanical pipe couplings shall be Smith Blair #441 or approved equal. Coupling gaskets shall be as recommended by the coupling manufacturer for the service intended. Mechanical pipe couplings for buried cast or ductile iron shall be ductile iron couplings.

E. Compression Fittings

Compression fittings for copper pipe shall be Dresser Style 88, McDonald, or approved equal.

F. Joints

Joints of mechanical installations inside structures, and of yard piping shall be as detailed on the Plans. Where not detailed on the Plans, such joints shall be mechanical type or push-on type, except that the first joint outside of buildings shall be mechanical type, and pipelines installed under structures shall be a mechanical joint pipe.

All other joints shall be mechanical type or push-on type. Lubricant for push-on type shall be that recommended by the manufacturer of the pipe.

G. Provide gaskets of neoprene, unless otherwise noted.

H. Provide full face gaskets or flat faced and ring gaskets for raised face flanges. Use 1/16" thick gaskets for pipe smaller than 6" and ⅛" thick gaskets for pipe 6" and larger. Gasket dimension shall conform to ANSI B16.21.

I. Provide insulating flange gasket kit where indicated or required where joining dissimilar metals or pipe materials.

2.04 VALVES

A. General

Valves shall be as specified in Section 15110, Manually Operated Valves, or as specified herein. A union or flanged connection shall be provided within 2' of each threaded end valve unless the valve can be otherwise easily removed from the piping. Unless otherwise indicated, the direction of rotation of the valve operating wheel, wrench nut, or lever shall be to the left (counterclockwise) to open the valve.

All valves, except those which are equipped with power operators shall be provided with manual operators. Unless otherwise specified, each manual operator shall be equipped with an operating wheel.

Chain wheels and operating chains shall be provided on all valves 4" and larger with centerline more than 7'6" above the floor except where other operator types are specifically required. Each chainwheel operated valve shall be equipped with a chain guide which will permit rapid handling of the operating chain without "gagging" of the wheel and will also permit reasonable side pull on the chain. Operating chains shall be heavily plated with zinc or cadmium and shall be looped to extend to within 4' of the floor below the valve. Where recommended by the manufacturer, the operator shall be provided with a hammer blow wheel.

Wrench nuts shall be provided on all buried valves, on all valves which are to be operated through floor boxes, and where shown. All wrench nuts shall comply with Section 20 of AWWA C-500. Not less than two operating keys shall be provided for operation of the wrench nut operated valves.

For all valves buried at a depth of greater than 3', an extension stem shall be provided to bring the operating nut within 3' of the finished elevation.

B. Gate Valves

The bearing, moving, or wearing parts of all gate valves shall be either of solid bronze or faced with bronze. Bronze facings shall be securely fastened to the iron castings. On valves 12" and smaller, all wedging surfaces may be Grade I, II, or III bronze to iron, but not iron to iron. All material shall be of the best quality and especially adapted for the service required, and workmanship shall be first class in all respects.

Gate valves shall conform to the current specifications of the American Water Works Association and shall be designed for a minimum water working pressure of 150-psi, unless otherwise specified on the Plans. Gate valves shall have a clear water way equal to the full nominal diameter of the valve and shall be opened by turning to the left. Each valve shall have the maker's initials, pressure rating, and year in which the manufacturer cast the body. Each valve shall have a non-rising stem, unless otherwise shown on the Plans.

All valves shall be equipped with "O" ring stem seals. Valves located inside structures shall be wheel operated, unless otherwise shown on the Plans. Valves in the ground shall be nut-operated. Gate valves located outside of structures shall be mechanical joint, or special rubber gasket joint, unless otherwise specified.

Except as may be otherwise approved by the Engineer, all gate valves required for this Contract shall be from one manufacturer, and similar types and sizes shall be identical and the parts interchangeable.

C. Ball Valves

Ball valves may be used in piping systems 2" in diameter and smaller. Valves shall be plastic or steel for line pressure up to 100-psi and steel for line pressures over 100-psi.

Plastic ball valves shall be constructed from thermoplastic polyvinyl chloride. Valves shall be of the cartridge type, with locked-in seal carriers, ethylene propylene rubber "O" ring seals, and Teflon seats. Valves shall be double entry, true-union threaded and coupled. Where shown on the Plans, furnish flanged valves with 125-psi flanges. Plastic ball valves shall be as manufactured by Balon Corporation, Oklahoma City, OK, or approved equal.

Steel ball valves shall be of 2-piece construction with internally seated stem. Provide precision machined mating surfaces, stem stop integral with body, and multi-seal seats. Ball shall be plated and polished. Provide each valve with lever operator. Steel ball valves designed for general service applications up to 1000-lbs. working pressure shall be as manufactured by Balon Corporation, or equal.

D. Valve Marking

All exposed valves shall be tagged with identifying numbers as shown on the Drawings. Tags shall be 2" diameter brass, Style No. 300-BL as manufactured by Seton Name Plate Corporation, or approved equal. Tags shall be fastened with brass chain and "S" hooks.

E. Backflow Preventers

Backflow preventers shall be of the reduced pressure principal type conforming to the applicable requirements of AWWA C-506, and shall be as manufactured by Watts or FEBCO.

F. Valve Boxes

Cast iron valve boxes extending to the finished or established ground or paved surfaces shall be provided for all buried valves. They shall have suitable base castings to fit properly over the bonnets of their respective valves and heavy top sections with stay-put covers. Boxes shall be of the screw or sliding type having 5¼" shaft diameter or greater. Covers shall be marked with the class of service. A concrete pad 1'6" x 1'6" x 4" thick shall be poured around the valve boxes.

2.05 FREEZE PROTECTION

Where specified on the plans, exposed piping, valves, or equipment shall be provided with freeze protection. The freeze protection shall consist of copper sheath, resistance type heating cable and 1" of insulation. The heating cable shall be designed to keep the contained fluid 50°F above ambient temperature. The heating cable shall be suitable for 110 V, single phase operation and ON-OFF switches for the tape shall be provided at each area of piping or equipment. The insulation shall be as specified in P1.11 except that preformed insulation must be oversized to allow for the heating cable.

PART 3. COATINGS AND LININGS

3.01 GENERAL

A. Coatings and linings are specified on the piping system specification sheets and shall conform to this section.

3.02 CEMENT MORTAR LINING

A. Cement mortar lining shall be for cast or ductile iron pipe and fittings and shall be standard thickness lining conforming to AWWA C104 (ANSI A241.4).

3.03 POLYETHYLENE ENCASEMENT

A. Polyethylene encasement for all buried cast or ductile iron pipe, fittings, and valve shall conform to AWWA C105 (ANSI A21.5).

3.04 EXTRUDED PLASTIC COATING

A. Extruded plastic coating for steel pipe shall be a high density polyethylene, or polypropylene copolymer, extruded to cover an adhesive first coat, to form a combined adhesive-extruded thermoplastic resin coating conforming to Federal Specification L-C 530B, Type 1. The first coat shall consist of rubber, asphalt, fluxing oil, and high molecular weight resin. Extruded plastic coatings shall have a minimum combined thickness of adhesive and thermoplastic of 33-mils for pipe up to and including 2" nominal diameter, 37-mils up to 3", 42-mils up to 5", and 46-mils for all pipe larger than 5" nominal diameter. Joints, for pipe and fittings having extruded plastic coating, shall be covered by plastic sleeves fabricated from radiation cross-linked, semi-rigid polyethylene, coated on the inside with a specifically formulated thixotropic adhesive, which when heated, shall shrink to encapsulate the joint with a strong impervious seal.

3.05 GALVANIZING

A. Galvanizing shall be in accordance with ASTM A153.

3.06 PIPE SUPPORTS

A. All exposed piping shall be supported in conformance with the pipe support and structural attachment details per the plans.

3.07 PIPE INSULATION

A. Where shown on the plans, above-ground outdoor piping shall be insulated with 2" J-M650 Micro-lok fiberglass pipe insulation material or equal. This material shall be covered with ASJ and stapled into place with outward clinching staples 2" O.C. Fittings and valves shall be covered with the same material and sealed with Childers CP-11 weather proofing. All insulation shall be weatherproofed with a jacket of 0.016" smooth aluminum held in place with stainless steel screws 6" O.C. Fittings shall be weatherproofed with premolded PABCD fitting covers or equal.

3.08 JOINT RESTRAINT

A. Joint restraint shall be provided at all flexible couplings and/or flange adaptors and at other locations shown on the plans. The joint restraint systems shall be as manufactured by EBAA Iron for 3" and larger and MIDCO for 2" or approved equal. All elbows, reducers, and laterals of all tees shall have EBAA Megalug or MIDCO restraint. Laterals with swivel glands will be excluded. Size and number shall be as shown or the minimum recommended by the manufacturer for the pipe size and service.

3.09 PROTECTION OF BURIED STEEL PIPE, VALVES, AND APPERTENANCES

A. All steel pipe installed underground shall be protected as specified. All buried valves, flanges, mechanical joints and mechanical pipe couplings shall be protected with a built-up asphalt mastic coating covered with a protective tape wrap. Surfaces shall be cleaned by wire brushing immediately prior to application of the mastic. The mastic shall be molded firmly to encase all bolts, nuts and flanges, and built up to a uniform surface over entire fitting. The build-up surface shall be covered with a protective tape wrap. Materials shall be applied in full accordance with manufacturer's recommendations. Coating shall be Type M-1 (LT) Denso Plast with Denso (LT) tape, Protectowrap tap, or approved equal.

PART 4. EXCAVATION

4.01 PIPE EMBEDMENT FOR PVC PIPE

A. 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 materials shall conform to the requirements shown on the Plans and to the following specifications:

B. 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:

1. Class I: Angular graded stone (¾" maximum), including a number of fill materials that have regional significance such as coral, slag, cinders, crushed stone, and crushed shells.
2. Class II: Fine sand and clayey gravels, including fine sands, sand/clay mixtures, and gravel/clay mixtures.

Where approved by the Engineer, good sound earth may be classified as Class II embedment. Good sound earth is defined as gravel, sand, sandy loam, or loam free from excessive clay and silt.

C. Bedding Placement and Composition: Prior to pipe installation, carefully bring the

bedding material to grade along the entire length of the 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 Bedding: 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 6" of Class I material is sufficient to provide uniform bedding. If Class I material is used for bedding, it must also be utilized for haunching at least up to the spring line of the pipe to avoid loss of side support through migration of Class II hunching material into the bedding.
2. Class II Bedding: Care must be taken with Class II material to provide an uniformly compacted bedding. Place the bedding material to a point above the pipe bottom such that resulting compaction will bring the material to grade. Use hand or mechanical tamping to compact the bedding material to a minimum 90% Standard Proctor Density. Slightly damp material will generally result in maximum compaction with a minimum of effort. If water is added to improve compaction or if water exists in the trench, take care to avoid saturation of Class II material, which could result in additional stability problems of the bedding. Carefully bring the surface of the bedding to grade after compacting it.

D. Haunching and Initial Backfill Placement and Compaction:

1. Class I Material:

   Wet Conditions: In any area where the pipe will be installed below existing or future ground water levels or where the trench could be subject to inundation, Class I material when used, shall be placed to the top of the pipe.

   A minimum of effort is needed to compact the material. 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" above the top of the pipe.

   Dry Conditions: In any area where ground water will not be experienced at any time above the level of the foundation material or where the trench will not be subject to inundation, place Class I material to the spring line of the pipe. Follow the procedure described above for placing Class I material in wet conditions. If Class II material is used for initial backfill above the spring line, achieve compaction consistent with SECTION 4.01.D.(2) below.

2. Class II Material: Place Class II material with care under the lower haunch area of the pipe, compact, and then place additional material to the spring line of the

pipe. If care has been taken to shape the bedding material to the curvature of the pipe, only one stage of placement will be required to bring the haunching material to the spring line of the pipe. In either event, thoroughly compact the haunching material to a minimum of 90% Standard Proctor Density. Take precautions to prevent movement of the pipe during placing of material under the pipe haunch. Place initial backfill material in two stages; one to the top of the pipe and the other to a point at least 6" over the top of the pipe. Compact each stage of haunching and initial backfill by hand or mechanical tamping to a minimum of 90% Standard Proctor Density.

4.02 PIPE EMBEDMENT FOR RIGID PIPE

A. All pipe other than PVC shall conform to the following embedment specifications.

B. 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 materials shall conform to the requirements shown on the plans and to the following specifications:

C. 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:

1. Class I: Shall be described in SECTION 4.02.D.(1).
2. Class II: Suitable native material including fine sands, sandy clay mixtures, and gravel/clay mixtures.

D. Bedding Placement and Composition: Prior to pipe installation, carefully bring the bedding material to grade along the entire length of the 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 Bedding: The bedding shall have a minimum thickness beneath the pipe of 4" or ⅛ of the outside diameter of the pipe, whichever is greater, and shall extend up the sides of the pipe to spring line of the pipe. Backfill from pipe spring line to 6" above the top of the pipe shall be of the bedding material or carefully placed earth. Hand placed backfill shall be finely divided materials free from debris, organic material, and stones.
2. Class II Bedding: The pipe shall be bedded in suitable native material on an unshaped trench bottom providing uniform and continuous support of pipe barrel between bell or coupling holes. After each pipe has been placed to grade, aligned, and placed in final position, deposit sufficient bedding material under the pipe haunches and one each side of the pipe to hold the pipe in proper position during subsequent pipe jointing, bedding, and backfill operation. Deposit bedding material uniformly and simultaneously on each side of the pipe to prevent lateral displacement. Bedding material shall be hand or mechanically tamped to a minimum of 90% Standard Proctor (Density) to a point 6" above

top of the pipe.

Trench backfill from a point 6" above the top of the pipe shall be as described in SECTION 4.03.

4.03 TRENCH BACKFILL

A. 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 paved areas or proposed structures, 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 paved areas or proposed structures, the entire trench shall be backfilled with select materials and compacted to a density of 95% ASTM D-698 or better.

The backfill of materials to be placed under paved areas or proposed structures 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.

4.04 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 Contractor. Copies of all test results will be furnished to the Owner.

4.05 SPECIAL PROBLEMS

A. 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. Before the trench is wheel-loaded, provide cover in accordance with pipe manufacturer's recommendation. Where pipelines are less than 36" deep, avoid the use of heavy equipment across these lines.

C. 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. 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.

4.06 GENERAL

This section covers the laying of piping.

A. Gravity Sewer Lines and Drains

1. 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.
2. All 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 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 preceding 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.
3. 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 the pipe line shall be closed temporarily.
4. The cutting of pipe for any reason shall be done in a neat and workmanlike manner without damage to pipe or pipe lining.
5. 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.
6. 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.
7. 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.
8. 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.
9. Pipe shall be supported to proper line and grade, and secured against upheaval or floating during the placement of concrete bedding or encasement.

B. Pressure Mains

1. All pipe and fittings shall be installed to the line and grade as detailed on the plans. Subject to the approval of the Engineer, other fittings may be added to or substituted for those shown on the plans, should the need therefore arise during construction. This permissive stipulation in no way shall relieve the Contractor of the responsibility for furnishing and installing all fittings required for a complete and proper installation of main as detailed on the plans.
2. All dirt and other foreign matter shall be removed from the inside of pipe and fittings before they are lowered into the trench. They shall be kept clean during and after laying, care shall be taken to keep dirt out of the jointing space. At the end of each days work, and when pipe laying is discontinued for an appreciable period, open ends of pipe shall be closed with a cast plug or cap firmly secured in place.
3. All pipe and fittings shall be lowered carefully into the trench in such manner as to prevent damage to pipe, fittings, or linings. Neither pipe nor fittings shall be dropped or dumped into the trench.
4. Cutting of pipe, where needed, shall be done in a neat and workmanlike manner without damage to pipe or pipe lining.
5. Unless otherwise directed by the Engineer, pipe shall be laid with bell ends facing in the direction of laying. For lines on an appreciable slope, bells shall, at the direction of the Engineer, face upgrade. Wherever necessary to deflect pipe from a straight line in either the horizontal or vertical plane, to avoid obstructions, or for other allowable reasons, the degree of deflection at any joint shall not exceed the maximum recommended by the pipe manufacturer.

C. Connections to Existing Sewers and Drains

1. Connections to existing sewers and drains shall not be made until all of the proposed piping and manholes have been constructed, cleaned and approval granted by the Engineer for making connection. No connection to existing sewers and drains shall be made until new lines have passed specified leakage tests.
2. 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.

D. Installation of Slip-Type Joints

1. Prior to jointing, the bell and spigot ends of the pipes, and bells of fittings, shall be cleaned thoroughly with soapy water and cloth, and by whatever additional 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. The gland also shall be cleaned in like manner.
2. Joints shall be made in strict accord with the recommendations of the pipe manufacturer. The rubber gasket shall be cleaned with soapy water and cloth, 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. When this initial insertion is made, the alignment of the added pipe shall deviate from true alignment not more than the amount recommended by the pipe manufacturer.

3. Following the initial insertion, the bell end of the added pipe shall be moved sideways or up a distance of approximately 8" to move the spigot end slightly away from the shoulder of the connecting bell, thus providing for expansion and flexibility in the completed line. The added pipe then shall be placed in true alignment at intended grade.

E. Installation of Mechanical Joints

1. 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 D. above. The gland also shall be cleaned in like manner.
2. 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 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 within the bell.
3. 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 spigot centered in bell. The joint shall be made tight by turning the nuts with a wrench; first partially tightening a nut, then partially tightening the nut 180° 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 bolts are as follows:

Diameter, Inches	Range of Torque Foot-Pounds	Length of Wrench, Inches
⅝	40 - 60	8
¾	60 - 90	10
1	70 - 100	12
1¼	90 - 120	14

4.07 TRENCH SAFETY SYSTEMS

A. Refer to Section 02260 of these Technical Specifications.

4.08 PLASTIC PIPE

A. Installation shall be in accordance with applicable ASTM Standards D 2774, D 2855 and F 402. The CONTRACTOR shall make certain before jointing polyvinyl chloride pipe that the ring groove in the bell of the pipe is clean, with no dirt or foreign material that could interfere with proper seating of the ring. Make sure pipe end is clean. Wipe with a clean dry cloth around the entire circumference from the end to one inch beyond the reference mark. Lubricate the spigot end of the pipe, using only the lubricant supplied by the manufacturer. Be sure the entire circumference is

covered. The coating should be the equivalent of a brush coat of enamel paint. It can be applied by hand, cloth, pad, sponge or glove. Do not lubricate the ring groove in the bell because such lubrication could cause ring displacement. The bevel end is then inserted into the bell so that it is in contact with the ring. Brace the bell, while the bevel end is pushed in under the ring, so that previously completed joints in the line will not be closed up. The spigot end is pushed until the reference mark on the spigot end is flush with the end of the bell. If undue resistance to inserting of the bevel end is encountered or the reference mark does not reach the flush position, disassemble the joint and check the position of the ring. If it is twisted or pushed out of its seat, clean the ring, bell and bevel end and repeat the assembly steps.

4.09 PIPE JOINT INSTALLATION

A. Dissimilar Materials

1. For piping systems which carry water or which are installed underground, wherever pipes of dissimilar metals are connected, an insulating section of rubber or plastic pipe shall be installed. The insulating section shall have a minimum length of 12 pipe diameters. Dielectric unions of an acceptable type may be used in lieu of the specified insulating sections. Wherever copper pipe is supported from hangers, it shall be insulated from the hangers with PVC tape.

B. Screwed Joints

1. Make up all threaded joints using a suitable joint lubricating compound applied to male threads only. Thoroughly ream all field cuts and carefully make all connections so that thread engagement will be secured.

C. Welded Joints

1. Weld and fabricate piping in accordance with ANSI Standard B31.1, latest edition, Code for Pressure Piping. Machine beveling in shop is preferred. Field beveling may be done by flame cutting to acceptable standards.
2. Align piping and equipment so that no part is offset more than 1/15". Set all fittings and joint square and true to preserve alignment during welding operation. Use of alignment rods inside pipe is prohibited.
3. Do not permit any weld to project within the pipe so as to restrict it. Tack welds, if used, must be of the same material and made by the procedure as the completed weld. Otherwise, remove tack welds during welding operation.
4. Do not split, bend, flatten or otherwise damage piping before, during or after installation.
5. Remove dirt, scale and other foreign matter from inside piping before tying in sections, fittings, valves or equipment.

D. Flanged Joints

1. Prior to installation of bolts, accurately center and align flanged joints to prevent

mechanical pre-stressing of flanges, pipe and equipment. Align bolt holes to straddle the vertical, horizontal, or north-south center line.

2. Install proper gaskets, suitable for intended service and factory cut to proper dimensions. Secure with a suitable gasket cement.
3. Tighten bolts progressively to prevent unbalanced stress. Draw bolts tight to ensure proper seating of gaskets.
4. Take special care when attaching suction and discharge piping to jumping equipment to ensure that no stresses are transmitted or imposed on pump suction and discharge flanges by the connected piping. Install and permanently support all such piping to accurately match bolt holes and to provide uniform contact over entire installation of bolts in flanges. In addition, pump connection piping shall be free to move parallel to its longitudinal center line while bolts in pump connection flanges are tightened.

4.10 WET CONNECTIONS

Schedules of existing fittings and proposed new fittings needed to make wet connections to existing waterlines as shown on the plans are estimates only. It is to be recognized that after existing lines and fittings are uncovered, that some discrepancies may occur. Where discrepancies occur, the CONTRACTOR shall request a decision by the OWNER as to how the connection in question shall be made. CONTRACTOR shall plan his work concerning wet connections in such a way that a minimum of inconvenience shall occur to existing water customers due to water service interruptions. Before water service interruptions are made to any customer, CONTRACTOR shall notify designated official and cooperate with operating personnel in every way to minimize service interruptions due to wet conditions. In certain locations, other utility lines or conduits will be obstructing the normal path of proposed waterlines. In such instances, gravity lines of all kinds hold priority as to grade over water pressure lines, gas lines, electric conduits, or other obstruction conduits or combinations of conduits which may be encountered. CONTRACTOR is to analyze conditions carefully and then use best judgment in determining proper method of proceeding through obstructed area with waterline construction, and shall notify the utility owner forty-eight (48) hours in advance of making such connection after obtaining approval from the Engineer.

4.11 OFFSET AND FITTINGS INSTALLATION

A. Because of the small scale of drawings, the indication of all offsets and fittings is not possible. Carefully investigate the structural and finish conditions affecting the work and take such steps as may be required to meet such conditions.

B. Provide proper space for covering and removal of pipe, and special clearances for offsets and fittings.

C. All iron fittings shall be wrapped in a plastic protector in conformance with AWWA Standard C-105 and ANSI A21.5 "Polyethylene Encasement for Gray and Ductile Cast-Iron piping for Water and Other Liquids." Fitting wrapping shall be installed in such a manner as to curtail or prevent corrosion of the metallic fittings.

4.12 SECURING AND SUPPORTING

A. General

1. Support piping as required to maintain line and grade, with due provisions for expansion and contraction. Use approved hot-dipped galvanized hangers, rollers, anchors and guides properly connected to structural members. Do not support piping from other piping. Use non-metallic and stainless steel hangers where indicated on the plans.

B. Hangers and Straps

1. Place hangers not more than 6 feet apart on ½" and ¾" pipes or 10' apart on larger pipes. Place hangers not more than 6' apart for all sizes of PVC pipe.
2. Support vertical risers with hot-dipped galvanized steel strap pipe clamps properly supported at every floor unless otherwise shown on drawings.
3. Perforated bar hangers, straps, wires or chains are not permitted.

C. Unistrut Pipe Supports

1. Provide standard Unistrap metal framing members and appurtenances for pipe support when applicable. Mult-A-Frame and Power-Strut pipe support systems also are acceptable. Hot-dip galvanize all such members and appurtenances.

D. Anchors

1. Provide anchors as indicated or required. Unless otherwise detailed on drawings, use pipe anchors consisting of heavy steel collars with lugs and bolts for clamping to pipe and attaching anchor braces. Install anchor braces in the most effective manner to secure desired results.
2. Do not install supports, anchors or similar devices where they will damage construction during installation or because of the weight or the expansion of the pipe.

E. Pipe Guides

1. For plant piping, provide pipe alignment guides as required by pipe manufacturer.
2. Guide expansion joints with two guides on the side opposite the anchor.

F. Substitution

1. In lieu of restrained joint pipe and fittings, Contractor may substitute mechanical or push-on joints with reaction anchorages and blocking as specified here and approved by Engineer. Provide all unlugged tees, Y-branches and bends deflecting 22½° or more which are installed in piping subjected to internal hydrostatic heads in excess of 15' in exposed or 30' in buried piping with suitable reaction blocking, struts, anchors, clamps, joint harness or other adequate means to prevent movement of pipe caused by unbalanced internal liquid pressure or as indicated on drawings.
2. Trench Installation

Where in trench, provide fittings with concrete thrust blocking between fitting and solid undisturbed ground in each case except where solid ground blocking support is not available. At tops of slopes, anchor vertical angle bends by means of a mass of concrete of sufficient weight to resist hydraulic thrust at maximum pressures to which pipe will be subjected. Install concrete blocking and anchors so that all joints between pipe and fittings are accessible for repair. Bearing area of concrete reaction blocking against ground or trench bank shall be as shown on drawings or as directed by Engineer in each case. In event that adequate support against undisturbed ground cannot be obtained, install metal harness anchorages consisting of steel rods or bolts across joint and securely anchor to pipe and fitting or other adequate anchorage facilities approved by Engineer to provide necessary support. Should lack of a solid vertical excavation face be due to careless or otherwise improper trench excavation, entire cost of furnishing and installing metal harness anchorage in excess of contract value of concrete blocking replaced by such anchorages shall be borne by Contractor.

3. Locations other than trenches

   Provide blocking, struts, anchorages or other supports for fittings installed in fills or other unstable reaction ground above grade or exposed within structures as required by drawings or as directed by Engineer

4. Protection of Metal Surfaces

   Adequately protect all steel clamps, rods, bolts and other metal accessories used in reaction anchorages, or joint harness subject to submergence or contact with earth or fill material and not encased in concrete from corrosion with not less than two coats of either Koppers "Bitumastic No.50", or equal, heavy coal-tar coating material applied to clean, dry metal surfaces. First coat shall be dry and hard before second coat is applied.

4.13 PIPE SLEEVES

A. Sleeves

1. Wall pipes are required where shown on the plans and at all pipes penetrating water holding structures.
2. Fit with sleeves all pipes passing through masonry and concrete construction. Fabricate sleeves of hot dipped galvanized steel pipe unless otherwise indicated. Size sleeve for minimum clearance between pipe or insulation and sleeve.
3. Extend each sleeve through the floor or wall. Cut the sleeve flush with each surface, except that in exposed locations, extend floor sleeves 2” above finished floor line.
4. Caulk all sleeves watertight and airtight. Seal annular space between pipes and sleeves with a Thunderline Link-Seal or approved equal.

4.14 CLEANING OF PIPING SYSTEMS

A. General

1. Clean piping systems thoroughly. Purge pipe of construction debris and contamination before placing the systems in service. Use whatever temporary connections are required for cleaning, purging and circulating.

B. Strainer

1. For each system when specified in that system, install temporary strainers in front of pumps, tanks, water still, solenoid valves, control valves and other equipment where permanent strainers are not indicated. Keep these strainers in service until the equipment has been tested, then remove either entire strainer or straining element only. Fit strainers with a blow-off valve.

4.15 LEAK TESTS

A. General

1. All piping systems shall demonstrate leak tightness in accordance with AWWA C600, this requirement shall be met by a water hydrostatic leak test or a pneumatic leak test, whichever is specified.

B. Liquid Piping System

1. Test Preparation

Expansion joints shall be provided with temporary restraint, if required, for the additional pressure load under test or shall be isolated from the test. Equipment which is not to be subject to the pressure test shall be either disconnected from the piping or isolated by a blind flange or similar means.

2. Test Pressure

The water hydrostatic test pressure shall be 1.5 times the maximum operating pressure. The pressure test shall be maintained for sufficient time to inspect all joints, with a minimum time of 2-hours.

3. Test Procedure

The CONTRACTOR shall provide all necessary equipment and shall perform all work required in connection with the tests. All pipe, fittings and valves shall be subjected to pressure. The line under test shall be slowly filled with water or air to the specified test pressure. The lowest elevation point of the section being

tested shall be determined and any corrections necessary shall be corrected to the elevation of the test gauge by means of a test pump connected to the pipe. A blow off or fire hydrant shall be installed at the end of the line under test. The required test pressure shall be applied for not less than two (2) hours and longer if ordered by the OWNER. Leakage tests shall be conducted concurrently with pressure tests. OWNER will inspect all pipe, fittings, valves and joints under tests. Any faults found to be due to improper workmanship shall be corrected by the CONTRACTOR at no expense to OWNER.

a. Hydrostatic testing

   Before applying the specified test pressure, all air shall be expelled from the test section including service connections. If hydrants or blowoffs are not available at high places, tap at points of highest elevation shall be made before the test is made and brass plugs inserted after the test has been completed.

END OF SECTION

SECTION 02511

SEPARATION DISTANCES

PART 1. GENERAL

1.01 SCOPE OF WORK

This section covers the requirements with respect to separation distances for water lines and sanitary sewers.

1.02 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 of 10' horizontal and 18" vertical separation shall be maintained between water and sanitary sewer lines where possible.

Parallel Pipes

Where 10-feet of horizontal separation is not possible, water mains must be placed so that the bottom of the water line will be at least 18" above the top of the sewer line at its highest point and the sewer pipe shall be water works grade 150-psi pressure rated pipe or greater, meeting AWWA standards. If 18" of vertical separation can not be maintained under these circumstances, the water line or the sewer line must be encased in watertight pipe with watertight end seals for the full length of the parallel pipes in close proximity. Any joint in the encasement pipe is to be mechanically restrained. The encasement pipe must be vented to the surface if carrying water or sewer under pressure.

Pipe Crossings

If 18" of vertical separation can not be maintain where a water line crosses over a sewer line, the water line or the sewer line must be encased in watertight pipe with watertight end seals at least 10' either side of the crossing. If the water line is encased, the sewer pipe shall be water works grade 150-psi pressure rated pipe or greater, meeting AWWA standards. Any joint in the encasement pipe is to be mechanically restrained. The encasement pipe must be vented to the surface if carrying water or sewer under pressure.

Where a water line must unavoidably pass beneath the sewer line, at least 18" of separation must be maintained between the outside of the two pipes in addition to the preceding encasement requirement.

END OF SECTION

SECTION 02513

PIPE TESTING AND CLEANUP

PART 1. GENERAL

1.01 DESCRIPTION

A. This section covers the testing of pipe materials, joints, or other materials incorporated into plant piping and leakage tests to determine watertightness.

B. All pipelines and sewers shall be tested. Test pressure, duration, and media shall be as specified by the Engineer. Care should be exercised to isolate equipment not rated for the specified test pressure to avoid damage to the equipment.

PART 2. LEAKAGE TESTS

2.01 LEAKAGE TESTS OF GRAVITY LINES

The leakage test must be performed in the presence of a representative of the Engineer. The Contractor shall provide 24-hours minimum notice before beginning testing procedures. Leakage tests for watertightness of gravity sewer lines shall be completed in accordance with the following procedure:

A. 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. Air testing shall be performed per Uni-Bell PVC Pipe Association's, "Recommended Practice for Low Pressure Air Testing of Installed Sewer Pipe". The Contractor is to use the table at the end of the Section as a reference guide.

B. 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 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.

2.02 PRESSURE CONDUIT LEAKAGE TESTS

A. Leakage tests for all piping specified to be "Water Tested" shall be made by filling the main with water and increasing the pressure to the testing pressure specified by the Engineer.

All pressure lines for this project shall be tested at 1.5 times the working pressure of the line. The duration of the leakage test shall be a minimum of 2-

hours and shall be conducted in the presence of the Engineer or his project representative.

B. All waterline shall be tested in accordance with AWWA C-600 or AWWA C-605 as applicable.

C. Leakage of all exposed piping shall be zero throughout the duration of the test.

D. The main shall not be accepted until the actual leakage is equal to or less than the allowable. In addition, all obvious leaks shall be repaired.

E. The maximum leakage per hour for ductile iron, PVC, and concrete pipe shall be as calculated from the following formula:

Rubber gasket or O-ring joints (iron, PVC, and concrete)

$$L = \frac{ND\sqrt{P}}{7400}$$

L = Allowable leakage (gallons per hour)
N = Number of joints in pipeline tested
D = Nominal diameter (inches)
P = Test pressure (psi)

2.03 LEAKS ENCOUNTERED IN FINAL INSPECTION

A. 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.

2.04 CLEANING UP

A. As the construction work progresses, the Contractor shall backfill the trenches, remove excess excavated materials and other debris and do sufficient cleanup 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. After the cleanup has been completed, but before final acceptance by the Owner, the entire line must be tested to see that there are no obstructions in the line. Water for this testing shall be the responsibility of the Contractor. A rubber or plastic beach ball of same diameter as the pipe will be flushed through the line for this test.

2.05 LINE CLEANING

A. All piping must be flushed to remove all mud and debris following construction.

Materials flushed from the line shall not be allowed to enter the existing collection system.

2.06 DISINFECTION

A. Following satisfactory completion of the acceptance test, all potable water lines shall be disinfected in accordance with Section 02512 of these Technical Specifications and AWWA C651.

END OF SECTION

AIR TESTING (TIME PRESSURE DROP METHOD)
MINIMUM TIME IN SECONDS FOR 1 PSIG DROP (3.5 PSIG TO 2.5 PSIG)

Length of Test Section in	Pipe Diameter in Inches												
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	178	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	238	371	510						
175	31	69	123	193	277	425							
200	35	79	141	220	317								
225	40	89	158	248	340								
250	44	99	176	275									
275	48	109	194	283									
300	53	119	211										
350	62	139	227										
400	70	158											
450	79	170											
500	88												
550	97												
600	106												
650	113	170	227	283	340	425	510	595	680	765	851	935	1020

SECTION 02515

DUCTILE IRON PIPE

PART 1. GENERAL

1.01 SCOPE

A. This section covers ductile iron pipe and fittings where indicated on the drawings or where required by the specifications.

PART 2. PRODUCTS

2.01 MATERIALS

A. All ductile iron pipe shall meet the requirements of ANSI A21.51. All fittings for ductile iron pipe shall meet the requirements of ANSI A21.10. Fittings for 12" diameter and smaller pipe shall be grey iron castings. Fittings for pipe larger than 12" in diameter shall be ductile iron castings.

B. All ductile iron pipe and fittings shall have a cement mortar interior lining, as manufactured by American Cast Iron Pipe Company, meeting the requirements of AWWA C104 (ANSI A241.4).

C. Except where otherwise required, ductile iron pipe shall be provided with a bituminous exterior coating approximately 1-mil thick conforming to the manufacturer's standard. Where ductile iron pipe is to be painted, the pipe may be shipped with no outside coating as it will be blasted to near white prior to painting.

Ductile iron pipe located inside wet wells or manholes will receive an approximately 80-mil thick exterior coating of POLIBRID 705 or equivalent 100% solids content elastomeric polyurethane coating applied to pipe and fittings after installation by approved methods, personnel and guidelines of the manufacturer of the coating.

D. Except where otherwise required, 4" in diameter and smaller pipe shall be thickness Class 51 and 6" in diameter and larger pipe shall be thickness Class 50.

2.02 JOINTS

A. Joints for ductile iron pipe and fittings shall be as indicated on the drawings or as specified herein. Where not indicated on the drawings, buried ductile iron pipe and buried fittings shall have mechanical joints. Where not indicated on the drawings, otherwise, exposed ductile iron pipe and fittings shall have flanged joints.

B. Ductile iron pipe with threaded flanges shall be at least thickness Class 53. Pipe with threaded flanges conforming to the dimensions of ANSI B16.1, 125-pound flanges shall be fabricated to meet the requirements of ANSI A21.15.

C. Rubber gaskets for ductile iron pipe and fittings shall be of synthetic rubber.

D. All joints shall be assembled in accordance with the manufacturer's recommendations. All bolted joints and connections shall be tightened uniformly around the pipe. All joints shall be completely water tight.

E. All buried joints, including joints inside manholes or similar structures, shall be coated as described in Section 09900 - Painting.

PART 3. EXECUTION

3.01 GENERAL

A. After the pipe has been placed and backfilled, each section of newly laid pipe shall be subjected to a hydrostatic pressure test. For any section being tested, the pressure applied shall be such that at the lowest point in the section, the pressure shall be equal to the design pressure of the pipe, or as indicated on the plans.

B. Methods

1. Each section of pipe shall be slowly filled with water and the specified test pressure measured to the point of lowest elevation, shall be supplied by means of a pump or fire hydrant connected to the pipe in a satisfactory manner. All necessary apparatus including gauges and meters shall be furnished by the Contractor.
2. The Contractor may test the pipeline in sections when all the pipe in the section has been placed and all concrete blocking is at least 28-days old. The test shall be made against valves when available, or by placing temporary plugs or bulkheads in the pipe, and filling the line slowly with water. Care shall be used to see that all air vents are open during the filling. After the line, or section thereof, has been completely filled, it shall be allowed to stand under a slight pressure at least 48-hours to allow the lining to absorb what water it will and to allow the escape of air from any air pockets. During this period, the bulkheads, valves, manholes, and connections, shall be examined for leaks. If any are found, these shall be stopped or, in the case of valves, in the main line or bulkheads, provision shall be made for measuring the leakage during the test. The water necessary to maintain the test pressure shall be measured through a meter, or by the other means satisfactory to the Engineer. The Contractor shall furnish all necessary equipment and make tests at his expense.
3. Before applying the specified test pressure, all air shall be expelled from the pipe. In the event it is necessary to expel air from high points other than where taps are provided, the Contractor may tap the line for this purpose and afterward tightly plug the tap. No extra compensation will be made for these taps. Duration of test shall be two hours.
4. During the test, the entire route of the pipeline shall be inspected to locate any leaks or breaks. Any defective joints, cracked or defective pipe, fittings, or valves discovered in consequence of this pressure test shall be removed and replaced with sound material in the manner provided and the test shall be repeated until satisfactory results are obtained.
5. Any and all noticeable leaks shall be repaired regardless of whether the actual leakage is within allowable amounts.

C. Permissible Leakage - See Section 02513.

1. Should any test of pipe disclose leakage greater than that specified, the Contractor shall, at his own expense, locate and repair the defective joints, until the leakage is within the specified allowance.

END OF SECTION

SECTION 02610

PIPE CULVERTS

PART 1. GENERAL

1.01 SCOPE

A. This section covers reinforced concrete pipe and flared end sections at the locations shown on the Drawings or as described by the Engineer.
B. All work shall be in accordance with details shown on the Drawings, or as directed by the Engineer and with these Specifications.

1.02 STANDARD SPECIFICATIONS

A. Materials and work shall be in accordance with Section 606 – Pipe Culverts of the Arkansas Highway and Transportation Department's Standard Specifications (latest edition), except as herein modified or augmented.

1.03 SUBMITTALS

A. The Contractor shall submit shop drawings of materials to be used on this project per Specification Section 01330.

PART 2. PRODUCTS

2.01 MATERIALS

A. Concrete pipes shall be of the bell and spigot type and shall conform to the specifications of ASTM Designation C 76 and C 506, latest editions, for the sizes and classes of pipes shown on the Drawings and listed in the Unit Price Schedule. The class of pipe and date of manufacture shall be marked on each joint of pipe. Pipe shall be at least ten (10) days old before it is delivered to the project.
B. Jointing material for reinforced concrete pipe shall be compression type rubber conforming to the following requirements:

1. With pipe manufactured for such joints, an approved rubber compression-type joint may be used.
2. In case of such use, backfilling may proceed immediately after the pipe is laid and inspected.

2.02 JOINTING OF PIPE

A. The bell and spigot shall be cleaned and maintained clean. The joint shall be constructed as recommended by the manufacturer of the pipe.

2.03 TRENCHING AND BACKFILL

A. Trenching and backfill shall be in accordance with applicable requirements of Section 02315 – Trench, Excavation, Backfill, and Compacting, except as augmented herein.

B. Where unsuitable material is encountered, excavation shall continue until a firm material is reached and the over-excavation filled to grade with a special bedding material conforming to Aggregate Base Course, Class 7.

PART 3. EXECUTION

3.01 INSTALLATION OF PIPE

A. Each section of pipe shall be examined carefully before being laid, and the defective or damaged section shall not be used. Pipelines shall be laid to the grades and alignment indicated, or as directed by the Engineer. Pipe laying shall proceed upgrade. The bell ends of concrete pipe shall point upgrade.

B. 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.

C. All pipe in place shall have been approved before being backfilled. In all backfilling operations, the Contractor shall be responsible for preventing damage to or misalignment of the pipe.

END OF SECTION

SECTION 02613

CORRUGATED METAL PIPE

PART 1. GENERAL

1.1 SECTION INCLUDES

A. Corrugated Metal Pipe.
B. Pipe Joints and Band Couplers.
C. Reinforcing End Collars.
D. Fittings.
E. Gaskets.

1.2 REFERENCES

A. American Society for Testing and Materials.

1. ASTM – A762 – Specification for Corrugated Steel Pipe, Polymer Precoated for Sewers and Drains.

B. American Association of State Highway and Transportation Officials (AASHTO):

1. AASHTO M36 – Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains.
2. AASHTO M190 – Bituminous Coated, Galvanized Corrugated Steel Pipe.
3. AASHTO M218 – Galvanized Corrugated Steel Pipe.
4. AASHTO M245 – Polymer Precoated Corrugated Steel Pipe.
5. AASHTO M246 – Steel Sheet, Polymer Precoated for Corrugated Steel Pipe.

1.3 RELATED SECTIONS

A. Section 01300 – Submittal Requirements.

1.4 SUBMITTALS

A. Submit manufacturer's data and Shop Drawings.

1.5 SAFETY REQUIREMENTS

A. Conform with OSHA requirements, federal, state, and local rules and regulations pertaining to safety and as specified elsewhere in these Specifications.
B. Conform with Occupational Safety and Health Administration (OSHA) Standard for Excavation and Trenches Safety System, 29 CFR 1926, Subpart P = Excavations.
C. Contractor shall be solely responsible for trench and excavation safety systems in accordance with Act 291 of 1993, Trench Excavation and Safety Systems.

PART 2. PRODUCTS

2.1 CORRUGATED METAL PIPE

A. Type I:

1. Corrugated Metal Pipe: 16 gage galvanized steel with full circular cross section and annular or helical corrugations.
2. Meet or exceed the requirements of ASTM A762 and AASHTO M245.
3. Polymer Coating:

a. AASHTO M218, M245, and M246.
b. Thickness: 10 mils, both sides.
c. Equal to Dow Chemical Trenchcoat protective film as furnished by Caldwell Culvert Company, North Little Rock, Arkansas.

2.2 PIPE JOINTS AND BAND COUPLERS

A. Pipe Joints and band couplers shall be recorrugated with annular corrugations a minimum of 12 inches on each pipe end with corrugations of the same depth as the pipe. For pipe diameter 12 inches through 36 inches a band coupler with at least two annular corrugations and a minimum of 12 inches wide shall be used. For pipe diameter 42 inches and up a band coupler with all annular corrugations and a minimum of 21 inches wide shall be used. Gages as per AASHTO M218.

2.3 GASKETS

A. Ram-Neck for Type I and Type II (Butyl asphalt gasket material equal or similar to Ram-Neck).
B. Ram-Neck or “O” Ring rubber gaskets for Type IA or Type IIA.

2.4 REINFORCING END COLLARS

A. For all pipe culverts without headwalls or protective end treatment a 6 inch wide, 14 gage annular corrugated reinforcing end collar shall be on both inlet and outlet ends of the culvert.

2.5 FITTINGS

A. Shall be in compliance with AASHTO M36, M245, and M218 for structural integrity and workmanship.
B. Shop Drawings are required before fabrication.

PART 3. EXECUTION

3.1 INSTALLATION - GENERAL

A. Examine the areas and conditions under which Work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

B. Install corrugated metal pipe as shown on Drawings and per manufacturer's recommendations.

3.2 CLEARING AND PROTECTION

A. Clean area of foreign materials resulting from Work and protect from damage.

END OF SECTION

SECTION 02821

CHAIN LINK FENCING AND GATES

PART 1. GENERAL

1.01 SCOPE

A. This item covers the construction of new fence as shown on the Plans and in accordance with these Specifications.

1.02 SUBMITTALS

A. Shop Drawings: Submit plans and details indicated extent of fences, locations of gates, and details of attachment and footings. Indicate means and methods for surface preparation and finishing.

1.03 QUALITY ASSURANCE

A. Comply with Standard Specifications for Public Works Construction, current edition.

PART 2. PRODUCTS

2.01 MATERIALS

A. Concrete: Class 500-C-2500 concrete furnished as prescribed in Section 201-1 "Concrete, Mortar, and Related Materials" of the Standard Specifications for Public Works Construction or may be provided in the following volumetric proportions:

Portland Cement	1 part.
Fine Aggregate	2 parts.
Coarse Aggregate (¼" to 1½")	4 parts.
Water	7½-gallons, maximum per sack of cement.

B. Chain Link Fence Fabric: Conforming to ASTM A-392, Class C2 zinc coating, 2.00-ounces minimum per square foot of uncoated wire surface, hot-dipped galvanized after weaving, and top and bottom edges knuckled.

1. Fabric for perimeter fencing and interior fencing shall be 9-gauge woven wire with 2-inch mesh, unless otherwise specified. For 16-feet high fences, the upper 8-feet of fabric may be 11-gauge. Fences 12-feet high or less shall be furnished with single width fabric.
2. Installed fence fabric shall be free from barbs, icicles, or other projections and installed fence fabric with such defects will be deemed defective work.

C. Posts, Top Rails, Brace Rails, and Gate Frames: Standard weight, galvanized, welded or seamless steel pipe conforming to ASTM A-53, with a minimum yield strength of 35,000-psi. Reinforcing wires shall be of high carbon steel; and gate hinges, post caps, barbed wire supporting arms, stretcher bar bands, and other parts shall be of steel, malleable iron, ductile iron, or equal except that ties and clips may be of aluminum.

a. Posts, gate frames, rails, and braces shall conform to the dimensions and weights shown in Table.

Item	Height	Nominal Pipe Size (Inches)	Outside Diameter (Inches)	Weight (Pounds per Foot)	Footings* Diameter (Inches)	Footings* Depth (Inches)
Top Rail, Brace Rails, and Transom Rails	Up to 10′	1¼	1.660	2.27	N/A	N/A
	10′-1″ to 16′	1½	1.900	2.72	N/A	N/A
Line Posts	Up to 6′	2	2.375	2.65	16	36
	6′-1″ to 8′	2	2.375	2.65	18	36
	8′-1″ to 10′	2½	2.875	5.79	18	48
	10′-1″ to 16′	3	3.5	7.58	24	56
Terminal, Corner Angle & Pull Posts	Up to 8′	2½	2.875	5.79	18	36
	8′-1″ to 10′	2½	2.875	5.79	18	48
	10′-1″ to 16′	3	3.5	7.58	24	56
Pedestrian Gate Posts	Up to 8′	2½	2.875	5.79	24	36
Gate Frames	Up to 8′	1½	1.900	2.72	N/A	N/A
Double-Leaf Swing Gate Posts	Up to 8′	3½	4.000	9.11	24	56

* Embed posts into footing 6″ less than the depth of the footing. Deviations from footing Schedule will require soil test and Engineer review.

D. Post Caps: Malleable iron, ASTM A-47, Grade 32510, designed to fit snugly over posts with a minimum projection of 1½" below top of posts. Post caps shall be manufactured with a curved top.

E. Eye Tops: Malleable iron, ASTM A-47, Grade 32510, designed to fit over line posts, and for through passage of top rail.

F. Expansion Sleeve Couplings for Top Rail: Steel, 6" long, designed to fit tightly on inside of rail, fitted with raised center.

G. Rail Ends for Top Rails and Brace Rails: Malleable iron, ASTM A-47, Grade 32510, with holes to receive ⅜" bolts for securing to rail end bands.

H. Tension Bands and Bands for Securing Rail Ends: Mild steel flats, at least ⅛" x 1", except tension bands in gates shall be ⅛" x ¾". Bolts for use with tension bands and rail end bands shall be ⅜" x 1½".

I. Tension Bars: Mild steel flats at least 3/16" x ¾".

J. Tension Wire for Installation at Bottom of Fabric: 6-gauge steel wire, conforming to requirements of AISI Steel Products Manual, Carbon Steel Wire, Section 16, merchant quality, galvanized, soft temper with Type I coating.

K. Turnbuckles for Installation with Tension Wire: Eye and eye type, drop forged steel, right and left hand threads, at least ⅜" screw diameter with at least 4½" of take-up.

L. Tie Wire: Aluminum ties 6-gauge for fastening fabric to posts, top rails, and brace rails. At bottom tension wire, 9-gauge galvanized hog rings shall be installed.

M. Finish of Metal Parts: Post caps, couplings, rail ends, tension bands, tension bars, turnbuckles, rivets, bolts, and other metal parts and fittings shall be hot-dipped galvanized after fabrication, except bolts, which may be galvanized or cadmium-plated. Galvanizing shall conform to ASTM A-569, 0.15% maximum, and ASTM A-47.

N. Paints for Refurbishing Existing Fence Posts, Rails, and Accessories: As required to provide the galvanized color of a new installation.

O. Fence Cap: Shall be an extruded corrugated pipe that fits over standard chain link fencing, bright safety yellow in color, attached to fence using color matched zip ties. The fence cap shall come in 250-feet rolls for this project.

P. Backstop Pads: Shall be furnished similar to those installed on other existing fields in the park.

PART 3. EXECUTION

3.01 INSTALLATION

A. Install fences to heights indicated on the Drawings.

B. Space fence posts at equal intervals between terminal, angle, corner, and gate posts, and not more than 10-feet apart measured from center to center of posts. In curved fence sections having a radius of 50-feet or

less, space posts not more than 5½' apart. Install posts so that top of eye of post caps are level with top of fabric.

C. Install angle or corner posts at each change in direction of 15° or more, at change of 5% or more in grade of fencing, and at the beginning and end of curved fence sections.

D. Install terminal posts at ends of runs of fencing. Install gateposts on both sides of driveway and pedestrian gates. For double-leaf gates, net opening between gate posts shall be gate size as indicated on the Drawings, plus 3½"; for single leaf gates, net opening shall be gate size plus 2½".

E. Where a fence is to be installed on a curb, construct footings with top of footing level with the lower finish grade. Align posts, set plumb and true before placing footings. Remove splattered concrete from exposed pipe surfaces while concrete is still soft. In bituminous surfaced areas, install seal coat on top of concrete footings.

F. Install fences with top rail. Top rail shall pass through eye tops and be secured at ends with rail-end fittings and bands.

G. Install fences over 10-feet in height, in addition to top rail, with a horizontal mid-rail set at mid-heights of fence.

H. In fences higher than 10-feet, install brace rails at angles, corners, and terminals at ¼ and ¾ of fence height. Provide one horizontal brace rail in panels adjacent to terminal, angle, corner, and gateposts, install at mid-height of fence and rigidly secured to posts with rail end fittings and bands. Provide horizontal brace rails, as specified, in panels of curved sections having a radius of 50-feet or less. Brace rails are not required in fencing 4' or less in height.

I. Provide a transom rail and fabric at top of pedestrian gate openings. Install transom rail 6'-8" above high point of grade at gate opening. Ends of transom rails shall be pinned or riveted to rail end fittings with ¼" mild steel rivets. Pin or rivet must go through rail and peen. Welding on rail ends is not permitted.

J. Install bottom tension wire a minimum of 3" from grade for fencing, and provide a turnbuckle for each 150-feet of wire or fractional part thereof. Turnbuckles are not required in runs of 25-feet or less. Install ends of tension wires to posts in a manner to prevent slipping or loss of tension. Turn end of wire around post twisted at 3-times around wire. At turnbuckles, wire through eye and twist end at least 3-times around wire. Cut tail of bottom wire flush.

K. Install fence fabric on inward facing side of posts. Install fence fabric with top edge projecting above top rail of fence.

L. Install bottom of fence fabric to clear finish grades, except on bituminous surface install ¾" above such surface. Locally shape and trench ground surfaces where necessary to provide uniform top and bottom alignment of fabric.

M. Tightly stretch fabric and at terminal, pull corner, angle, and gateposts, secure with tension bars extending full height of fence. Secure tension bars to posts with bolted tension bands spaced not more than 14" apart.

N. Bands and Ties: Install bands and ties in accordance with the following schedule:

15 bands on 16-feet fence	16 ties on 16-feet fence
11 bands on 12-feet fence	12 ties on 12-feet fence
7 bands on 8-feet fence	7 ties on 8-feet fence
6 bands on 6-feet fence	6 ties on 6-feet fence
4 bands on 4-feet fence	4 ties on 4-feet fence

O. Fasten fabric to line posts with wire ties spaced not more than 16" apart. Where 6-gauge aluminum ties are furnished, hook the tie at both ends. Installation of hooked ties with links is not permitted.

P. Fasten fabric to top rails, mid-rails, brace rails, with wire ties spaced not more than 18" apart. Bend back ends of tie wires so as not to be a hazard. At bottom tension wire, install hog rings spaced not more than 18" apart. Where 2 fabrics are furnished, lap the fabrics one mesh at mid-rail and tie both fabrics with 9-gauge wire or 6-gauge aluminum ties to midrails.

Q. Field welds shall be cleaned of flux and spatter, damaged galvanized removed, burrs and projections ground off, properly prepared, then heavily coated with "Galviz" or "Galvabar", or approved equal. Install coating in accordance with written recommendations of manufacturer.

R. Fabrication of Gates

1. Frames: Fabricate gate frames from steel pipe of size specified, with joints at corners miter cut and continuously welded to sides.
2. Fabric: Install fence fabric to side members with tension bars and tension bands as specified, spaced not more than 14" apart. Tension bars shall extend full height of gate. Install fence fabric to top and bottom members and to brace rail with wire ties as specified for top rails, spaced not more than 12" apart.
3. Latches: Gate latches and strikes shall be furnished. Weld gate latches and strikes to gate posts and frames. Welding shall be performed before gate frames are galvanized, or welds shall be finished as specified for field welds.
4. Hinges: Install and adjust hinges, burr or center punch threads of gate hinge bolts to prevent removal of nuts. Install three (3) hinges on each post for swing gates more than 16-feet wide.
5. Grind welds flush and smooth. Hot-dip galvanize fabricated parts after welding, or finish as specified for field welds.

3.02 INSTALLATION ON TOP OF CONCRETE WALLS

A. Posts for fences on top of new concrete or concrete masonry walls shall be installed in 24-gauge galvanized iron inserts one (1") inch larger than the outside post diameter. Wall thickness for such installation shall be 8"

minimum. Depth of embedment of post shall not be less than 15" for fence height not exceeding 4'. Install post plumb, true, and fill joint space with cement grout or "Por-Rok", as manufactured by Hallemite Manufacturing Co., or approved equal, finished flush with top of wall. Remove excess grout and clean posts.

B. Fencing on Gravity Walls: Post of fence not exceeding 8' high shall have a minimum of 15" embedment in gravity walls with a top width of 10" minimum and side of 1H:4V. Where the height of gravity wall from top to bottom, within 5' from each side of a post, is less than 22", provide concrete fence post footings and embed posts in accordance with the schedule of posts and footings as set forth in this section.

C. Do not install footings on existing walls without the review of the Engineer.

3.03 FENCING ADJUSTMENTS

A. Where the finish grade is raised 6" or less, cut and re-knuckle the existing fence fabric. Adjust tension wire and tie to fabric. Bottom of fence fabric shall be installed ¾" above finish grade.

B. Where the finish grade is lowered 6" or less, demolish the fence footing flush with the finish grade and adjust the fabric and its attachments. Bottom of fence fabric shall be installed ¾" above finish grade.

C. Post footings and fabrics that require readjustment after installation shall be entirely replaced.

3.04 INSTALLATION OF GATES

A. Provide gates of the sizes indicated on the Drawings. Allow clearance on gates of 1½" at bottom and 1" on top. Construct gates installed in sloping areas to conform to the grade. Provide an opening in each gate for access to locking device or padlock. Knuckle ends of fabric cut for opening to eliminate hazards.

B. Sliding Gates and Swing Barricade Gates: Fabricate and install as indicated on the Drawings.

3.05 COMPLETION

A. Completed fencing shall form continuous units between points indicated with required parts, accessories, and fittings provided and installed. Clean exposed metal surfaces of cement, grout, and other foreign substances.

B. Fill in holes left by removal of existing fence footings, except in areas where grading work is indicated or specified, to existing grade with clean earth thoroughly compacted to at least same density as adjoining soil.

3.06 PROTECTION

A. Protect the work of this section until Substantial Completion.

3.07 CLEANUP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 02950

SITE RESTORATION AND REHABILITATION

PART 1. GENERAL

1.01 SUMMARY

A. Provide finish grading and grass establishment.
B. The intention of this Specification is that the Contractor establishes turf on pipelines and areas damaged as a result of construction.

PART 2. MATERIALS

2.01 TOPSOIL

A. Existing topsoil shall be reused where practical.
B. Imported Topsoil:

1. Furnish at sole expense of Contractor.
2. Friable loam free from subsoil, roots, grass, excessive amounts of weeds, stone, and foreign matter; acidity range (pH) of 5.5 to 7.5; and containing a minimum of 4% and a maximum of 50% organic matter.

2.02 SEED

A. Certified, blue tag, clean, delivered in original, unopened packages and bearing an analysis of the contents, guaranteed 95% pure and to have a minimum germination rate of 85%, within 1-year of test.

2.03 SEED MIX

A. Mix for areas: Common Bermuda grass. Follow the recommendations of the local Agricultural Extension Agent for requirements on coverage, fertilization, and seasons.

PART 3. EXECUTION

3.01 SITE GRADING

A. Shape, trim, and finish slopes to conform with lines, grades, and cross sections shown.
B. Make slopes free of loose exposed roots and stones exceeding 3” diameter.
C. Ensure that site drains properly and there are no areas where water may pond.
D. Finished site grading will be reviewed by Engineer.

3.02 GRADING OF TOPSOIL

A. Shape the topsoil over the area to the desired shape and contour.
B. Apply commercial fertilizer at the Agricultural Extension Agent's recommended rate, distributing it uniformly with a mechanical spreader.

3.03 FINISH GRADING

A. Thoroughly mix the topsoil and fertilizer.
B. Rake the area to a uniform grade so that areas drain in the same manner as at the start of the Project.
C. Lightly compact before planting grass.
D. Remove trash and stones exceeding 2" in diameter from area to a depth of 2" prior to preparation and planting grass.

3.04 TIME OF SEEDING

A. Conduct seeding under favorable weather conditions during seasons, which are normal for work, as determined by accepted practice in locality of Project.

3.05 MECHANICAL SEEDING

A. Sow grassed areas evenly with a mechanical spreader at rate of 100 pounds per acre, minimum, or as otherwise recommended by the Agricultural Extension Agent. Roll with cultipaker to cover seed, and water with fine spray. Method of seeding may be varied at discretion of Contractor on his own responsibility to establish a smooth, uniformly grassed area.

3.06 HYDROSEEDING

A. Seed may be applied by hydroseeding method. Seeding shall be done within 10 days following soil preparation. Hydroseed areas at rate of 100 pounds seed and 500 pounds ammonium phosphate per acre, minimum, or as otherwise recommended by the Agricultural Extension Agent.
B. Proceed with seeding operation on moist soil, but only after free surface water has drained away.
C. Exercise care to prevent drift and displacement of mixture into other areas.

3.07 WINTER PROTECTIVE SEEDING

A. Winter barley or annual rye grass applied at a rate of 120 pounds/acre shall be used after September 15 or as recommended by the Agricultural Extension Agent.
B. Areas receiving temporary winter protective seeding shall be re-seeded when weather conditions become favorable.

3.08 MAINTENANCE

A. Begin maintenance immediately after each portion of grass is planted and continue until a reasonable stand of grass has been obtained. Water to keep surface soil moist. Repair washed out areas by filling with topsoil, fertilizing, and seeding.

3.09 GUARANTEE

A. If, at the end of a 180-day period, a satisfactory stand of grass has not been produced, the Contractor shall renovate and reseed the grass or unsatisfactory portions thereof immediately, or, if after the usual planting season, during the next planting season. If a satisfactory stand of grass develops by July 1 of the following year, it will be accepted. If it is not accepted, a complete replanting will be required during the planting season.

B. A satisfactory stand is defined as grass or section of grass that has:

1. No bare spots larger than 1 square foot.
2. Not more than 10% of total area with bare spots larger than 1 square foot.
3. Not more than 15% of total area with bare spots larger than 6” square.

END OF SECTION

SECTION 03100

CONCRETE FORMS AND ACCESSORIES

PART 1. GENERAL

1.01 DESCRIPTION

A. Scope

This section describes the design, construction, erection, and handling of concrete forms for cast-in-place concrete.

1.02 QUALITY ASSURANCE

A. Design Criteria

1. The design of concrete formwork is solely the responsibility of the Contractor.
2. Conform to ACI 347, "Recommended Practice for Concrete Formwork", regarding the design loads, lateral pressures, wind loads, and design stresses.

B. Allowable Tolerances

1. The maximum deflection of formwork for surfaces exposed to view is 1/240 of the span between supports. Camber formwork where necessary to compensate for anticipated deflections in formwork due to loads imposed by fresh concrete and construction loads.
2. The maximum allowable deviation from a true plane is 1/8" in 6' for all exposed surfaces.
3. The maximum deviation from a true circle for circular structures is ± ¼" when measured at the edge of each form.
4. The maximum allowable deviation from any Plan dimensions is ± ¼".

C. Reference Standards

1. "Recommended Practice for Concrete Formwork", ACI 347.
2. "Building Code Requirements for Reinforced Concrete Structures", ACI 318.
3. "Specifications for Structural Concrete Building", ACI 301.

1.03 SUBMITTALS

A. Submit a description of the forming system to be used, including form type and description of form ties, to the Engineer for review.
B. Submit detailed plans of the forming layout for any structure if directed by the Engineer. If such plans appear inadequate, the Engineer will recommend to the Contractor such changes as he deems necessary. The

Engineer's concurrence shall in no way relieve the Contractor of his responsibility for obtaining satisfactory results or his responsibility for damages or injury resulting from the use of such forming plans.

1.04 HANDLING AND STORAGE

A. Handle all forming materials with care while erecting, removing, and storing.
B. When forms are not in use, stack neatly to prevent damage from moisture or other environmental conditions.

PART 2. PRODUCTS

2.01 MATERIALS

A. Prefabricated Forms – Steel framed plywood, steel framed fiberboard, or steel.
B. Plywood – Product Standard PS-1, waterproof, resin bonded, exterior fir; Grade B or better for face adjacent to concrete.
C. Fiberboard – Fed. Spec. LLL-B-810 Type IX, tempered waterproof, concrete from hardboard.
D. Lumber – Straight, uniform, free from holes, dents, or other surface defects.
E. Chamfer Strips – Commercially manufactured chamfer strips of molded plastic or PVC. Use one style throughout the project. Surface against concrete planed smooth; 45° chamfer strip with minimum cross section dimension of ¾".
F. Form Ties – Steel, removable end, permanently embedded type. Furnish spreader cones such that no metal from the tie remains closer than 1½" from the formed surface after the forms are removed.
G. Rustication and Score Line Strips – PVC.

2.02 FABRICATION AND MANUFACTURE

A. All forms shall be fabricated or manufactured to be sufficiently tight to prevent leakage of mortar and to be easily aligned to prevent offsets. Warped or bent forms or frames will not be acceptable.
B. Construct forms so they may be easily removed without damaging concrete surfaces.
C. Provide positive means of adjustment of shores and struts by use of wedges or jacks.
D. Forms shall be sufficiently rigid to prevent displacement or sagging during concrete placement.

PART 3. EXECUTION

3.01 INSPECTION

A. Inspect all forms for warps, bent frames, damaged plywood or fiberboard and remove damaged forms from the jobsite.
B. Examine surfaces to which forms may be connected or may abut before beginning erection of forms. Correct any defects and deviations in these surfaces before erecting forms.

3.02 PREPARATION

A. Field Measurements

Lay out all necessary dimensions required to establish proper placement of forms. Use string lines, chalk lines, or other suitable aids to establish lines and grades for form-setters. Check all dimensions of erected formwork before placing concrete.

B. Clean forms before beginning erection.
C. Lubricate with approved commercially prepared form lubricant, all portions of the form which will be in direct contact with concrete.

3.03 ERECTION

A. Erect all forms in such a manner as to be true to line, dimension, and elevations shown on the Plans, to be rigidly braced and unyielding, and to be completely mortar tight.
B. Install walers, studs, internal ties, and other form supports, adequately spaced so proper working stresses are not exceeded.
C. Provide temporary openings in wall and column forms to facilitate cleaning, inspection, and placing of concrete.
D. Forms for concrete normally exposed to view

1. Lay forms out in a regular and uniform pattern with the long dimension of the panels vertical with all joints aligned. Flat segmental forms may be used for forming curved surfaces 25' in diameter or larger.
2. Do not use any forms which have offsets, ridges, concave, or convex surfaces.
3. Use new, or like new, forms for all surfaces normally exposed to view and to a point one foot below finish grade.

   Steel forms shall be square and true and have no dents or deviations from a true plane exceeding 1/8".

4. Wherever the top of a wall is to be exposed to view, bring the top of at least one side of the forms to proper line and grade so the top of the wall can be finished with a screed or template.

E. Install chamfer strips for all exposed corners.

3.04 FALSEWORK

A. General Requirements

All falsework shall be designed and constructed so that no excessive settlement or deformation will occur, and so that the necessary rigidity will be provided.

B. Design Loads

For calculating the loads on falsework, a weight of 150-lbs. per cubic foot shall be assumed for concrete plus a live load of 50-lbs. per square foot of horizontal surface for the forms.

C. Materials

All timber used in falsework shall be sound, in good condition, and free from defects which will impair its strength. Steel members shall be of adequate strength and of such shape as to be suitable for the purpose intended.

D. Workmanship

Sills or timber grillages used to support falsework columns, (unless founded on solid rock, shale, or other hard materials) shall be placed in excavated pits and backfilled to prevent softening of the supporting material by drip from the forms or by rains that may occur during construction process. Footings or grillages shall be of ample size to support superimposed loads without settlement. Falsework which cannot be founded on a satisfactory spread footing shall be supported on piling driven to a bearing capacity sufficient to support the superimposed load without settlement. In general, each falsework bent shall be capped transversely at the proper elevation by a cap of adequate size. If desired by the Contractor, a short cap section forming a T-head may be substituted at the top of each pile or column and shall be set at the proper elevation to produce, in conjunction with the use of approved hardwood wedges or jacks, permanent camber indicated on the Plans or specified, plus a construction camber covering allowance for deformation of the forms and falsework. The use of wedges to compensate for incorrectly cut bearing surfaces will not be permitted. Wedges shall be used in pairs and shall be so arranged as to ensure uniform bearing. Each falsework bent shall be of ample size to provide the stiffness required. The bracing shall be securely spiked or bolted to each pile or column it may cross.

3.05 FIELD QUALITY CONTROL

A. Before placing concrete, check all shores, struts, jacks, connections, and ties for tightness and rigidity.
B. Check all forms for alignment and for conformance to Plan dimensions.

3.06 REMOVAL OF FORMS

A. Formwork for beam soffits, structural slabs, and other parts that support the weight of concrete may be removed only after compression tests of field cylinders indicate the concrete has obtained 85% of the specified 28-day strength.
B. In general, form or shores for supported slabs shall not be removed until the concrete, so supported, has acquired 70% of its design strength; except where the 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 below or sooner, if required by the Engineer, where concrete is to receive a rubbed finish.
C. Forms shall not be removed before the minimum times given below, or longer if job control test 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

END OF SECTION

SECTION 03210

REINFORCING STEEL

PART 1. GENERAL

1.01 SUMMARY

A. Provide reinforcing steel and welded wire fabric.
B. Conform to “Placing Reinforcing Bars”, Recommended Practices, Joint Effort of CRSI-WCRSI, prepared under the direction of the CRSI Committee on Engineering Practice.
C. Notify Engineer when reinforcing is ready for inspection and allow sufficient time for this inspection prior to casting concrete.

1.02 RELATED SECTIONS

A. Section 01330 – Submittal Requirements.
B. Section 03300 – Cast-in-place Concrete.

1.03 REFERENCES

A. American Concrete Institute, 22400 West Seven Mile Road, Detroit, Michigan 48219.

1. ACI-318-83 – Building Code Requirements for Reinforcing Concrete.

B. American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.

1. ASTM A185 – Specification for Steel Welded Wire, Fabric, Plain, for Concrete Reinforcement.
2. ASTM A497 – Specification for Welded Deformed Steel Wire Fabric for Concrete Reinforcement.
3. ASTM A615 – Specification for Deformed and Plain Billet-Steel for Concrete Reinforcement.

C. American Welding Society, 550 North West LeJeune Road, Miami, Florida 33126.

1. AWS S1.4-79 – Structural Welding Code; Reinforcing Steel.

D. Concrete Reinforcing Steel Institute, 933 North Plum Grove Road, Schamburg, Illinois 60195.

1. CRSI-MSP-1-86 – Manual of Standard Practice.

1.04 SUBMITTALS

A. Submit the following in accordance with Section 01330:

1. Bending lists.
2. Placing drawings.
3. Shop drawings.

B. Shop Drawings:

1. Bars for footings, including dowels, may be fabricated and shipped without prior review of Shop Drawings by the Engineer, provided that Drawings are followed without deviation.
2. Otherwise, Shop and Placing Drawings shall include reinforcing placing plans and details indicating size, location, arrangement, placing sequence, etc., and shall conform to ACI 315.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Steel:

1. Deliver with suitable hauling and handling equipment.
2. Tag for easy identification.
3. Store to prevent contact with the ground.

B. Unloading, storing, and handling of bars shall conform to CRSI publication "Placing Reinforcing Bars".

PART 2. PRODUCTS

2.01 DEFORMED REINFORCING BARS

A. Deformed billet-steel bars conforming to ASTM A615, Grade 60.

2.02 WELDED WIRE FABRIC

A. Conform to ASTM A185 or A497.

2.03 ACCESSORIES

A. Tie wire: 16-gage, black, soft-annealed wire.
B. Bar supports: proper type for intended use.
C. Bar supports in beams, columns, walls, and slabs exposed to view after stripping: Small rectangular concrete blocks of same color and strength of concrete that is being placed around them.
D. Concrete supports: for reinforcing concrete placed on grade.
E. Conform to requirements of "Placing Reinforcing Bars" published by CRSI.

PART 3. EXECUTION

3.01 REINFORCING STEEL

A. Clean metal reinforcement of loose mill scale, oil, earth and other contaminants.
B. Straightening and rebending reinforcing steel:

1. Do not straighten or rebend metal reinforcement.
2. Where construction access through reinforcing is a problem, use bundle or space bars instead of bending.
3. Submit details and obtain Engineer's review prior to placing.

C. Protection, spacing, and positioning of reinforcing steel: Conform to the current edition of the ACI Standard Building Code Requirements for Reinforced Concrete (ACI 318), reviewed placing drawings and design drawings.
D. Location Tolerance: Conform to the current edition of "Placing Reinforcing Bars" published by Concrete Reinforcing Steel Institute and to the Details and Notes on the Drawings.
E. Splicing:

1. Conform to Drawings and current edition of ACI Code 318.
2. Stagger splices in adjacent bars.

F. Tying deformed reinforcing bars: Conform to current edition of "Placing Reinforcing Bars" published by Concrete Reinforcing Steel Institute and to details and notes on Drawings.
G. Field Bending:

1. Field bending of reinforcing steel bars is not permitted when rebending will later be required to straighten bars.
2. Consult with Engineer prior to pouring if there is a need to work out a solution to prevent field bending.

3.02 REINFORCEMENT AROUND OPENINGS

A. Place an equivalent area of steel around pipe or opening and extend on each side sufficiently to develop bond in each bar.
B. See Drawings for bar extension length each side of opening.
C. Where welded wire fabric is used, provide extra reinforcement using fabric or deformed bars.

3.03 WELDING REINFORCEMENT

A. Welding shall not be permitted unless Contractor submits detailed Shop Drawings, qualifications, and radiographic nondestructive testing procedures for review by Engineer.

1. Obtain results of this review prior to proceeding.

2. Basis for submittals: Structural Welding Code, Reinforcing Steel, AWS D1.4-79, published by American Welding Society, and applicable portions of ACI 318, current edition.
3. Test 10% of welds using radiographic, nondestructive testing procedures referenced codes.

3.04 PLACING WELDED WIRE FABRIC

A. Conform to ACI 318-77 and to current Manual of Standard Practice, Welded Wire Fabric, by Wire Reinforcement Institute regarding placement, bends, laps, and other requirements.

B. Placing:

1. Extend fabric to within 2” of edges of slab.
2. Lap splices at least 1½ courses of fabric and a minimum of 6”.
3. Tie laps and splices securely at ends and at least every 24” with 16-gage black annealed steel wire.
4. Place welded wire fabric at the proper distance above bottom of slab.

END OF SECTION

SECTION 03312

CAST-IN-PLACE CONCRETE
(HEAVY STRUCTURAL)

PART 1. GENERAL

1.01 SCOPE

A. This section covers the method and materials used for the construction of foundations, piers, walls, beams, tanks, basins, floor slabs, columns, and other steel reinforced, cast-in-place, concrete structures.

B. Reference Standards (latest edition)

1. American Society for Testing Materials (ASTM)

a. ASTM C31 - Standard method of making and curing concrete test specimens in the field.
b. ASTM C33 - Standard specifications for concrete aggregates.
c. ASTM C39 - Standard test method for compressive strength of cylindrical concrete specimens.
d. ASTM C42 - Standard method of obtaining and testing drilled cores.
e. ASTM C88 - Standard test method for soundness of aggregates by use of sodium sulfate or magnesium sulfate.
f. ASTM C94 - Standard specifications for ready mixed concrete.
g. ASTM C127 - Standard test method for specific gravity and absorption of coarse aggregate.
h. ASTM C143 - Standard test method for slump of Portland cement concrete.
i. ASTM C150 - Standard specifications for Portland cement.
j. ASTM C171 - Standard specifications for sheet materials for curing concrete.
k. ASTM C172 - Standard method of sampling fresh concrete.
l. ASTM C173 - Standard test method for air content of freshly mixed concrete by the volumetric method.
m. ASTM C260 - Standard specification for air-entraining admixtures for concrete.
n. ASTM C309 - Standard specification for liquid membrane-forming compounds for curing concrete.
o. ASTM C494 - Standard specification for chemical admixtures for concrete.
p. ASTM C618 - Standard specifications for fly ash and raw or calcined natural pozzolan for use as a mineral admixture in Portland cement concrete.

2. American Concrete Institute (ACI)

a. ACI 318 - Building code requirements for reinforced concrete.
b. ACI 301 - Specifications for structural concrete buildings
c. ACI 305 - Hot weather concreting.
d. ACI 306 - Cold weather concreting
e. ACI 309 - Recommended Practice for consolidation of concrete.

f. ACI 350R - Concrete for sanitary engineering structures.

1.02 QUALITY CONTROL

A. Testing Requirements

The Contractor will engage a reputable certified independent testing laboratory acceptable to the Engineer to collect and test concrete samples. Unless otherwise informed, the Contractor will be responsible for sampling concrete for test cylinders, recording, and preparing them for the laboratory. All costs in connection with work performed by the laboratory will be paid by the Contractor. All concrete work which fails to meet the specified strength shall be removed from the project and replaced by the Contractor at his own expense. All reinspection and retesting costs for replaced concrete shall be at the expense of the Contractor.

B. Methods

Test shall be taken for each class of concrete poured each day with a minimum of a 1-yard pour. On large pours, at least one test shall be made on each 30 cubic yards of concrete poured. Testing shall be done in accordance with ASTM C 31 latest edition.

C. Strength Determination

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 below 100% of the specified strength and no test falls below 90% of the specified strength.

1. 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 assure strength requirements. The Engineer may require additional curing not to exceed a total of 21 days on portions of the concrete already placed.
2. The Engineer may also require tests in accordance with ASTM C 42, "Methods of Securing, Preparing, and Testing Specimen from Hardened Concrete for Compressive and Flexural Strengths," when the concrete cylinder tests fail to meet strength requirements. In the event there are questions about the quality of the concrete in the structure, the Engineer may require load tests for that portion where the questionable concrete has been placed. Load tests will be made as outlined in Chapter 20 of ACI 318, latest edition, and shall be at the expense of the Contractor.

D. Removal of Under Strength Concrete

If the above tests indicate that a particular batch of previously placed concrete has less than the design strength, the Engineer may direct that the defective concrete be removed and replaced.

1. 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.
2. The removal, and replacement, of any defective concrete, shall be made at no additional cost to the Owner. This shall include any formwork required and any reinforcing steel required. The Owner will not accept any additional costs for extra work required because of the failure of placed concrete to meet the minimum strength requirements.

1.03 SUBMITTALS

A. The Contractor shall submit the following items for review and approval:

1. Concrete mix design for each psi class used on this project. **Mix design must be stamped by a registered Engineer in state of Arkansas.**
2. Concrete cylinder compression test results for the last ten jobs using this mix design, if applicable.

1.04 INSPECTION

A. 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.

PART 2. PRODUCTS

2.01 MATERIALS

A. General

Cast-in-place concrete shall be composed of Portland cement, fly ash, fine aggregate, coarse aggregate, water, and admixtures properly mixed to produce 2000 or 3500 psi, 1½" maximum coarse aggregate, structural concrete. Concrete for blocking and pipe encasement may be a 2000 psi mixture.

B. Composition

1. Portland Cement

Shall conform to ASTM C 150, Type I. Only one brand of cement shall be used for exposed concrete.

2. Fly ash

Fly ash will not be allowed on this project.

3. Fine Aggregate

   Shall be washed sand composed of clean, un-coated, grains of strong materials graded so that 100% will pass a #4 sieve.

4. Coarse Aggregate

   Shall conform to ASTM C 33, and shall consist of washed gravel or crushed stone, composed of clean, un-coated, durable material free from contamination by dust, clay, or soft organic material. The maximum size of coarse aggregate shall be 1-1/2". Smaller aggregate shall be used as needed to facilitate placement in tight areas.

5. Water

   Shall be clear potable water.

6. Admixtures

   a. 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.
   b. Cement reducing admixture will not be allowed on this project.

C. Coatings

Coatings will be required on embedded equipment and anchors not made of stainless steel, or galvanized steel.

1. Where aluminum anchors, aluminum shapes, or aluminum electrical conduits are embedded in concrete, all contact surfaces shall be painted with zinc chromatic primer. The paint shall be allowed to thoroughly dry before the aluminum is placed in contact with the concrete.
2. Aluminum surfaces mounted in contact with concrete shall be given a heavy coat of an alkali-resistant bituminous paint before installation. The paint shall be applied exactly as recommended by the manufacturer.
3. All steel, or other ferrous metal, to be mounted on or placed in contact with cured concrete, (such as valve operator floor stands, electrical switchgear, etc.) shall be finish painted on the mounting surface in accordance with SECTION 09900.

2.02 CONCRETE PROPORTIONS AND CONSISTENCY

A. Design

All structural concrete shall have a minimum 28-day compressive strength of 2000 or 3500 psi, respectively. Unless field data is available from the concrete supplier, the Contractor shall perform compressive tests on the proposed concrete mix design before placement. All concrete shall be designed by an approved testing laboratory in accordance with ACI Standard Recommended Practice for Selecting Proportion for Concrete (ACI-211) to produce the strength for each class of concrete specified, and with the 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 cost to the testing laboratory for designing concrete mixes shall be borne by the Contractor. Concrete batch designs shall be submitted to and approved by the Engineer prior to placement of any concrete.

1. Prior to placing concrete, the Contractor shall submit the concrete mix design for each type of concrete to be used in the project. Provide the name of the concrete supplier; manufacturer and type of Portland cement used, sieve analysis of fine and coarse aggregate, proportional weights of cement, water, aggregates, and admixtures.
2. If field data is unavailable, trial batches shall be made and one 7-day, one 14-day, and one 28-day compressive test for each mix at a 4" slump shall be submitted for approval.
3. The 28-day compressive strength determined and cured in accordance with ASTM C 39 and C 31 shall not be less than the value specified for the concrete class shown.

B. Class A Concrete

1. 3500 psi at 28 days; minimum 5½ sack mix (to be used for all work unless otherwise specified).

C. Class B Concrete

May be used for blocking and encasement.

1. 2000 psi at 28 days; minimum 4 sack mix.

D. Maximum Slumps

MAXIMUM SLUMPS FOR VARIOUS
TYPES OF CONSTRUCTION

Types of	Hand Placed	High Frequency Vibrator Used

Construction	Maximum	Maximum
Reinforced Foundation Walls and Footings	5"	2"
Slabs, Beams, and Reinforced Walls	6"	3"
Building Columns	5"	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.

2.03 PRODUCTION OF CONCRETE

A. General

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," published by the National Ready-Mixed Concrete Association.

2.04 ACCESSORY MATERIALS

A. Pre-Molded Expansion Joints

Shall be of non-extruding, resilient material conforming to the requirements of "Standard Specifications for Pre-Formed Expansion Joint Fillers," ASTM D 1751 and D 1752. Testing shall conform to ASTM D 545.

B. Joint Sealant

Expansion joints shall be sealed as shown on the Plans using Rubber Caulk 210 Polyurethane Sealant and PRC Primer No.4, as manufactured by the Products Research Company, Burbank, California; equal products by Sonneborn Building Products; or approved equal. Backing material for sealant in slabs shall be 2" "ethaform" rod by Sonneborn, or approved equal. Where surfaces are to receive a swept-in grout topping, a 3" wide, 1 mil polyethylene strip shall be placed above joint sealant. The strip shall be held in place by 1" wide polyethylene tape placed not to exceed 12" centers.

C. Curing Compound

Curing compound shall be of a standard, and uniform, quality ready for use as delivered by the manufacturer. At the time of use, curing compound shall be completely mixed and not diluted or altered except as specifically prescribed by the manufacturer. Curing compound shall conform to the requirements of ASTM C 309,

Type I.

1. Curing compound shall be transparent and free from color such that there is no permanent change in the color of the finished concrete. However, the compound shall contain a temporary dye to make the membrane clearly visible for a period of at least four hours after application.

D. Cement Grout

Cement based grout shall be composed of cement, sand, admixtures and water proportioned and mixed as specified.

1. Cement for grout shall be Portland cement conforming to the specifications for cement in concrete.
2. 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.
3. Grout shall be a mixture of one part cement to two parts sand with a water cement ratio of 0.55. When shrinkage control of standard grout is required, aluminum powder may be added.

E. Drypack Mortar

Drypack mortar shall be composed of approximately one part Portland cement, 1-1/2 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 cast-in-place concrete.

F. Non-Shrink Grout

Grout shall be pre-mixed "Embeco" as manufactured by Master Builder's, or "Ferrolith G" as manufactured by Sonneborn-Contech, or approved equal. Type as recommended by the manufacturer for the particular applications.

G. Abrasive Aggregate

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. Liquid Curing Compound/Sealer

Sealer shall be "Master-Seal" as manufactured by Master Builder's, "Kure-N-Seal" as manufactured by Sonneborn-Contech or approved equal.

PART 3. EXECUTION

3.01 GENERAL REQUIREMENTS

A. Prior Approval by Engineer

Before starting work, the Contractor shall inform the Engineer fully as to the type of forms and methods of construction he proposes to use, and the amount and character of equipment he proposes to use. The Contractor shall submit a schedule showing the sequence of concrete pours. The primary consideration in the preparation of the schedule shall be the pouring of alternate sections in long structures to provide for shrinkage of concrete. This sequence of pours, when approved, shall be strictly adhered to unless otherwise authorized by the Engineer.

B. Time Sequence of Operations

Unless otherwise provided, the following requirements shall govern for the time sequence in which construction operations shall be carried on. Steel beams or forms and falsework for superstructures shall not be erected on concrete substructures until the concrete in the substructure has cured at least four curing days. Concrete for concrete slab or girder spans or concrete slabs on steel beam spans shall not be placed until the substructure has cured at least seven curing days. Steel trusses or plate girders to be erected from the ground on falsework may be erected when the substructure has cured four curing days, but the falsework shall not be removed until the substructure has cured at least seven curing days. Forms for walls or columns shall not be erected on concrete footings until the concrete in the footing has cured at least two curing days. Concrete may be placed in a wall or column as soon as the reinforcing steel placements are approved. The use of completed portions of a structure at the site for mixing operations or for storing materials will not be permitted until the particular portion of the structure has aged at least ten curing days. In continued cold weather, the construction operations may be delayed to the end of a period of calendar days equal to twice the number of curing days specified above.

C. Preparation for Placement

The Contractor shall give the Engineer sufficient advance notice before placing concrete to permit inspection of forms, reinforcing steel placement, and the preparation for pouring. Unless authorized by the Engineer, no concrete shall be placed in any unit prior to the completion of all form work and the placement of all reinforcement for that unit.

1. The operation of depositing and compacting the concrete shall form a compact, dense, impervious mass of uniform texture, which will show smooth faces on all surfaces. The placing shall be regulated so that the pressures caused by the plastic concrete shall not exceed the loads used in the design of forms.
2. Careful attention shall be given by the Contractor to the proper curing of all concrete. The curing methods shall use sheet materials conforming to ASTM C 171 or membrane curing compound conforming to ASTM C 309. Membrane curing is not permitted on surfaces to be rubbed or on surfaces which additional

concrete or mortar is to be applied. The curing method shall be selected by the Contractor and submitted to the Engineer for approval.

3.02 PLACING CONCRETE

A. General Requirements

1. Preliminary Considerations

The Contractor shall notify the Engineer upon completion of various portions of the work required for placing concrete so that the inspection may be made as early as practical. The Contractor shall also keep the Engineer informed regarding his anticipated concrete placing schedule. When all items have been found to be in order by the Engineer, including lines and grades, forms, reinforcing, inserts, piping, electrical, plumbing, and the Contractor's materials and equipment, the Engineer will authorize the Contractor to proceed. Concrete placed without such authority may not be accepted by the Engineer. Unless authorized by the Engineer, no concrete shall be placed in any unit prior to the completion of the formwork, and the placement of all reinforcement. No concrete shall be placed before the completion of all adjacent operations that might prove detrimental to the concrete. Whenever it is necessary to continue the mixing, placing, and finishing of concrete after daylight hours, the site of the work shall be brilliantly lighted so that all operations are plainly visible. In general, however, concrete placing shall be regulated to permit finishing operations to be completed during daylight hours. The Engineer reserves the right to order postponement of the placing operations when, in his opinion, impending weather conditions may result in rainfall, or low temperatures, which will impair the quality of the finished work. In case rainfall should occur after placing operations are started, the Contractor shall provide covering to protect the work. In case of a drop in temperature, the provisions set forth in "Placing Concrete in Cold Weather" shall be applied.

2. Preparation

Water shall be removed from excavations before concrete is deposited. Spilled concrete, construction materials, wood chips, and other debris shall be removed from excavations, forms, and conveying equipment. Wood forms shall be oiled or, except in freezing weather, wetted with water before pouring.

For slabs on grade, the Contractor shall insure that the sub-grade has been thoroughly compacted and leveled prior to placing concrete. Wet all sub-grade with water no more than 30 minutes prior to placing concrete.

Vapor barriers shall be provided below all interior slabs and floors, and shall be placed prior to setting the reinforcing steel. Vapor barriers shall be minimum 6 mil black polyethylene, lapped a minimum of 12". Laps shall be secured with tape and all rips and punctures repaired prior to placing concrete. Reinforcing shall be secured in position, inspected, and approved by the Engineer before

starting pouring of concrete.

3. Handling and Transporting

Chutes, troughs, or pipes, used as aids in placing concrete shall be arranged so that concrete is conveyed as rapidly as possible, such that the ingredients of the concrete will not be separated. Chutes shall be constructed so that concrete slides and shall be metal or metal lined. Chutes shall not have a slope greater than one in two. Open troughs and chutes shall extend, inside the forms or through holes left in the forms, and the ends of such chutes shall terminate in vertical down-spouts. Where a vertical drop greater than 5' is necessary, placement shall be through flexible trunks or similar devices to prevent segregation. All chutes, troughs, and pipes shall be kept clean and free from coatings of hardened concrete by a thorough flushing with water before and after placement. Water used for flushing shall be discharged clear of the concrete in place. The use of chutes in excess of 25' total length for conveying concrete will not be permitted except by specific authorization by the Engineer. Pumping of concrete will be permitted, subject to approval of equipment by the Engineer. Carting or wheeling concrete batches on a completed concrete floor slab will not be permitted until the slab has aged at least four curing days. Unless pneumatic tired carts are used, the carts shall be wheeled on planking so that the loads and impact will not damage the slab. Curing operations shall not be interrupted for the purpose of wheeling concrete over finished slabs. Stockpiling of concrete aggregate, or cement, on completed floors and the storing of reinforcing or structural steel on completed floors shall generally be avoided; when permitted, such storage shall be limited to quantities and distribution authorized by the Engineer.

4. Depositing

The method and manner of placing shall be such as to avoid the possibility of segregation, of the aggregate, or the displacement of the reinforcement. In thin walls, drop chutes of rubber or metal shall be used. The spattering of forms, or reinforcement bars, shall be prevented if the concrete so spattered will dry or harden before being incorporated in the mass. Each part of the forms shall be filled by depositing concrete directly as near its final position as possible. Coarse aggregate shall be worked back from the face and the concrete forced under and around the reinforcement bars without displacing them. Depositing large quantities at one point in the forms and running or working it along the forms will not be allowed. Concrete shall be placed before initial set and in no event after it has contained its water content for more than 30 minutes. After the concrete has taken initial set, the forms shall not be jarred or any strain placed on projecting reinforcement. Where the Contractor's operations involve the placing of concrete from above, all concrete so placed shall be deposited through vertical drop chutes of rubber or metal of satisfactory size. Drop chutes shall be made in sections or provided in several lengths so that the outlet may be adjusted to proper heights during placing operations. Concrete shall be placed in continuous horizontal layers with a thickness of from 1 to 3 feet. Each

layer shall be soft when a new layer is placed upon it, and unless otherwise specified, not more than one hour shall elapse between the placing of successive layers of concrete in any portion of the structures included in a continuous placement. Foreign matter of any kind shall not be permitted to accumulate inside the forms, and openings in forms shall be provided if needed for clean-out. If excessive bleeding causes water to form on the surface of the concrete in tall forms, the mix shall be stiffened to reduce bleeding. In tall walls, the concrete shall be placed to a point about a foot below the top of the wall, or the bottom of any slab or beam to be poured monolithically with the wall, and at least one hour, or more if specified by the Engineer, shall be allowed for settling. Concreting should be resumed before set occurs to avoid a joint. If the slab is thin, a reduction of coarse aggregate size may be required, and the form overfilled, with the excess screeded off after partial stiffening.

5. Consolidation

Each layer of concrete shall be well compacted and the mortar flushed to the surface of the forms by continuous working with mechanical vibrators of an approved type. Vibrators of the type which operate by attachment to forms will be permitted only when immersion type vibrators cannot be used due to inaccessibility. The vibrators shall be applied to the concrete immediately after deposit and shall be moved throughout the mass, through the layer of concrete just placed, and several inches into the plastic layer below, thoroughly working the concrete around the reinforcement, embedded fixtures, and into the corners and angles of the forms until the concrete is thoroughly compacted. Mechanical vibrators shall not be operated so that they will penetrate or disturb layers placed previously which have become partially set or hardened and they shall not be used to aid the flow of concrete laterally. The vibration shall be of sufficient duration to accomplish thorough compaction and complete embedment of reinforcement and fixtures, but shall not be to an extent that will cause segregation. Vibrators shall be kept constantly moving in the concrete and shall be applied vertically at points uniformly spaced, not farther apart than the radius over which the vibrator is visibly effective. The vibrator shall not be held in one location longer than is required to produce a liquified appearance on the surface.

The amplitude and frequency of vibration shall be sufficient such that the number of vibrators required will be one for each ten cubic yards of concrete placed per hour. At least one vibrator, which may be of the gasoline powered type, shall be immediately available as a standby. The Engineer may require the Contractor to use a vibrator of a larger size and power if he feels, based on observed performance, that this is necessary to produce satisfactory consolidation.

6. Embedded Items

Before placing concrete, care shall be taken to determine that all embedded items are firmly and securely fastened in place as indicated on the Drawings or required by the Engineer. All embedded items shall be thoroughly clean and

free of oil and other foreign material.

Cast-in-place anchor bolts shall be set to exact locations by the use of suitable anchor bolt templates, or as otherwise dimensioned on the Plans, approved shop drawings, or certified dimension prints. Equipment anchor bolts shall be sized and furnished by the equipment manufacturers and shall meet the minimum requirements of the specifications. The Contractor shall place anchors as directed by the manufacturer and shown on the approved shop drawings. Threads shall be protected during placement and furnishing. Damaged threads shall be cleaned, oiled, and re-tapped, prior to setting equipment.

The Contractor shall set accurately, and hold in exact position, 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.

7. Construction Joints

Construction joints shall be formed as indicated on the Drawings or as approved or directed by the Engineer. In vertical wall sections, construction joints shall be formed at a maximum spacing of 40-ft. 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 girders. 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 specifications.

8. Drypack Mortar

Surfaces required to be built-up with mortar, or repaired, shall be thoroughly roughened by brushing, completely cleaned, and coated with appropriate bonding compound before the application of the 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 depressions. Construction joints in the mortar shall be sloped to thin edges and the joint shall be thoroughly cleaned. Drypack mortar shall be used for built-up surfaces and correcting minor repairs and imperfections.

9. Patching

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 the defective area. 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 materials shall be used for patching and repairing defective surfaces.

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.

Where necessary, defective areas shall be chipped away to a depth of not less than one 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 one part cement to two parts sand. White Portland cement shall be proportioned with gray Portland cement as needed to match color out of the surrounding concrete.

The patching mortar shall be thoroughly compacted into place and screeded off so as to leave patch slightly higher than surrounding surface. It shall be left undisturbed for a period of 1 to 2 hours to permit initial shrinkage before being finished flush. The patch shall 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.

10. Concrete Hardener

Hardner 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.

11. 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 watertight 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 subsequent grouting. Framing for blockouts shall be strong enough to withstand the pressure of the plastic concrete without deformation or sagging. Before placing the grout, the concrete surfaces and the surfaces of the inserted, item shall be coated with an approved latex or epoxy bonding compound.

Additional reinforcement shall be provided around large openings, detailed as shown on the drawings. The inserted pipes, castings or conduits, shall be grouted in place by pouring in grout under a head of at least 4". The grout shall be poured or rammed or joggled into place to completely fill the space so as to obtain the same watertight condition as the wall itself. The grouting material shall be surfaced when the forms are removed to give a uniform appearance to the wall if exposed.

B. Placing Concrete Slabs

1. Concrete in columns, walls, and deep beams or girders shall be allowed to stand for at least one hour, or more if specified by the Engineer, to permit full settlement due to consolidation before concrete is placed in the slabs they are to support. Haunches are considered as part of the slab and shall be placed integrally with them.
2. When slabs are poured in strips, the widths of the strips, unless otherwise specified or shown, shall be such that the concrete in any one strip will not be allowed to lie in place for more than one hour before the adjacent strips are placed. Immediately before placing concrete, the cushion to receive concrete shall be dampened to prevent absorption of moisture from the concrete.

C. Placing Concrete Foundations

1. Concrete shall not be placed in footings until the depth and character of the foundation has been inspected by the Engineer and permission has been given to proceed. The placing of concrete bases above seal courses will be permitted after the forms are free from water and the seal course cleaned. Any necessary pumping or bailing during placing operations shall be done from a suitable sump located outside the forms. Concrete in deep foundations shall be placed in a manner that will avoid separation of the aggregates or displacement of the reinforcement. Suitable chutes or vertical pipes shall be provided.
2. Where concrete is to be cast against undisturbed soil or a granular fill material, a sheet of 6-mil polyethylene shall be placed over the soil or fill material prior to pouring. The polyethylene sheets shall be water-tight so as to prevent loss of moisture to the soil or fill. Joints in the polyethylene cover shall be sealed with a suitable water-tight tape. All punctures and tears in the polyethylene cover shall be repaired in an acceptable manner prior to pouring the concrete.

3.04 CURING CONCRETE

A. General

Careful attention shall be given to the proper curing of concrete structures particularly during conditions of high temperatures, high winds, and low humidity. All concrete shall be cured except where the forms are left in place for at least 14 days.

1. Unformed concrete surfaces such as floors and slabs, shall be water cured by the use of wet burlap mats or other method acceptable to the Engineer.
2. Formed surfaces shall be water cured beginning as soon as the forms are stripped. Prior to stripping the concrete forms shall be kept moist.
3. Unless otherwise specified, or approved by the Engineer, concrete surfaces shall be water cured for a minimum of 7 days after the concrete is placed or forms stripped.
4. During and at conclusion of the specified curing period, means shall be provided to insure that the temperature of the air.

B. Membrane Curing

After 48 hours of water cure, curing of flat concrete surfaces and unformed concrete may be completed with curing compound. Curing compound may not be used if additional concrete, grout, coatings, or sealers are to be applied. 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°F in any 1 hour nor more than 30°F in any 24 hours.

C. Curing in Cold Weather

1. Whenever the ambient temperature is less than 60°F, adequate provisions shall be made for maintaining the temperature of the all Class A concrete above 60°F, or the wet curing period shall be extended as directed by the Engineer.

2. Whenever the ambient temperature is less than 40°F, all Class A concrete shall be maintained at a temperature of not less than 50°F for at least 72 hours, or as directed by the Engineer.

D. Removal of Forms

1. Forms for surfaces required to be rubbed shall be removed when the concrete has aged at least 18 hours but not more than 7 days after the concrete is placed. Forms shall be removed from surfaces requiring a rubbed finish only as rapidly as the rubbing operation can progress, in order to permit more rapid and more satisfactory rubbing while the surface is moist and relatively soft.
2. Forms may be removed when the concrete has aged for the minimum number of curing days necessary to achieve the percent of design strength indicated.
3. In general, forms for supported concrete shall not be removed until the concrete has attained 70% of its design strength except forms for roof slabs, floors, beams, and girders shall not be removed until the concrete has attained 85% of its design strength. Where loads other than the dead weight of concrete are superimposed, the forms shall not be removed until 24-hours after the concrete has attained 90% of its design strength.
4. The term "curing-day" will be interpreted as any calendar day on which the temperature is above 50°F, for at least 19 hours. Colder days may be counted if satisfactory provisions are made to maintain the air temperature adjacent to the concrete constantly above 50°F throughout the entire day. In continued cold weather, when artificial heat is not provided, the Engineer may permit the removal of forms and falsework at the end of a period of calendar days equal to twice the number of curing days stated in the above table. Test specimens may be made at the option of the Engineer for the purpose of determining a satisfactory time for form and falsework removal in cold weather.
5. When tests made on specimens cured under like conditions to the curing of the structure indicate that strength equivalent to the 7-day strength specified, are achieved the forms and falsework may be removed if approved by the Engineer.

E. Protection of Concrete

1. All surfaces shall be protected against injury. During the first 72 hours after placing the concrete, any wheeling, working or walking on the concrete will not be permitted. All slabs subject to wear shall be covered with a layer of sand or other material as soon as the concrete has set. Tough, waterproof paper may also be used, provided all joints between adjacent strips of paper are carefully lapped and sealed. This does not alter the requirements for proper curing as specified.

3.05 CONSTRUCTION JOINTS

A. General Requirements

The joint formed by placing plastic concrete in direct contact with concrete that has attained its initial set shall be considered a construction joint. When concrete in a

structure or a portion of a structure is specified to be placed monolithically, the term monolith shall be interpreted to mean that the manner and sequence of concrete placing shall be such that construction joints will not occur. Any additional construction joints shall have details, including waterstops, equivalent to those shown on the Plans for joints in similar locations.

B. Preparation of Existing Concrete

Before jointing plastic concrete to concrete that has already set, the surface of the concrete in place shall be reasonably rough with some aggregate particles exposed; shall be free from all loose materials, laitence, dirt or foreign matter; shall be washed and scrubbed clean with stiff brooms and thoroughly drenched with water until saturated and kept wet until the plastic concrete has been placed. The method of concrete placement shall be determined by the Contractor subject to approval of the Engineer.

1. Construction joints shall be provided with concrete keyways, reinforcing steel dowels and waterstops. The method of forming keys for keyed joints shall permit the easy removal of forms without chipping, breaking, or damaging the concrete in any manner. All keyway forms must be oiled before installation.
2. Special attention shall be given to keyed joints so they will be neatly constructed of thoroughly compacted concrete, free of excess water, and uniform in every respect.

C. Placement

All concrete at construction joints shall have been in place not less than 12 hours, or longer if necessary, before concrete resting thereon is placed. Before placing is resumed, or commenced, excess water and laitence shall be removed, and loose concrete trimmed away, to insure 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 inch layer of mortar immediately before the new concrete is deposited.

D. Locations

Construction joints, if required, shall be located as shown on the plans or as specified. Joints in columns or piers shall be made at the underside of the deepest beam or girder. Joints not shown, or specified, shall be located to least impair strength and appearance of work and will require the approval of the Engineer. Vertical joints in wall footings shall be minimized. Placement of concrete shall be at a rate such that surfaces of concrete not carried to planned joint levels will not have attained initial set before additional concrete is placed. 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 inch above the underside of the strip. The strip shall be removed one hour after concrete has been placed and any irregularities in the joint line leveled off with a wood float.

Waterstops shall be installed in all construction joints below grade or in liquid containing structures.

3.06 EXPANSION JOINTS

A. General Requirements

Expansion joints and devices to provide for expansion and contraction shall be constructed as indicated on the Plans. All joints constructed open, which are to be left open, or filled with poured joint material, shall be constructed using forms adaptable to loosening or early removal. In order to avoid jamming by the expansion action of the concrete, these forms shall be removed or loosened as soon as possible after the concrete has attained its initial set. A provision for loosening the forms to permit free expansion of the concrete without the necessity for full removal is preferred.

B. Workmanship

Armored joints shall be carefully constructed in order to avoid defective anchorage of the steel and to avoid porous or honeycombed concrete adjacent to the joint. Pre-molded materials, wherever used, shall be anchored to the concrete on one side of the joint by means of an approved adhesive. Such adhesive shall be sufficient to preclude the tendency of the material to fall out of the joint. Careful workmanship shall be exercised in the construction of all joints to insure that the concrete sections are completely separated by an open joint, or by the joint materials, and to insure that the joints will be true to the outline indicated.

1. Immediately after the removal of forms, and where necessary after surface finishing, all projecting concrete shall be removed along the exposed edges of pre-molded materials in order to secure full effectiveness of the expansion joint. Where roofing felt or pre-molded materials are specified for horizontal joints, the material shall extend two inches beyond the form for the upper pour. The projecting portion shall be trimmed after the forms are removed.

C. Expansion Joint Sealer

1. Surface Preparation and Priming

The expansion joint to be sealed shall be approximately one inch wide and 1¼" deep. The joint sides shall be prepared by sand blasting to remove all dirt and foreign matter. The vertical faces shall be formed so that a slight taper exists. "Ethafoam" breaker rods shall be placed sufficiently below the sealant joint surface to avoid being forced into sealant joint by thermal expansion. All surfaces to which sealant is to adhere shall be clean and dry. Joints should be protected from materials which might be sprayed on concrete for curing purposes. Apply one thin, uniform coat of PRC Primer No.4 to the clean concrete joint surface and allow to dry at least 30 minutes, or until tack free, before applying Rubber Caulk 210 Sealant. Manufacturer's directions shall be

carefully followed in the application of both primer and sealant.

2. Sealant Application

After sealant components are mixed, apply to joints from bottom up using a hand or air operated caulking gun, putty knife, or trowel. It is important that the sealant be firmly pressed into the joint to assure complete wetting of the bonding surface in order to obtain uniform adhesion, and to prevent entrapped air. Surfaces shall be smoothed with pointing tools within one hour after applying sealant. Where other concrete or concrete grout is required above sealer, a three-inch wide strip of polyethylene shall be placed on top of sealant to act as a bond breaker.

3.07 JOB CONDITIONS

A. Cold Weather Concreting

When the atmospheric temperature may be expected to drop below 40°F at the time concrete is delivered to the work site, during placement, or at any time during the curing period, the following provisions shall apply:

1. Except upon written authorization by the Engineer, do not place concrete when the temperature is below 40°F and falling.
2. Concrete may be placed when the temperature is 35°F and rising.
3. No mixed concrete will be accepted which has a temperature of 50°F, or less, when delivered.
4. Protect all concrete from freezing temperatures for five days after placement. Use protective coverings, enclosures or heat to prevent concrete from freezing. Methods used shall conform to ACI 306 and shall maintain a 50°F air temperature around the concrete.
5. The Contractor shall be responsible for the quality and strength of concrete under cold weather conditions and all concrete damaged by freezing shall be removed and replaced by the Contractor at his own expense.
6. When dry heat is used to protect concrete, assure ambient humidity of at least 40% unless concrete has been coated with curing compound, or covered with plastic sheets.

B. Hot Weather Concreting

When climatic or other conditions are such that the temperature of the concrete may be expected to exceed 95°F; or generally, during periods of high wind, low humidity, and hot weather, the following provisions shall apply:

1. All reinforcing steel shall be wetted and cooled prior to placing concrete.
2. Sub-grade and plastic vapor barriers shall be wetted and cooled prior to placing concrete.
3. The concrete mix supplier shall wet the coarse aggregate prior to use.
4. Delivery shall be scheduled such that the maximum time between loading and

unloading the mixing trucks is 90 minutes.
5. A water reducing agent or other admixtures should be used.
6. Methods used shall conform to ACI 305, "Recommended Practice for Hot Weather Concreting."
7. The Contractor shall be responsible for the quality and strength of concrete under hot weather conditions and all concrete damaged by high temperatures shall be removed and replaced by the Contractor at his own expense.

C. Illumination

1. Do not place concrete before sunrise or later than will permit completion of all finishing operations during daylight hours.

D. Protection

1. No concrete slabs or walls shall be placed during rain unless acceptable protective shelter is provided. During such weather, all concrete placed within the preceding 12 hours shall be protected with waterproof canvas or other suitable covering.

3.08 CONCRETE FINISHES

A. Slabs and Flatwork

1. Exterior paving shall have a slip resistant finish formed by brushing. Slabs shall be given a slip resistant brush finish. Sidewalks shall be scored at a space equal to the width of the walk using an approved tool having a radius of approximately ¼".
2. Interior slabs that are to receive a finish floor covering, except ceramic tile which will require a setting bed, are to be finished by tamping with special tools to force the coarse aggregate below the surface, then screeded and floated to bring the surface to the required finish level. Final finish shall be steel trowelled to a smooth, impervious finish free from blemishes. After cement has set enough to ring the trowel, surface of all slabs shall be given a second steel trowelry to a burnished finish.
3. Interior slabs that are to receive a setting bed shall be left roughened sufficiently to produce a good bond with the topping material.
4. Interior slabs that are not to receive any finish floor covering shall be steel trowelled as described above and have a final finish applied by brushing lightly with a soft bristle brush to form a slightly roughened, slip resistant, surface. The brush shall be kept clean and wet at all times. Where indicated on the plans apply a floor hardener and sealer.
5. During periods of high temperature and low humidity, extreme care shall be taken in the finishing of slabs to eliminate initial shrinkage cracks. Following the initial set of concrete but while the concrete is still green, finishing shall continue as required to remove shrinkage cracks which may occur in the initial set of concrete. In hot, dry weather, a cement finisher shall remain on the job following normal finishing operations for a sufficient length of time to insure the

removal of initial shrinkage cracks.

6. Basin floors, horizontal surfaces, and all hydraulic structures shall be screeded to grade and cross section, tamped as required to raise a good bed of mortar for finishing and re-screeded as necessary. Final finish shall be by wood float and steel trowelled to a smooth, even, impervious finish, free from blemishes. Where indicated on the Plans, slabs shall be sloped to provide drainage. Where floor drains are shown in slabs and slope of floor is not indicated, floors shall be sloped to drain on a grade of one sixteenth inch (1/16") per foot with a maximum total slope of one and one-quarter inches (1¼").

   Where indicated on the plans, grout topping may be used for shaping and forming fillets the structure to drain, and for final floor leveling.

7. In lieu of hand finishing, surfaces of slabs requiring wood float finish may be finished with an approved power finishing machine, operated in accordance with the directions of the machine manufacturer. Following machine finishing, irregularities left by the machine shall be eliminated by hand trowelling with a steel trowel. Power machine finishing may also be used as initial step in finishing surfaces requiring a final finish using a steel trowel. Where surfaces are to receive a floor covering, it is not required that the entire surface be hand trowelled. The preparation of surfaces for finishing by machine shall be as required for hand finishing.
8. Edges at all expansion joints, construction joints, and elsewhere as directed by the Engineer, shall be rounded or chamfered with a suitable jointing or edge tool.

B. Formed Concrete Surfaces

1. Minimum finish requirement for formed surfaces shall be as follows and will be required before any additional finishes.

   a. After being cleaned and thoroughly dampened, fill the tie holes completely with patching mortar. Patch all tie holes within 7 days after removal of forms.
   b. Remove fins and surface projections from all surfaces except exterior surfaces that will be in contact with earth backfill and not specified to be damp-proofed. Use a power grinder if necessary to remove projections and provide a flush surface.

2. All interior and exposed vertical surfaces to a point one foot below ground or normal water level and exposed horizontal surfaces not normally subjected to foot traffic, including the exposed underside of slabs shall receive a rubbed finish.

   a. The rubbed finish shall be produced on newly hardened concrete no later than the day following form removal. Surfaces shall be wetted and rubbed with carborundum brick or other abrasive until a uniform color and texture are produced. No cement grout may be used other than the cement paste

drawn from the surface by the rubbing process.

b. Forms shall be removed, 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 mortar. The surface film of all such pointed places shall be removed before setting occurs. After the point has set sufficiently, 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 a surface of a smooth texture and uniform color. Excess mortar or grout worked up during rubbing shall be removed so no visible grout film or paste will remain. All surfaces shall be 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.

C. Plaster Coating

Furnish and install thorocoat as finish for concrete surfaces. Coating system shall be as manufactured by Thoro System Products, or approved equal, for all outside wall sections down to a minimum of six (6") inches below proposed finished ground elevations.

3.09 SURFACE DEFECTS

A. General

Any defective work discovered after the forms have been removed shall be repaired immediately. If the surface of the concrete is bulged, uneven, or shows excessive honey-combing or form marks, which in the opinion of the Engineer, cannot be repaired satisfactorily, the entire section shall be removed and replaced.

B. Patching

Slight honeycomb and minor defects in all concrete surfaces shall be patched with cement mortar mixed in the same proportions of cement and fine aggregate as the original concrete. Repair minor honeycomb areas by removing all loose material from the area, applying an approved bonding material, then grouting the area flush with surrounding surfaces. In exposed areas, mix the grout to be used for patching to match the color and texture of the area to be patched. Defective concrete not acceptable to be patched shall be repaired by cutting out the unsatisfactory material and replacing it with dry pack mortar which shall be securely keyed and bonded to the old concrete and finished in such a manner as to render the jointing as inconspicuous as possible. This concrete shall be drier than the regular mixture and shall be tamped into place. Each defective area shall be cut back with pneumatic chipping tool as deep as the defective area extends and in no case less than one inch. The holes shall then be painted with an approved bonding agent, such as Daraweld, and then filled to within three-fourths inch of the surface with approved non shrink grout and the remainder of the hole filled with dry pack mortar. The surface of such patches shall then be finished as specified. Dry pack mortar shall be

packed into place.

C. Repairs

Where the area of 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 and neatly finished to match the surface and texture of the adjacent concrete. All patches and repairs shall be cured as required for cast-in-place concrete or as approved by the Engineer.

3.10 MODIFICATIONS OF EXISTING CONCRETE

A. General

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 those parts of the existing structures that are to remain.

1. Where the cut surface is to be left exposed, it shall be cleaned and surfaced with non-shrink grout and finished to match adjacent surface.
2. Where new concrete or mortar is to be placed against existing concrete surfaces or surfaces that have been cut, each surface shall be thoroughly cleaned, by sandblasting if necessary, and coated with latex or epoxy bonding compound prior to the placement of the new concrete.
3. Unless otherwise indicated on the drawings, continuity of reinforcing steel shall be obtained by exposing bars to provide sufficient laps with new bars.

3.11 BLOCKING OF PIPE FITTINGS

A. General

Concrete blocking shall be placed at all bends, tees, wyes, crosses, and plugs, in accordance with Standard Details or as shown on the Plans. The concrete blocking shall be placed to rest against firm undisturbed trench walls. The supporting areas for each block shall be sufficient to withstand internal pressures, thrust, and water hammer. Each block, except those for upward thrusts, shall rest on a firm, undisturbed foundation or trench bottom. Blocking design should be as shown on the plans. Concrete for blocking may be Class B (2,000 psi).

1. No concrete shall be placed around any part of a joint or fitting that interferes with removal.
2. Do not backfill until the concrete has attained initial set and blocking inspected by the Engineer.

END OF SECTION

SECTION 05520

HANDRAILS AND RAILING

PART 1. GENERAL

1.01 SCOPE

A. This item shall consist of furnishing and erecting galvanized steel handrail on headwalls, retaining walls or steps, where shown on the Drawings, or as directed by the Engineer, in accordance with the details shown on the Drawings and with these Specifications.

PART 2. PRODUCTS

2.01 MATERIALS

A. All handrail materials shall be galvanized steel, coated at the rate of 2.0 ounces of zinc per square foot of surface coated, and in accordance with the current provision of ASTM A 123.
B. All handrail materials shall be steel, conforming to the current provisions of the ASTM Designation in the listing as follows:

1. Pipe – A 53, Type E or S, Grade B.
2. Plates – A 36.
3. Sleeves – A 53, Type E or S, Grade B.

PART 3. EXECUTION

3.01 EXECUTION

A. All welding shall be in accordance with current provisions of Specifications for Welded Highway and Railroad Bridges, American Welding Society.
B. Welding shall be done by the shielded arc method, and shall be done only by certified welders.
C. Welding rods shall be low hydrogen suitable for use with the metal being welded.
D. Welds joining sections of handrail shall be ground smooth prior to field galvanizing.
E. All welds shall be field galvanized, and all galvanized areas which have been damaged shall be repaired as follows:

1. All galvanizing that has been chipped off or damaged in handling or transporting or in welding or riveting shall be repaired by field galvanizing by the application of a paste composed of approved zinc powder and flux with a minimum amount of water.
2. The places to be coated shall be thoroughly cleaned, including removal of slag on welds before the paste is applied.
3. The surface to be coated shall first be heated with a torch to a sufficient temperature so that all metallics in the paste are melted when applied to the

heated surface.

4. Extreme care shall be taken to see that the galvanized surfaces are not damaged by the torch.
5. The flux in the paste will cause a black substance to appear on the surface of the coated parts, and this black substance shall be removed by wiping off with waste or by quick application of cold water.

F. Other galvanizing methods may be used if approved in writing by the Engineer.

G. The bottom of posts shall be painted with a bituminous paint. Painting shall be done by dipping or by careful swabbing of inside and outside of posts. The paint on the outside of posts shall extend approximately ½" above the top of grout.

H. Grout, for setting posts in sleeves, shall be approved premixed, nonshrink grout and shall be used in accordance with the manufacturer's recommendations. The amount of water shall be no more than necessary to allow complete filling of the annular space between post and sleeve.

I. Prior to fabrication, the Contractor shall submit, to the Engineer, shop drawings, and obtain approval thereof. Drawings shall be in sufficient detail to show the proposed fabrication and to imply the method of erection.

END OF SECTION

SECTION 05521

GUARD RAIL

PART 1. GENERAL

1.01 DESCRIPTION

This item shall consist of furnishing and installing steel plate guard rail, including concrete line post, and spacer blocks, terminal anchor post, and guard rail anchor post, at the locations shown on the drawings or designated by the Engineer.

1.02 STANDARD SPECIFICATIONS

All work under this item shall be in accordance with the Arkansas State Highway and Transportation Department (AHTD) SECTION 617 – GUARD RAIL of the Standard Specifications, except as modified or augmented herein.

1.03 MATERIALS

A. Materials for line posts shall conform to paragraph 617.02(b)(2) of the AHTD Standard Specifications.
B. Materials for terminal anchor posts shall conform to paragraph 617.02(b)(2) of the AHTD Standard Specifications.

1.04 METHOD OF MEASUREMENT

A. Guard rail shall be measured in place by the linear foot, measured along the center line of the rail.
B. Terminal anchor posts will be measured by the unit.
C. Guard rail anchor posts will be measured by the unit.

(SWPPP)

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

_____

Doug Formon, Mayor

VALLEY AND OWENS DRAINAGE IMPROVEMENTS
CITY OF JONESBORO

STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

February 2007

NRS CONSULTING ENGINEERS

1220 Stone Street
Jonesboro, Arkansas 72401

(870) 972-5316

FAX (870) 932-0432

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LIST OF EXHIBITS

BACKGROUND:

This Storm Water Pollution Prevention Plan (SWPPP) has been prepared for the City of Jonesboro – Valley and Owens Drainage Improvements project to meet the requirement set forth in the Arkansas General Permit for owners or operators of facilities discharging storm water associated with construction activities located in the State of Arkansas (Permit No. ARR150000). The Contractor shall adhere strictly to this plan and to the general permit requirements provided as Exhibit 1.

GENERAL INFORMATION:

A. Owner Information:

City of Jonesboro
The Honorable Doug Formon, Mayor
515 W. Washington Avenue
Jonesboro, AR 72401

B. Nature of Activity: Detention Pond Construction and Channel Improvements.

C. Sequence of Events: Notice-of-Intent, installation of perimeter control measures, construction entrances, and site posting, clearing and grubbing, installation of erosion control measures, excavation of detention ponds and drainage channel, installation of culverts and other drainage structures, final site grading, landscaping and soil stabilization, final cleanup and removal of temporary structural controls, and Notice-of-Termination.

D. Estimated area to be disturbed: 3.6-acres.

E. Estimated Runoff Coefficients:

Pre-Construction:	C = 0.6
Post-Construction:	C = 0.3

Soils information is provided as Exhibit 2.

F. Location Map: Exhibit 3.

G. Site Map: Exhibit 4.

H. Receiving Stream: Higginbottom Creek.

I. General Permit Requirements: Exhibit 1.

J. Endangered Species: Exhibit 5.

K. Technical Specifications: Exhibit 6.

L. Inspection Log: Exhibit 7.

CONTROLS:

Construction shall proceed in an orderly fashion so that areas of disturbed soil, at any one time, are kept to a minimum. Existing vegetation shall be preserved where possible, particularly around the perimeter of the site and along drainage channels where it can be used as a vegetative buffer.

A. Structural Controls: Structural controls shall be installed in the approximate locations shown on the site map provided (Exhibit 4) according to the timeframe listed under General Information – Part "C" of the plan. Structural control measures include silt fence, hay bales, rock check dams, sedimentation basins, and gravel entrance drives. These measures shall be installed in accordance with the details provided (Exhibit 6) and shall be maintained in-place until final site stabilization is complete.

B. Stabilization Measures: Stabilization practices may include temporary seeding, permanent seeding, mulching, sod stabilization, hydro-mulching, liquid copolymers soil stabilization, concrete revetment mat, and geo-textiles. Stabilization measures shall be initiated as soon as practicable in portions of the site where work has temporarily or permanently ceased, but in no case more than 14 days after the work has ceased, unless work is to resume within 21 days. Short-term stabilization methods to be employed shall be selected and installed by the Contractor on a case-by-case basis. Long-term methods shall be installed by the Contractor in accordance with the approved construction plans and specifications.

C. Other Controls: No solid materials, including building materials, shall be discharged to waters of the United States, except as authorized by a permit issued under Section 404 of the CWA. The Contractor or his designated representatives shall police that site each workday to ensure that paper products, building materials, and food items are placed in waste disposal containers. The Contractor shall ensure that construction entrances are used and maintained, and that water or other appropriate dust suppression means are used to minimize the generation of dust from the site. All diesel tanks

and other oil products stored at the site are to be located in earthen or other secondary containment areas that are sufficiently sized to hold the entire content of the storage container. The Contractor shall provide sanitary facilities, maintained in accordance with current health codes, at the project site for use by site personnel.

INSPECTION:

Qualified personnel, provided by the Contractor and approved by the Owner, shall inspect disturbed areas of the construction site, areas used for storage of materials that are exposed to precipitation that have not been fully stabilized, and structural control measures and locations where vehicles enter or exit the site. Inspections shall be done at least once every fourteen (14) calendar days and within 24-hours of the end of a storm that is 0.5-inches or greater. Contractor shall install a rain gauge at the project site for measuring rainfall events. Owner may periodically check inspection records to verify that inspection work is being done. Contractor shall provide to the Owner a statement of qualifications for all personnel responsible for performing inspections in accordance with this plan. A copy of the qualification statement(s) shall also be kept onsite by the Contractor with this plan for documentation.

A. Disturbed areas and areas used for material storage that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control measures shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impact to receiving waters. Locations where vehicles enter or exit the site shall be inspected for evidence of offsite sediment tracking.
B. Based on the results of the inspection, this plan shall be modified as necessary to prevent significant impact to receiving waters. The Contractor shall be responsible for maintaining all control measures and shall select, installing, and maintaining additional control measures as needed, and shall update the site map and pollution prevention measures identified thereon as

required within 7 calendar days following the inspection. Field modifications or additions to the pollution prevention measures shall be implemented by the Contractor within 7 calendar days following the inspection.

C. A report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the storm water pollution prevention plan, and actions taken shall be made and retained as part of the storm water pollution prevention plan for at least three (3) years form the date the site is finally stabilized. The report shall be signed by the Contractor and the Inspector(s), if different.

The Contractor shall also maintain a daily field log and record the dates when major grading activities occur, when construction activities temporarily or permanently cease on a portion of the site, and when stabilization measures are initiated. These records shall be kept with this plan.

DOCUMENTATION OF PERMIT ELIGIBILITY TO TOTAL MAXIMUM DAILY LOADS:

Storm water from the construction site discharges to Higginbottom Creek. The ultimate receiving stream is the St. Francis River. This water body is not on the list of impaired water bodies (i.e., 303(d) list) for siltation/turbidity. Since this water body is not impaired, a TMDL is not applicable to this construction project.

DOCUMENTATION OF ATTAINMENT OF WATER QUALITY STANDARDS AFTER AUTHORIZATION:

The Contractor shall install, implement, and maintain all pollution prevention measures at the construction site. If at any time during the construction period, the Arkansas Department of Environmental Quality (ADEQ) or the local permitting authority, as applicable, determines that storm water discharge from the project site may cause, have reasonable potential to cause, or contribute to an excursion above an applicable water quality standard, the Contractor will be required to:

1. Develop a supplemental plan to address the identified water quality concerns;
2. Submit valid and verifiable data and information that is representative of ambient conditions and indicate that the receiving water is attaining water quality standards; or,
3. Cease discharge of pollutants from construction activity and submit an individual permit application according to General Permit.

NON-STORM WATER DISCHARGES:

There is no non-storm water component not permitted by ADEQ at this site.

PERMITEE'S CERTIFICATION:

"I certify under penalty of law that I understand the terms and conditions of the general National Pollutant Discharge Elimination System (NPDES) permit that authorizes the storm water discharge associated with industrial activity from the construction site identified as part of this certifications."

Signature: _____
Title: _____
Address: _____
Telephone: _____
Project: _____
Address: _____
Date: _____

CONTRACTOR'S CERTIFICATION:

"I certify under penalty of law that I understand the terms and conditions of the general National Pollutant Discharge Elimination System (NPDES) permit that authorizes the storm water discharge associated with industrial activity from the construction site identified as part of this certifications."

Signature: _____

Title: _____

Address: _____

Telephone: _____

Project: _____

Address: _____

Date: _____

INSPECTOR'S CERTIFICATION:

"I certify under penalty of law that I understand the terms and conditions of the general National Pollutant Discharge Elimination System (NPDES) permit that authorizes the storm water discharge associated with industrial activity from the construction site identified as part of this certifications."

Signature: _____

Title: _____

Address: _____

Telephone: _____

Project: _____

Address: _____

Date: _____

EXHIBIT 1

AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM AND THE ARKANSAS WATER AND AIR POLLUTION CONTROL ACT

In accordance with the provisions of the Arkansas Water and Air Pollution Control Act (Act 472 of 1949, as amended, Ark. Code Ann. 8-4-101 et seq.), and the Clean Water Act (33 U.S.C. 1251 et seq.),

Owners or operators of Facilities Discharging Storm Water Associated With Construction Activity Located in the State of Arkansas

are authorized to discharge

to all receiving waters

in accordance with effluent limitations, monitoring requirements, and other conditions set forth in Parts I and II herein.

This permit shall become effective on November 1, 2003.

This permit and the authorization to discharge shall expire at midnight, October 31, 2008.

Signed this 30th day of September, 2003.

_____

Martin Maner, P.E.
Chief, Water Division
Arkansas Department of Environmental Quality

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PART I
PERMIT REQUIREMENTS

Information in **Part I** is organized as follows:

Section A: Permit Requirements Summary Flowchart

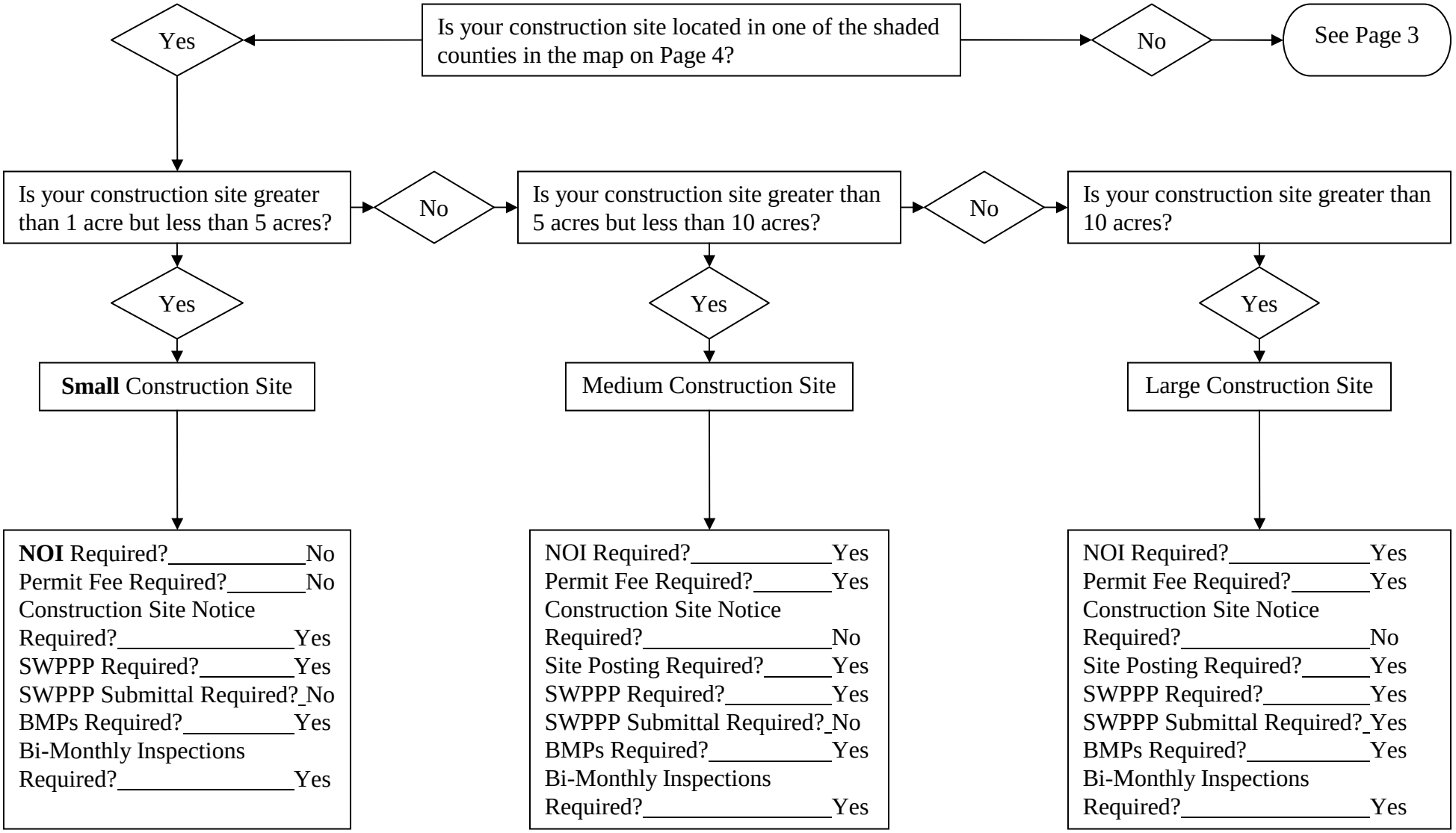
Section B: Coverage Under this Permit:

1. Permit Area
2. Eligibility
3. Limitations on Coverage
4. Requiring an Individual NPDES Permit or an Alternative General Permit
5. Waivers from Permit Coverage
6. Authorization
7. Notice of Intent Requirements
8. Notice of Termination Requirements

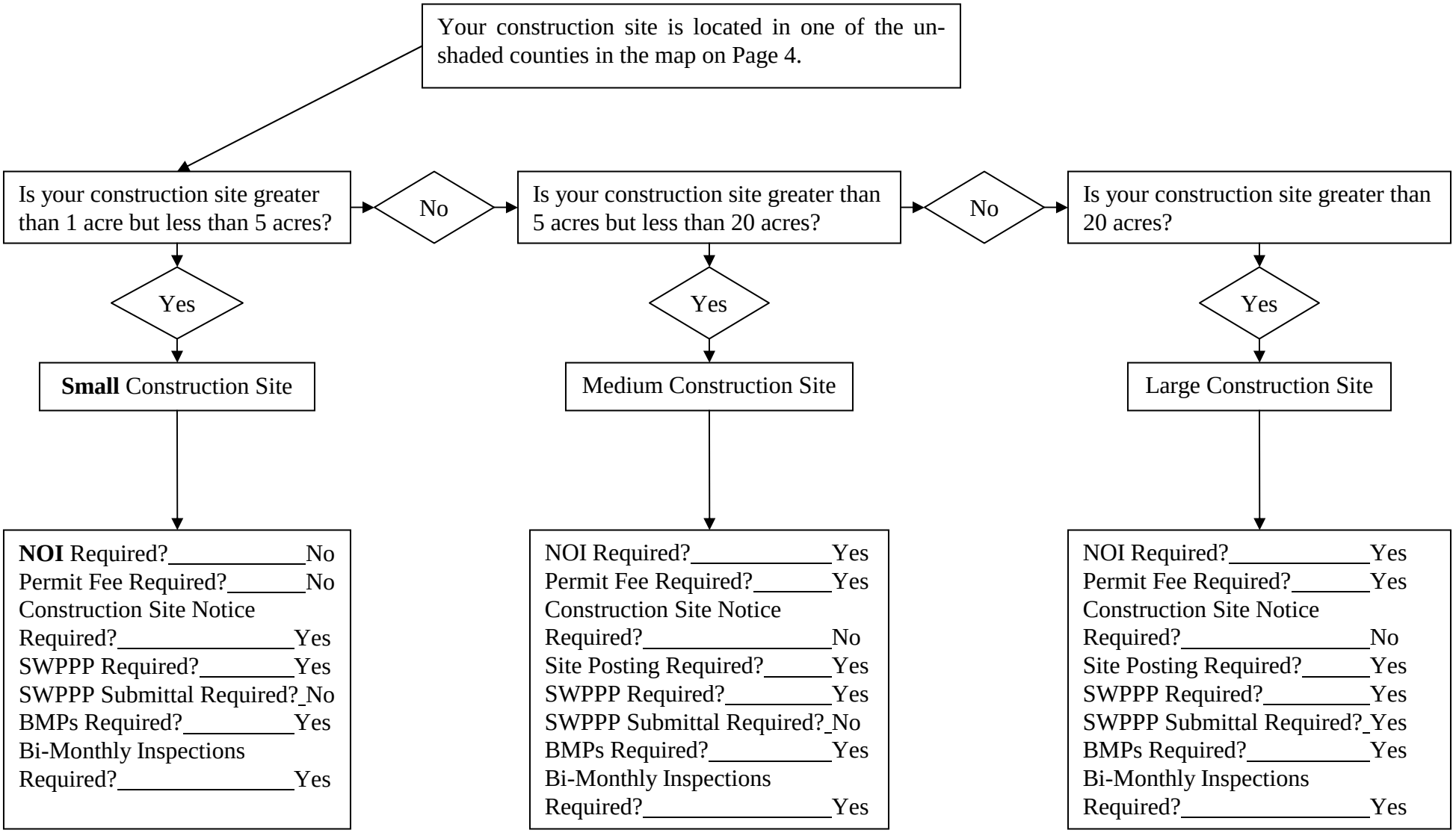
Section C: Other Requirements:

1. Prohibition of Non-Storm Water Discharges
2. Releases in Excess of Reportable Quantities
3. Responsibilities of Operators

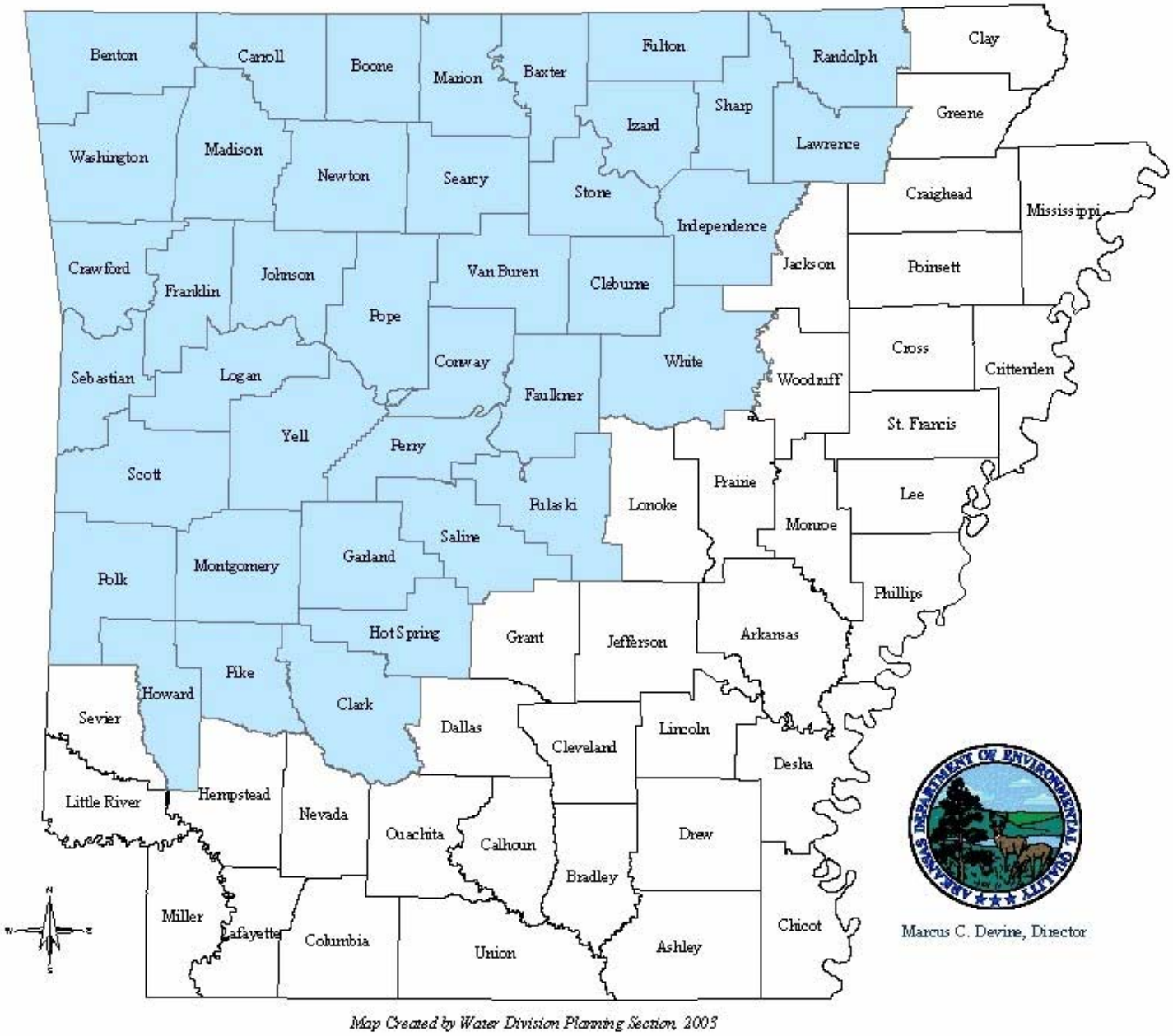
SECTION A: PERMIT REQUIREMENTS SUMMARY FLOWCHART



SECTION A: PERMIT REQUIREMENTS SUMMARY FLOWCHART (CONT.)



SECTION A: PERMIT REQUIREMENTS SUMMARY FLOWCHART (CONT.)



Map Created by Water Division Planning Section, 2003

SECTION B: COVERAGE UNDER THIS PERMIT

1. **Permit Area**. This general permit includes all areas within the State of Arkansas.

2. **Eligibility.**

a. Except for storm water discharges identified under Part I.B.3 below, this permit shall authorize all discharges of storm water from the following construction sites (henceforth referred to as storm water discharges from construction activities) occurring after the effective date of this permit (including discharges occurring after the effective date where the construction activity commenced before the effective date):

i. **Large Construction Sites:** any construction activity that meets one of the following two definitions:

A. Construction sites that will result in the disturbance (e.g., clearing, grading, excavating, etc.) of **ten (10)** or more acres of total land area or less than **ten (10)** acres of total land area that is part of a larger common plan of development or sale if the larger common plan will ultimately disturb **ten (10)** acres or more located in the following counties:

Baxter	Garland	Newton	Sharp
Benton	Hot Spring	Perry	Stone
Boone	Howard	Pike	Van Buren
Carroll	Independence	Polk	Washington
Clark	Izard	Pope	White
Cleburne	Johnson	Pulaski	Yell
Conway	Lawrence	Randolph	
Crawford	Logan	Saline	
Faulkner	Madison	Scott	
Franklin	Marion	Searcy	
Fulton	Montgomery	Sebastian	

B. Construction sites that will result in the disturbance (e.g., clearing, grading, excavating, etc.) of **twenty (20)** or more acres of total land area or less than **twenty (20)** acres of total land area that is part of a larger common plan of development or sale if the larger common plan will ultimately disturb **twenty (20)** acres or more located in the following counties:

Arkansas	Crittenden	Jefferson	Nevada
Ashley	Cross	Lafayette	Ouachita
Bradley	Dallas	Lee	Phillips
Calhoun	Desha	Lincoln	Poinsett
Chicot	Drew	Little River	Prairie
Clay	Grant	Lonoke	Sevier
Cleveland	Greene	Miller	St. Francis
Columbia	Hempstead	Mississippi	Union
Craighead	Jackson	Monroe	Woodruff

ii. **Medium Construction Sites:** any construction activity that meets one of the following two definitions:

A. Construction sites that will result in the disturbance (e.g., clearing, grading, excavating, etc.) of greater than **five (5)** acres and less than **ten (10)** acres of total land area or less than **five (5)** acres of total land area that is part of a larger common plan of development or sale if the larger common plan will ultimately disturb **five (5)** acres or more, but less than ten (10) acres, located in one of the counties identified in Part I.B.2.a.i.A above.

B. Construction sites that will result in the disturbance (e.g., clearing, grading, excavating, etc.) of greater than **five (5)** acres and less than **twenty (20)** acres of total land area or less than **five (5)** acres of total land area that is part of a larger common plan of development or sale if the larger common plan will ultimately disturb **five (5)** acres or more, but less than twenty (20) acres, located in one of the counties identified in Part I.B.2.a.i.B above.

iii. **Small Construction Sites:** any construction activity that meets the following definition:

A. Construction sites that will result in the disturbance (e.g., clearing, grading, excavating, etc.) of greater than or equal to **one (1)** acre and less than **five (5)** acres of total land area or less than **one (1)** acre of total land area that is part of a larger common plan of development or sale if the larger common plan will ultimately disturb **one (1)** acre or more, but less than five (5) acres.

(1) Road, pipeline, and utility maintenance activities are not regulated under this permit unless one or more acres of underlying and/or surrounding soil are cleared, graded, or excavated as part of the operation.

b. This permit also authorizes storm water discharges from support activities (e.g., concrete or asphalt batch plants, equipment staging yards, materials storage areas, excavated material disposal areas, borrow areas) provided:

i. The support activity is directly related to a construction site that is required to have NPDES permit coverage for discharges of storm water associated with the construction activity;

ii. The support activity is not a commercial operation serving multiple unrelated construction projects by different operators, and does not operate beyond the completion of the construction activity at the last construction project it supports; and

iii. Appropriate controls and measures are identified in a storm water pollution prevention plan covering the discharges from the support activity areas.

3. **Limitations on Coverage.** The following storm water discharges associated with construction activity are not covered by this permit:

a. Storm water discharges associated with construction activity that originate from the site after construction activities have been completed and the site has undergone final stabilization.

b. Discharges that are **mixed with** sources of **non**-storm water. (See Part I.C.1.a on page 16)

c. Storm water discharges from facilities with an existing NPDES individual or general permit for storm water discharges or which are issued a permit in accordance with Part I.B.4 of this permit. Such discharges may be authorized by this permit after an existing permit expires provided the expired permit did not establish numeric effluent limitations for such discharges.

d. Storm water discharges from construction sites that the Director has determined to be or may reasonably be expected to be contributing to a violation of a water quality standard.

e. Discharges to waters for which there is a total maximum daily load (TMDL) allocation are not eligible for coverage under this permit unless you develop and certify a storm water pollution prevention plan (SWPPP) that is consistent with the assumptions and requirements in the approved TMDL. To be eligible for coverage under this general permit, operators must incorporate into their SWPPP any conditions applicable to their discharges necessary for consistency with the assumptions and requirements of the TMDL within any timeframes established in the TMDL. If a specific numeric wasteload allocation has been established that would apply to the project's discharges, the operator must incorporate that allocation into its SWPPP and implement necessary steps to meet that allocation.

f. Discharges that the Department, prior to authorization under this permit, determines will cause, have the reasonable potential to cause, or contribute to an excursion above any applicable water quality standard. Where such a determination is made prior to authorization, the Department may notify you that an individual permit application is necessary in accordance with Part I.B.4. However, the Department may authorize coverage under this permit after inclusion of appropriate controls and implementation procedures in the SWPPP designed to bring the discharge into compliance with water quality standards.

g. Storm water discharges from construction sites if the discharge or clearing activities are likely to adversely affect a **listed endangered or threatened species or its critical habitat***.

*For a **list of endangered or threatened species,** contact the Arkansas Natural Heritage Commission at (501) 324-9619or www.naturalheritage.com or the U.S. Fish and Wildlife Service at (501) 324-5643 www.fws.gov.

h. Discharges which are not in compliance with the Endangered Species Act (ESA). In order to obtain coverage, the applicant must certify to meeting one of the following criteria.

The criteria are as follows:

i. The storm water discharge(s), and the construction and implementation of Best Management Practices (BMPs) to control storm water runoff, are not likely to adversely affect species or critical habitat for a listed species; or

ii. The applicant's activity has received previous authorization under section 7 or section 10 of the Endangered Species Act and that authorization addressed storm water discharges and/or BMPs to control storm water runoff (e.g. developer included impact of the entire project in consultation over a wetlands dredge and fill permit under Section 7 of the Endangered Species Act); or

iii. The applicant's activity was considered as part of a larger, more comprehensive assessment of impacts on endangered and threatened species under section 7 or section 10 of The Endangers Species Act that which accounts for storm water discharges and BMPs to control storm water runoff (e.g., where an area wide habitat conservation plan and section 10 permit is issued which addresses impacts from construction activities including those from storm water, or a National Environmental Policy Act (NEPA) review is conducted which incorporates ESA section 7 procedures); or

iv. Consultation under section 7 of the Endangered Species Act is conducted for the applicant's activity which results in either a no jeopardy opinion or a written concurrence on a finding of a no likelihood of adverse effects: or

v. The applicant's activity was considered as part of a larger, more comprehensive site-specific assessment of impacts on endangered and threatened species by the owner or other operator of the site and that owner or operator certified eligibility under item (1), (2), (3), or (4) above (e.g., owner was able to certify no adverse impacts for the project as a whole under item (1), so the contractor can the certify under item (5).

The State of Arkansas notes that it is **requiring all** applicants to follow directions to ensure protection of the **listed species and critical habitat** when applying for permit coverage. Those directions require that applicants assess the impacts of their "storm water discharges" and "BMPs to control storm water run off" on listed species and critical habitat that are located in "proximity" to

those discharges and BMPs are planned or are to be constructed. This definition reflects the purpose of this permit which regulates storm water discharges and measures (i.e., BMPs) to control those discharges.

4. Requiring an *Individual* NPDES Permit.

a. The Director may require any person authorized by this permit to apply for and obtain an individual NPDES permit. Any interested person may petition the Director to take action under this paragraph.

b. The Director may require any owner or operator authorized to discharge under this permit to apply for an individual NPDES permit only if the owner or operator has been notified in writing that a permit application is required.

i. This notice shall include a brief statement of the reasons for this decision, an application form, a statement setting a deadline for the owner or operator to file the application, and a statement that on the effective date of the individual NPDES permit as it applies to the individual owner or operator, coverage under this general permit shall automatically terminate.

ii. The Director may grant additional time to submit the application upon request of the applicant.

iii. Coverage under this permit will be terminated if an owner or operator fails to submit the Individual NPDES permit application in a timely manner as required by the Director.

c. Any owner or operator authorized by this permit may request to be excluded from the coverage of this permit by applying for an individual permit. The owner or operator shall submit an individual application in accordance with the requirements of 40 CFR 122.26(c)(1)(ii), with reasons supporting the request to the Director. The request may be granted by issuance of any individual permit if the reasons cited by the owner or operator are adequate to support the request. However, the permittee **must comply with this permit until** an individual permit is issued.

d. When an individual NPDES permit is issued to a discharger otherwise subject to this permit, the applicability of this permit to the individual NPDES owner or operator is automatically terminated on the effective date of the individual permit. When an individual NPDES permit is denied to an owner or operator otherwise subject to this permit, the applicability of this permit to the individual NPDES owner or operator remains in effect, unless otherwise specified by the Director.

5. Waivers from Permit Coverage. The Director may waive the otherwise applicable requirements of this general permit for storm water discharges from some small construction activities (e.g., sites disturbing between one and five acres of total land area) under the terms and conditions described in this section.

a. Waiver Applicability and Coverage. Operators of small construction activities may apply for and receive a waiver from the requirements to obtain authorization under this general permit where:

i. The calculated **rainfall erosivity (R) factor** for the entire period of the construction project is less than five (5);

ii. The operator submits a signed waiver certification form, supplied by the Director, certifying that the construction activity will commence and be completed within a period when the value of the calculated rainfall erosivity (R) factor is less than five (5); and

iii. The waiver certification form is submitted to the Department **at least 48 hours before** construction activity begins.

b. Activities Extending Beyond the Waiver Period. If a construction activity extends beyond the approved waiver period due to circumstances beyond the control of the operator, the operator **must either**:

i. Recalculate the rainfall erosivity (R) factor using the original start date and the new projected ending date, and if the R factor is still under five (5), **submit a new** waiver certification form at least 48 hours before the end of the original waiver period; or

ii. **Develop and implement** a storm water pollution prevention plan in accordance with the requirements **of Part II** of this permit **at least 48 hours before** the end of the approved waiver period.

6. Authorization.

a. Large Construction Sites

i. An owner or operator of a large construction site must submit a Notice of Intent (NOI) and a Storm Water Pollution Prevention Plan (SWPPP) in accordance with the requirements of Part I.B.7 of this permit in order for storm water discharges from large construction sites to be authorized to discharge under this general permit. **An initial permit fee of $200.00 must accompany the NOI under the provisions of ADEQ Regulation No.9. Subsequent annual fees of $200.00 per year will be billed by the Department.** Failure to remit the required permit fee may be grounds for the Director to deny coverage under this general permit.

ii. Where a new operator is selected after the submittal of an NOI under Part I.B.7, a new Notice of Intent **must** be submitted by the operator in accordance with Part I.B.7.a.iv.

iii. Unless notified by the Director to the contrary, dischargers who submit a Notice of Intent in accordance with the requirements of this permit are authorized to discharge storm water from construction sites under the terms and conditions of this permit **two weeks after** the date the NOI is postmarked. Upon review of the NOI and other available information, the Director may deny coverage under this permit and require submittal of an application for an individual NPDES permit.

b. Medium Construction Sites

i. An owner or operator of a medium construction site must submit a Notice of Intent (NOI) in accordance with the requirements of Part I.B.7 of this permit in order for storm water discharges from medium construction sites to be authorized to discharge under this general permit. **An initial permit fee of $200.00 must accompany the NOI under the provisions of ADEQ Regulation No.9. Subsequent annual fees of $200.00 per year will be billed by the Department.** Failure to remit the required permit fee may be grounds for the Director to deny coverage under this general permit.

ii. Where a new operator is selected after the submittal of an NOI under Part I.B.7, a new Notice of Intent **must** be submitted by the operator in accordance with Part I.B.7.a.iv.

iii. Unless notified by the Director to the contrary, dischargers who submit a Notice of Intent in accordance with the requirements of this permit are authorized to discharge storm water from construction sites under the terms and conditions of this permit **two weeks after** the date the NOI is postmarked. Upon review of the NOI and other available information, the Director may deny coverage under this permit and require submittal of an application for an individual NPDES permit.

c. Small Construction Sites

i. In accordance with 40 CFR 122.28(b)(2)(v), the owner or operator of a small construction site, that meets the eligibility criteria set forth in this general permit and in 40 CFR 122.28 (a) and (b), may discharge under this general permit without submitting a NOI.

ii. An owner or operator of a small construction site, as described in Part I.B.6.C.i above, is automatically authorized to discharge storm water related to construction activities under this general permit. **Submittal of an NOI or general permit fee is not required for coverage under this general permit.**

7. Notice of Intent Requirements

a. Deadlines for Notification.

i. Except as provided in Part I.B.7.a.iv and Part I.B.7.a.v individuals who intend to obtain coverage for storm water discharges from medium and large construction sites under this general permit, shall submit a Notice of Intent (NOI) in accordance with the requirements of this Part **at least two weeks prior** to the commencement of construction at any site that will result in the disturbance of **five (5)** or more acres of total land area.

ii. Large Construction

A. **Ongoing Projects:** Operators of ongoing large construction projects as of the effective date of this permit that received authorization to discharge for these projects under the 1998 construction general permit (ARR10A000 issued July 1, 1998) **must**:

(1) **For the first 90 days** from the effective date of this permit (i.e., grace period), comply with the terms and conditions of the **previous** construction general permit they were previously authorized under; and

(2) **Update** their storm water pollution prevention plan (SWPPP), **as necessary**, to **comply with** the requirements of Part II.A **within 90 days** of the effective date of this permit. (Submittal is not required.)

B. **New Projects:** Operators of large construction projects that commence construction after the effective date of this permit must:

(1) Submit an NOI and a SWPPP to comply with the requirements of Part II.A at least **two weeks prior to** commencement of construction activities (i.e., the initial disturbance of soils associated with clearing, grading, excavation activities, or other construction activities). The SWPPP may be submitted for "pre-approval" two weeks prior to submittal of the NOI.

iii. Medium Construction

A. **Ongoing Projects:** Operators of ongoing medium construction projects as of the effective date of this permit that received authorization to discharge for these projects under the 1998 construction general permit (ARR10A000 issued July 1, 1998) **must**:

(1) **For the first 90 days** from the effective date of this permit (i.e., grace period), comply with the terms and conditions of the **previous** construction general permit they were previously authorized under; and

(2) **Update** their storm water pollution prevention plan (SWPPP), **as necessary**, to **comply with** the requirements of Part II.A **within 90 days** of the effective date of this permit.

B. **New Projects:** Operators of medium construction projects that commence construction after the effective date of this permit must:

(1) Submit an NOI **two weeks prior to** commencement of construction activities (i.e., the initial disturbance of soils associated with clearing, grading, excavation activities, or other construction activities); and

(2) Develop a SWPPP to comply with the requirements of Part II.A **prior to commencement** of construction activities.

iv. Small Construction

A. **Ongoing Projects:** Operators of ongoing small construction projects as of March 10, 2003 are automatically authorized to discharge storm water related to construction activities under this general permit and **must**:

(1) Develop and implement a SWPPP to comply with the requirements of Part II.A within 90 days after the effective date of this permit (i.e., grace period). If the construction is completed and final stabilization achieved before the 90^{th} day, development of a SWPPP is not required.

(2) Complete a Construction Site Notice, located in Attachment A to this permit, within 90 days after the effective date of this permit. **The signed Construction Site Notice shall be posted at the construction site in a prominent place for public viewing (such as alongside a building permit).**

B. **New Projects:** Operators of small construction projects that commence construction after the effective date of this permit are automatically authorized to discharge storm water related to construction activities under this general permit and **must**:

(1) **Develop and implement** a SWPPP to comply with the requirements of Part II.A **prior to commencement** of construction activities (i.e., the initial disturbance of soils associated with clearing, grading, excavation activities, or other construction activities).

(2) Complete a Construction Site Notice, located in Attachment A to this permit, prior to commencement of construction activities. **The signed Construction Site Notice shall be posted at the construction site in a prominent place for public viewing (such as alongside a building permit).**

v. **Change in Operator:** For storm water discharges from **large** and **medium** construction sites where the owner/operator changes, (including projects where an operator is selected after an NOI has been submitted under Part I.B.7.a above), a new NOI shall be submitted **at least two weeks prior to** the operator beginning work at the site; and

vi. **Late Notifications:** A discharger is not precluded from submitting an NOI in accordance with the requirements of this part after the dates provided in Part I.B.7.a of this permit. In such instances, the Director **may** bring an **enforcement action** for failure to submit an NOI in **a timely manner** or for any unauthorized discharges of storm water associated with industrial activity that have occurred on or after the dates specified in Part I.B.7.a.

b. Failure to Notify. Owners or operators of **large** or **medium** construction sites who fail to notify the Director of their intent to be covered under this permit, and who discharge pollutants to waters of the State without an NPDES permit, **are in violation** of the Arkansas Water and Air Pollution Control Act (Act 472 of 1949, as amended)

c. Contents of the Notice of Intent.

i. The Notice of Intent form must be the form obtained from the ADEQ (www.adeq.state.ar.us) unless written approval is received for an optional form.

ii. All Notices of Intent for coverage under this general permit must be signed in accordance with the provisions of 40 CFR 122.22, as adopted by reference in ADEQ Regulation No. 6, and Part II.B.9 of this permit, and submitted to the Department by **certified** mail.

iii. Owners and operators shall notify the Director upon permanent termination of discharge from their facilities. (See Part I.B.8)

d. Where to Submit.

i. Facilities which discharge storm water from medium and large construction sites must submit a complete signed original of the Notice of Intent to the Department at the following address. In addition, facilities which discharge storm water from a large construction site must also submit a complete SWPPP to the Department at the following address:

NPDES Permits/Storm Water
Department of Environmental Quality
P.O. Box 8913
Little Rock, AR 72219-8913

e. **Construction Site Posting for Medium and Large Construction Sites. The Storm Water Construction General Permit Certificate, a copy of the NOI confirmation letter, or other indication that storm water discharges from the site are covered under an NPDES permit, and a brief description (shall include permit number) of the project shall be posted at the**

construction site in a prominent place for public viewing (such as alongside a building permit).

f. Additional Notification. Facilities which are operating under approved State or local sediment and erosion plans, grading plans, local storm water permits, or storm water management plans, **in addition to** filing copies of the Notice of Intent in accordance with Part I.B.7, **shall submit** signed copies of the Notice of Intent to the State or local agency approving such plans in accordance with the deadlines in Part I.B.7 of this permit (or sooner if required by State or local rules).

g. Reaffirmation of Permit Coverage. Upon re-issuance of a new general permit, the owner or operator must notify the Director of his/her intent to be covered by the new general permit in the following manner.

i. Submit an NOI consistent with the new general permit requirements **no later than 90 days** following the effective date of the new general permit.

8. Notice of Termination (NOT). Where a site has been finally stabilized and all storm water discharges from construction activities authorized by this permit are eliminated, the operator of the facility must submit a Notice of Termination to the Director at the address in Part I.B.7.d that is signed in accordance with Part II.B.9 of this permit. Final stabilization is not required if the land is returned to its pre-construction agriculture use. **If a Notice of Termination is not submitted when the project is completed, owners and contractors will be responsible for annual fees due.**

SECTION C: OTHER REQUIREMENTS

1. Prohibition of Non-storm Water Discharges.

a. All discharges covered by this permit shall be composed entirely of storm water except the following non-storm water discharges that are combined with storm water may be authorized by this permit:

i. Discharges from fire fighting activities; fire hydrant flushings; water used to wash vehicles (where detergents are not used) or control dust in accordance with Part II.A.4.b.iii.B; potable water sources including uncontaminated waterline flushings; irrigation drainage; routine external building wash down which does not use detergents; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled materials have been removed) and where detergents are not used; uncontaminated air conditioning or compressor condensate; uncontaminated springs; uncontaminated ground water; foundation or footing drains where flows are not contaminated with process materials such as solvents; and uncontaminated excavation dewatering.

b. Except as provided in Part I.C.1.a above, discharges of material other than storm water must be in compliance with an individual NPDES permit issued for the discharge.

2. Releases in Excess of Reportable Quantities.

a. The discharge of hazardous substances or oil in the storm water discharge(s) from a facility shall be prevented or minimized in accordance with the applicable storm water pollution prevention plan for the facility. This permit does not relieve the owner or operator of the reporting requirements of 40 CFR Parts 110, 117 and 302. Where a release containing a hazardous substance or oil in an amount equal to or in excess of a reporting quantity established under either 40 CFR 110, 40 CFR 117, or 40 CFR 302, occurs during a 24-hour period, the following action shall be taken:

i. Any person in charge of the facility is **required** to notify the National Response Center (NRC) (800-424-8802) in accordance with the requirements of 40 CFR 110, 40 CFR 117, or 40 CFR 302 **as soon as** he/she **has knowledge** of the discharge;

ii. The Owner or operator **shall submit** within **5** calendar days of knowledge of the release a **written** description of the release (including the type and estimate of the amount of material released), the date that such release occurred, the circumstances leading to the release, and steps to be taken in accordance with Part I.C.10.a.iii of this permit to the ADEQ at the address provided in Part I.B.7.d of this permit.

iii. The storm water pollution prevention plan described in Part II.A of this permit **must** be modified **within 14 calendar days** of knowledge of the release to:

A. Provide a description of the release and the circumstances leading to the release; and

B. The date of the release;

iv. Additionally, the plan must be reviewed to identify measures to prevent the reoccurrence of such releases and to respond to such releases, and the plan must be modified where appropriate. The modified plan **must be sent to this Department** for review.

b. Spills. This permit does **not** authorize the discharge of hazardous substances or oil resulting from an on-site spill.

3. Responsibilities of operators.

a. **Permittees with operational control are responsible for compliance with all applicable terms and conditions of this permit as it relates to their activities on the construction site, including protection of endangered species and implementation of BMPs and other controls required by the SWPPP.**

PART II
STANDARD CONDITIONS

Information in **Part II** is organized as follows:

Section A: Storm Water Pollution Prevention Plans:

1. Deadlines for Plan Preparation and Compliance
2. Signature and Plan Review
3. Keeping Plans Current
4. Contents of Plan
5. Non-storm water discharges
6. Contractors

Section B: Standard Permit Conditions:

1. Retention of Records
2. Duty to Comply
3. Penalties for Violations of Permit Conditions
4. Continuance of Expired General Permit
5. Need to Halt or Reduce Activity Not a Defense
6. Duty to Mitigate
7. Duty to Provide Information
8. Other Information
9. Signatory Requirements
10. Certification
11. Penalties for Falsification of Reports
12. Penalties for Tampering
13. Oil and Hazardous Substance Liability
14. Property Rights
15. Severability
16. Transfers
17. Proper Operation and Maintenance
18. Inspection and Entry
19. Permit Actions
20. Re-Opener Clause

Section C: Definitions

SECTION A: STORM WATER POLLUTION PREVENTION PLANS (SWPPP).

A storm water pollution prevention plan (the plan) shall be developed for each construction site covered by this permit. The plan shall be prepared in accordance with good engineering practices. The plan shall identify potential sources of pollution which may reasonably be expected to affect the quality of storm water discharges associated with industrial activity from the facility. In addition, the plan shall describe and ensure the implementation of practices which are to be used to reduce pollutants in storm water discharges associated with industrial activity at the facility and to assure compliance with the terms and conditions of this permit. Facilities must implement the provisions of the plan required under this part as a condition of this permit.

1. Deadlines for Plan Preparation and Compliance.

a. Large Construction Sites

i. The plan shall be completed and submitted for review along with an NOI to be covered under this permit and updated as appropriate. The plan may be submitted for "pre-approval" prior to submittal of an NOI. Submittals of updates to the plan during the construction process are required only if requested by the Director.

b. Medium Construction Sites

i. The plan shall be completed prior to the submittal of an NOI to be covered under this permit and updated as appropriate.

c. Small Construction Sites

i. The plan shall be completed prior to the commencement of construction activities and updated as appropriate.

2. Signature and Plan Review.

a. The plan shall be signed in accordance with Part II.B.9, and be retained on-site at the facility which generates the storm water discharge in accordance with Part II.B.7 (Retention of Records) of this permit.

b. The owner or operator shall make plans available, upon request, to the Director, the EPA, or a State or local agency approving sediment and erosion plans, grading plans, or storm water management plans, or, in the case of a storm water discharge associated with construction activity which discharges through a municipal separate storm sewer system with an NPDES permit, to the municipal operator of the system.

c. The Director, or authorized representative, may notify the owner or operator at any time that the plan does not meet one or more of the minimum requirements of this Part. Within 7 days of such

notification from the Director, (or as otherwise provided by the Director), or authorized representative, the owner or operator shall make the required changes to the plan and submit to the Director a written certification that the requested changes have been made.

3. **Keeping Plans Current.** The owner or operator shall amend the plan whenever there is a change in design, construction, operation, or maintenance which has a significant affect on the potential for the discharge of pollutants to the waters of the State and which has not otherwise been addressed in the plan or if the plan proves to be ineffective in eliminating or significantly minimizing pollutants from sources identified under Part II.A.4.b of this permit, or in otherwise achieving the general objectives of controlling pollutants in storm water discharges associated with construction activity. Amendments to the plan may be reviewed by ADEQ in the same manner as Part II.A.2 above.

4. **Contents of Plan.** The storm water pollution prevention plan shall include the following items:

a. Site Description. Each plan shall provide a description of the following:

i. A description of the nature of the construction activity;

ii. A description of the intended sequence of major activities which disturb soils for major portions of the site (e.g. grubbing, excavation, grading);

iii. Estimates of the total area of the site and the total area of the site that is expected to be disturbed by excavation, grading or other activities;

iv. An estimate of the runoff coefficient of the site after construction activities are completed and existing data describing the soil or the quality of any discharge from the site;

v. A site map indicating drainage patterns and approximate slopes anticipated after major grading activities, areas of soil disturbance, the location of major structural and nonstructural controls identified in the plan, the location where stabilization practices are expected to occur, surface waters (including wetlands), and locations where storm water is discharged to a surface water;

vi. The name of the receiving water(s), or if the discharge is to a municipal separate storm sewer, the name of the operator of the municipal system, the ultimate receiving water(s), and the extent of wetland acreage at the site.

vii. Endangered Species: Information on endangered and threatened species including whether any endangered species are in proximity of the storm water discharge and BMPs to be constructed to control storm water runoff.

b. Controls. Each plan **shall include** a description of appropriate controls and measures that will be implemented at the construction site. The plan will clearly describe for each major activity identified in Part II.A.4.a.ii appropriate control measures and the timing during the construction process that

the measures will be implemented. (For example, perimeter controls for one portion of the site **will be installed** after the clearing and grubbing necessary for installation of the measure, but **before the** clearing and grubbing for the remaining portions of the site. Perimeter controls will be **actively maintained** until final stabilization of those portions of the site upward of the perimeter control. Temporary perimeter controls will be removed after final stabilization). The description and implementation of controls shall address the following minimum components:

i. Erosion and Sediment Controls.

A. Stabilization practices. A description of interim and permanent stabilization practices, **including site-specific** scheduling of the implementation of the practices. Site plans should ensure that existing vegetation is preserved where attainable and that disturbed areas are stabilized. Stabilization practices may include: temporary seeding, permanent seeding, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of trees, and preservation of mature vegetation and other appropriate measures. A **record of the dates** when major grading activities occur, when construction activities temporarily or permanently cease on a portion of the site, and when stabilization measures are initiated shall be included in the plan. Except as provided in Parts II.A.4.b.i.A.(1) and (2) below, stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but **in no case more than 14 days** after the construction activity in that portion of the site has temporarily or permanently ceased.

(1) Where the initiation of stabilization measures by the 14th day after construction activity temporarily or permanently ceases is precluded by snow cover, stabilization measures shall be initiated as soon as practicable.

(2) Where construction activity will **resume on a portion** of the site within 21 days from when activities ceased, (e.g. the total time period that construction activity is temporarily ceased is less than 21 days) then stabilization measures do not have to be initiated **on that portion** of the site by the 14th day after construction activity temporarily ceased.

(3) In arid regions (areas with an average annual rainfall of 0-10 inches) and semi-arid regions (areas with an average annual rainfall of 10-20 inches), where the initiation of stabilization measures by the 14th day after construction activity has been temporarily or permanently ceased is precluded by seasonal arid conditions, stabilization measures shall be initiated as soon as practicable thereafter.

B. Structural practices.

(1) A description of structural practices to divert flows from exposed soils, store

flows or otherwise limit runoff and the discharge of pollutants from exposed areas of the site to the degree attainable. Such practices may include:

- silt fences (installed **and maintained**)
- earth dikes
- drainage swales
- check dams
- subsurface drains
- pipe slope drains
- level spreaders
- storm drain inlet protection
- rock outlet protection
- sediment traps
- reinforced soil retaining systems
- gabions
- temporary or permanent sediment basins.

Structural practices should be placed on upland soils to the degree attainable. The installation of these devices may be subject to Section 404 of the Clean Water Act.

(2) For **common drainage locations** that serve an area with **10 or more disturbed acres** at one time, a **temporary** or **permanent** detention basin based on either the smaller of **3600 cubic feet per acre**, or a size based on the runoff volume of a **10 year, 24 hour storm**, shall be provided where attainable until stabilization of the site. This does not apply to flows from offsite areas and flows from onsite areas and flows from onsite areas that are either undisturbed of have undergone final stabilization where such flows are diverted around the sediment basin. For drainage **locations** which serve **10 or more disturbed acres** at one time and where a temporary sediment basin based on either the smaller of 3600 cubic feet per acres, or a size based on the runoff volume of a 10 year storm, **is not attainable**, sediment traps, silt fences, or equivalent sediment controls **are required** for **all side** slope **and down** slope boundaries of the construction area.

(3) For drainage locations serving **less than 10 acres**, sediment traps, silt fences, or equivalent sediment controls are **required for all side** slope **and down** slope boundaries of the construction area **unless** a sediment basin providing storage based on either the smaller of 3600 cubic feet per acre, or a size based on the run off volume of a 10 year, 24 hour storm is provided.

ii. Storm Water Management. A description of measures that will be installed during the construction process to control pollutants in storm water discharges that will occur after construction operations have been completed. Structural measures should be placed on

upland soils to the degree attainable. The installation of these devices may be subject to Section 404 of the Clean Water Act. This permit only addresses the installation of storm water management measures, and not the ultimate operation and maintenance of such structures after the construction activities have been completed and the site has undergone final stabilization. Owners or operators are only **responsible for the installation and maintenance** of storm water management measures prior to final stabilization of the site, and are not responsible for maintenance after storm water discharges associated with industrial activity have been eliminated from the site.

A. Such practices may include:

- infiltration of runoff onsite
- flow attenuation by use of open vegetated swales and natural depressions
- storm water retention structures
- storm water detention structures (including wet ponds)
- sequential systems, which combine several practices

A goal of 80 percent removal of total suspended solids from these flows which exceed predevelopment levels should be used in designing and installing storm water management controls (where practicable). Where this goal is not met, the owner or operator shall provide justification for rejecting each practice listed above based on site conditions.

B. Velocity dissipation devices (e.g., rock check dam, hay bales, etc.) shall be placed at discharge locations and along the length of any outfall channel as necessary to provide a non-erosive velocity flow from the structure to a water course so that the natural physical and biological characteristics and functions are maintained and protected.

iii. Other Controls.

A. Waste disposal. No solid materials, including building materials, shall be discharged to waters of the United States, except as authorized by a Section 404 permit.

B. Off-site vehicle tracking of sediments and the generation of dust shall be minimized.

C. The plan shall ensure and demonstrate compliance with applicable State or local waste disposal, sanitary sewer or septic system regulations.

c. Approved State or Local Plans.

i. Facilities which discharge storm water associated with industrial activity from construction activities must include in their storm water pollution prevention plan procedures and requirements specified in applicable sediment and erosion site plans, site permits or storm

water management plans approved by State or local officials. Requirements specified in sediment and erosion plans, site permits or storm water management plans approved by State or local officials that are applicable to protecting surface water are, upon submittal of an NOI for coverage under this permit, incorporated by reference and are enforceable under this permit even if they are not specifically included in a storm water pollution prevention plan required under this permit. This provision does not apply to provisions of master plans, comprehensive plans, non-enforceable guidelines or technical guidance documents that are not identified in a specific plan or permit that is issued for the construction site.

ii. Dischargers seeking alternative permit requirements shall submit an individual permit application in accordance with Part I.B.4 of this permit to the Director, along with a description of why requirements in approved State or local plans or permits should not be applicable as a condition of an NPDES permit.

d. Maintenance. A description of procedures to maintain in good and effective operating condition vegetation, erosion and sediment control measures and other protective measures identified in the site plan.

e. Inspections. Qualified personnel (**provided** by the **discharger**) **shall** inspect disturbed areas of the construction site, areas used for storage of materials that are exposed to precipitation that have not been finally stabilized, and structural control measures and locations where vehicles enter or exit the site at least **once** every **fourteen (14) calendar days and within 24 hours of the end of a storm that is 0.5 inches or greater**. Where sites have been finally stabilized or during seasonal arid periods in arid areas (areas with an average rainfall of 0-10 inches) and semi-arid areas (areas with an average rainfall of 10-20 inches) such inspection shall be conducted at least once every month.

i. Disturbed areas and areas used for material storage that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control measures identified in the plan shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Locations where vehicles enter or exit the site shall be inspected for evidence of offsite sediment tracking.

ii. Based on the results of the inspection, the site description identified in the plan in accordance with Part II.A.4.a of this permit and pollution prevention measures identified in the plan in accordance with Part II.A.4.b of this permit shall be revised as appropriate, but in no case more than 7 calendar days following the inspection. Such modifications shall provide for timely implementation of any changes to the plan within 7 calendar days following the inspection.

iii. A report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the storm water pollution prevention plan, and actions taken in accordance

with paragraph II.A.4.e.ii of the permit shall be made and retained as part of the storm water pollution prevention plan for at least three (3) years from the date the site is finally stabilized. The report shall be signed in accordance with Part II.B.9 of this permit.

f. Documentation of Permit Eligibility Related to Total Maximum Daily Loads (TMDL). The SWPPP must include documentation supporting a determination of permit eligibility with regard to waters that have an established TMDL, including **either**:

i. Information on whether storm water discharges from the site enter a water body with an approved TMDL;

And

ii. A statement that the construction site's discharge is not identified in a TMDL applicable to that water body;

Or

iii. Information on whether storm water discharges from the site enter a water body with an approved TMDL;

iv. Identification of the pollutants that the TMDL addresses, specifically whether the TMDL addresses sediment or a parameter that addresses sediment (such as total suspended solids, turbidity, or siltation);

v. Identification of whether the operator's discharge is identified, either specifically or generally, in the TMDL and any associated assumptions and allocations identified for the discharge; and

vi. Measures taken by the operator to ensure that its discharge of pollutants from the site is consistent with the assumptions and allocations of the TMDL.

g. Attainment of Water Quality Standards After Authorization.

i. The permittee must select, install, implement and maintain BMPs at the construction site that minimize pollutants in the discharge as necessary to meet applicable water quality standards. In general, except in situations explained in Part II.A.4.g.ii below, the SWPPP developed, implemented, and updated consistent with Part II.A.4 is considered as stringent as necessary to ensure that the discharges do not cause or contribute to an excursion above any applicable water quality standard.

ii. At any time after authorization, the Department may determine that the storm water discharges may cause, have reasonable potential to cause, or contribute to an excursion above any applicable water quality standard. If such a determination is made, the Department will

require the permittee to:

A. Develop a supplemental BMP action plan describing SWPPP modifications to address adequately the identified water quality concerns;

B. Submit valid and verifiable data and information that are representative of ambient conditions and indicate that the receiving water is attaining water quality standards; or

C. Cease discharges of pollutants from construction activity and submit an individual permit application according to Part I.B.4.

iii. All written responses required under this part must include a signed certification consistent with Part II.B.9.

5. **Non-storm water discharges.** Except for flows from fire fighting activities, sources of non-storm water listed in Part I.C.1.a of this permit that are combined with storm water discharges associated with construction activity must be identified in the plan. The plan shall identify and ensure the implementation of appropriate pollution prevention measures for the non-storm water component(s) of the discharge.

6. **Contractors.**

a. The storm water pollution prevention plan **must clearly identify** for each measure identified in the plan, **the contractor(s) that will implement** the measure. **All contractors identified** in the plan **must sign a copy** of the certification statement required by Part II.A.6.b below in accordance with Part II.B.9 of this permit. All certifications must be included in the storm water pollution prevention plan.

b. Certification statement. All contractors identified in the storm water pollution prevention plan in accordance with Part II.A.6 of this permit shall sign a copy of the following certification statement before conducting any professional service at the site identified in the storm water pollution prevention plan:

"I certify under penalty of law that I understand the terms and conditions of the general National Pollutant Discharge Elimination System (NPDES) permit that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this certification."

The certification **must** include the name and title of the person providing the signature in accordance with Part II.B.9 of this permit; the **name**, **address**, and **telephone number** of the contracting firm; the address (or other identifying description) of the site; and the date the certification is made.

SECTION B: STANDARD PERMIT CONDITIONS

1. Retention of Records.

a. The owner or operator shall retain records of all storm water pollution prevention plans and all reports required by this permit, and records of all data used to complete the Notice of Intent to be covered by this permit, for a period of at least three years from the date the site is finally stabilized. This period may be extended by request of the Director at any time.

b. The owner or operator shall retain a copy of the storm water pollution prevention plan required by this permit at the construction site from the date of project initiation to the date of final stabilization.

2. Duty to Comply. The owner or operator **must** comply with **all** conditions of this permit. Any permit noncompliance constitutes a violation of the federal Clean Water Act and the Arkansas Water and Air Pollution Control Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

3. Penalties for Violations of Permit Conditions. The Arkansas Water and Air Pollution Control Act (Act 472 of 1949, as amended) provides that any person who violates any provisions of a permit issued under the Act shall be guilty of a misdemeanor and upon conviction thereof shall be subject to imprisonment for not more than one (1) year, or **a fine of** not more than **twenty five thousand dollars** ($25,000) **or by both** such fine and imprisonment **for each day of** such **violation**. Any person who violates any provision of a permit issued under the Act may **also** be subject to **civil penalty** in such amount as the court shall find appropriate, not to exceed **ten thousand dollars** ($10,000) **for each day** of such violation. The fact that any such violation may constitute a misdemeanor shall not be a bar to the maintenance of such civil action.

4. Continuance of the Expired General Permit. An expired general permit continues in force and effect until a new general permit is issued. If this permit is not re-issued or replaced prior to the expiration date, it will be administratively continued in accordance with the Administrative Procedure Act and remain in force and effect. If you were granted permit coverage prior to the expiration date, you will automatically remain covered by the continued permit until the earliest of:

a. Re-issuance or replacement of this permit, at which time you must comply with the conditions of the new permit to maintain authorization to discharge; or

b. Your submittal of a Notice of Termination; or

c. Issuance of an individual permit for the project's discharges; or

d. A formal permit decision by the ADEQ to not re-issue this general permit, at which time you must seek coverage under an individual permit.

5. Need to Halt or Reduce Activity Not a Defense. It shall not be a defense for a owner or operator in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to

maintain compliance with the conditions of this permit.

6. **Duty to Mitigate.** The owner or operator shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has reasonable likelihood of adversely affecting human health or the environment.

7. **Duty to Provide Information.** The owner or operator shall furnish to the Director, an authorized representative of the Director, the EPA, a State or local agency approving sediment and erosion plans, grading plans, or storm water management plans, or in the case of a storm water discharge associated with industrial activity which discharges through a municipal separate storm sewer system with an NPDES permit, to the municipal operator of the system, within a reasonable time, any information which is requested to determine compliance with this permit.

8. **Other Information.** When the owner or operator becomes aware that he or she failed to submit any relevant facts or submitted incorrect information in the Notice of Intent or in any other report to the Director, he or she shall promptly submit such facts or information.

9. **Signatory Requirements.** All Notices of Intent, reports, or information submitted to the Director or the operator of a regulated small, medium, or large municipal separate storm sewer system shall be signed and certified.

a. All Notices of Intent shall be signed as follows:

i. For a corporation: by a responsible corporate officer. For purposes of this section, a responsible corporate officer means:

A. A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or

B. The manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

ii. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or

iii. For a municipality, State, Federal or other public agency: By either a principal executive or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes:

A. The chief executive officer of the agency; or

B. A senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency.

b. All reports required by the permit and other information requested by the Director shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

i. The authorization is made in writing by a person described above and submitted to the Director;

ii. The authorization specifies either an individual or a person having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, or position of equivalent responsibility, or position of equivalent responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and

iii. Changes to authorization. If an authorization under this Part is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the above requirements must be submitted to the Director prior to or together with any reports, information, or applications to be signed by an authorized representative.

10. Certification. Any person signing a document under this section shall make the following certification:

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

11. Penalties for Falsification of Reports. The Arkansas Water and Air Pollution Control Act provides that any person who knowingly makes any false statement, representation, or certification in any application, record, report, plan or other document filed or required to be maintained under this permit shall be subject to civil penalties specified in Part II.B.9 of this permit and/or criminal penalties under the authority of the Arkansas Water and Air Pollution Control Act (Act 472 of 1949, as amended).

12. Penalties for Tampering. The Arkansas Water and Air Pollution Control act provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under the Act shall be guilty of a misdemeanor and upon conviction thereof shall be subject to imprisonment for not more than one (1) year or a fine of not more than twenty five thousand dollars ($25,000) or by both such fine and imprisonment.

13. **Oil and Hazardous Substance Liability.** Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the owner or operator from any responsibilities, liabilities, or penalties to which the owner or operator is or may be subject under Section 311 of the Clean Water Act or Section 106 of CERCLA.

14. **Property Rights.** The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

15. **Severability.** The provisions of this permit are severable. If any provisions of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provisions to other circumstances, and the remainder of this permit, shall not be affected thereby.

16. **Transfers.** This permit is not transferable to any person except after notice to the Director. A new NOI must be submitted to the ADEQ as required in Part I.6.a.ii and Part I.6.b.ii of this permit.

17. **Proper Operation and Maintenance.** The owner or operator shall at all times:

a. Properly operate **and maintain all facilities and systems** of treatment and control (and related appurtenances) which are installed or used by the owner or operator to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems which are installed by a owner or operator only when the operation is necessary to achieve compliance with the conditions of the permit.

b. Provide an adequate operating staff which is duly qualified to carry out operation, maintenance and testing functions required to insure compliance with the conditions of this permit.

18. **Inspection and Entry.** The owner or operator shall allow the Director, the EPA, or an authorized representative, or, in the case of a construction site which discharges to a municipal separate storm sewer, an authorized representative of the municipal operator of the separate sewer system receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to:

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

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

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

19. **Permit Actions.** This permit may be modified, revoked and reissued, or terminated for cause including, but not limited to, the following;

a. Violation of any terms or conditions of this permit; or

b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or

c. A change in any conditions that requires either a temporary or permanent reduction or elimination of the authorized discharge; or

d. A determination that the permitted activity endangers human health or the environment and can only be regulated to acceptable levels by permit modification or termination; or

e. Failure of the owner or operator to comply with the provisions of ADEQ Regulation No. 9 (Permit Fees). Failure to promptly remit all required fees shall be grounds for the Director to initiate action to terminate this permit under the provisions of 40 CFR 122.64 and 124.5(d), as adopted by reference in ADEQ Regulation No. 6, and the provisions of ADEQ Regulation No. 8.

20. **Re-Opener Clause.**

a. If there is evidence indicating potential or realized impacts on water quality due to any storm water discharge associated with industrial activity covered by this permit, the owner or operator of such discharge may be required to obtain an individual permit or an alternative general permit in accordance with Part I.B.4 of this permit or the permit may be modified to include different limitations and/or requirements.

b. Permit modification or revocation will be conducted in accordance with the provisions of 40 CFR 122.62, 122.63, 122.64 and 124.5, as adopted by reference in ADEQ Regulation No. 6.

SECTION C: DEFINITIONS

"Arid Areas" means areas with an average rainfall of 0 to 10 inches.

"Best Management Practices (BMPs)" means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the State. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

"Control Measure" as used in this permit, refers to any Best Management Practice or other method used to prevent or reduce the discharge of pollutants to waters of the United States.

"Commencement of Construction" means the initial disturbance of soils associated with clearing, grading, or excavating activities or other construction activities.

"CWA" means the Clean Water Act or the Federal Water Pollution Control Act.

"Dedicated Portable Asphalt Plant" means a portable asphalt plant that is located on or contiguous to a construction site that provides asphalt only to the construction site on which the plant is located or adjacent to. The term does not include facilities that are subject to the asphalt emulsion effluent guideline limitations at 40 CFR Part 443.

"Dedicated Portable Concrete Plant" means a portable concrete plant that is located on or contiguous to a construction site and that provides concrete only to the construction site on which the plant is located on or adjacent to.

"Director" means the Director, Arkansas Department of Environmental Quality, or a designated representative.

"Discharge" when used without qualification means the "discharge of a pollutant".

"Discharge of Storm Water Associated with Construction Activity" as used in this permit, refers to a discharge of pollutants in storm water runoff from areas where soil disturbing activities (e.g., clearing, grading, or excavation), construction materials or equipment storage or maintenance (e.g., fill piles, borrow area, concrete truck washout, fueling), or other industrial storm water directly related to the construction process (e.g., concrete or asphalt batch plants) are located.

"Discharge-Related Activities" as used in this permit, include: activities that cause, contribute to, or result in storm water point source pollutant discharges, including but not limited to: excavation, site development, grading and other surface disturbance activities; and measures to control storm water including the siting, construction and operation of BMPs to control, reduce or prevent storm water pollution.

"Eligible" means qualified for authorization to discharge storm water under this general permit.

"Facility" or "Activity" means any NPDES "point source" or any other facility or activity (including land or appurtenances thereto) that is subject to regulation under the NPDES program.

"Final Stabilization" means that:

(i) All soil disturbing activities at the site have been completed and either of the two following criteria are met:

(1) A uniform (e.g., evenly distributed, without large bare areas) perennial vegetative cover with a density of 70% of the native background vegetative cover for the area has been established on all unpaved areas and areas not covered by permanent structures, or

(2) Equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed.

(ii) When background native vegetation will cover less than 100% of the ground (e.g., arid areas, beaches), the 70% coverage criteria is adjusted as follows: if the native vegetation covers 50% of the ground, 70% of 50% (0.70 x 0.50 = 0.35) would require 35% total cover for final stabilization. On a beach with no natural vegetation, no stabilization is required.

(iii) In arid and semi-arid areas only, all soil disturbing activities at the site have been completed and both the following criteria have been met:

(1) Temporary erosion control measures (e.g., degradable rolled erosion control product) are selected, designed, and installed along with an appropriate seed base to provide erosion control for at least three years without active maintenance,

(2) The temporary erosion control measures are selected, designed, and installed to achieve 70% vegetative coverage within three years.

(iv) For individual lots in residential construction, final stabilization means that either:

(1) The homebuilder has completed final stabilization as specified above, or

(2) The homebuilder has established temporary stabilization including perimeter controls for an individual lot prior to occupation of the home by the homeowner and informing the homeowner of the need for, and benefits of, final stabilization.

(v) For construction projects on land used for agricultural purposes (e.g., pipelines across crop or range land, staging areas for highway construction, etc.), final stabilization may be accomplished by returning the disturbed land to its pre-construction agricultural use. Areas disturbed that were not previously used for agricultural activities, such as buffer strips immediately adjacent to "water of the United States", and areas which are not being returned to their pre-construction agricultural use must meet the final stabilization criteria in (i), (ii), or (iii) above.

"**Flow-Weighted Composite Sample**" means a composite sample consisting of a mixture of aliquot collected at a constant time interval, where the volume of each aliquot is proportional to the flow rate of the discharge.

"**Large and Medium Municipal Separate Storm Sewer System**" means all municipal separate storm sewer systems that are either:

(i) Located in an incorporated place with a population of 100,000 or more as determined by the latest Decennial Census by the Bureau of Census: or

(ii) Located in the counties with unincorporated urbanized populations of 100,000 or more, except municipal, separate storm sewers that are located in the incorporated places, townships or towns within such counties; or

(iii) Owned or operated by a municipality other than those described in paragraphs (i) or (ii) and that are designated by the Director as part of the large or medium municipal separate storm sewer system.

"Large Construction Sites" mean any construction activity that meets one of the following two definitions:

(i) Construction sites that will result in the disturbance of **ten (10)** or more acres of total land area or less than **ten (10)** acres of total land area that is part of a larger common plan of development or sale if the larger common plan will ultimately disturb **ten (10)** acres or more located in the following counties:

Baxter	Garland	Newton	Sharp
Benton	Hot Spring	Perry	Stone
Boone	Howard	Pike	Van Buren
Carroll	Independence	Polk	Washington
Clark	Izard	Pope	White
Cleburne	Johnson	Pulaski	Yell
Conway	Lawrence	Randolph	
Crawford	Logan	Saline	
Faulkner	Madison	Scott	
Franklin	Marion	Searcy	
Fulton	Montgomery	Sebastian	

(ii) Construction sites that will result in the disturbance of **twenty (20)** or more acres of total land area or less than **twenty (20)** acres of total land area that is part of a larger common plan of development or sale if the larger common plan will ultimately disturb **twenty (20)** acres or more located in the following counties:

Arkansas	Crittenden	Jefferson	Nevada
Ashley	Cross	Lafayette	Ouachita
Bradley	Dallas	Lee	Phillips

Calhoun	Desha	Lincoln	Poinsett
Chicot	Drew	Little River	Prairie
Clay	Grant	Lonoke	Sevier
Cleveland	Greene	Miller	St. Francis
Columbia	Hempstead	Mississippi	Union
Craighead	Jackson	Monroe	Woodruff

"Medium Construction Sites" mean any construction activity that meets one of the following two definitions:

(i) Construction sites that will result in the disturbance of greater than **five (5)** acres and less than **ten (10)** acres of total land area or less than **five (5)** acres of total land area that is part of a larger common plan of development or sale if the larger common plan will ultimately disturb **five (5)** acres or more located in one of the counties identified in Part (i) of the Large Construction Site definition above.

(ii) Construction sites that will result in the disturbance of greater than **five (5)** acres and less than **twenty (20)** acres of total land area or less than **five (5)** acres of total land area that is part of a larger common plan of development or sale if the larger common plan will ultimately disturb **five (5)** acres or more located in one of the counties identified in Part (ii) of the Large Construction Site definition above.

"NOI" means Notice of Intent to be covered by this permit.

"NOT" means Notice of Termination.

"Operator" for the purpose of this permit and in the context of storm water associated with construction activity, means any party associated with a construction project that meets either of the following two criteria:

(i) The party has operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or

(ii) The party has day-to-day operational control of those activities at the project which are necessary to ensure compliance with a SWPPP for the site or other permit conditions (e.g., they are authorized to direct workers at a site to carry out activities required by the SWPPP or comply with other permit conditions).

"Owner or Operator" means the owner or operator of any "facility or activity" subject to regulation under the NPDES program.

"Physically Interconnected" means that one municipal separate storm sewer system is connected to a second municipal separate storm sewer system in such a way that it allows for direct discharges into the second system.

"Point Source" means any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff.

"Regulated Small Municipal Separate Storm Sewer System" means all municipal separate storm sewer systems that are either:

(i) Located within the boundaries of an "urbanized area" with a population of 50,000 or more as determined by the latest Decennial Census by the Bureau of Census; or

(ii) Owned or operated by a municipality other than those described in paragraph (i) and that serve a jurisdiction with a population of at least 10,000 and a population density of at least 1,000 people per square mile; or

(iii) Owned or operated by a municipality other than those described in paragraphs (i) and (ii) and that contributes substantially to the pollutant loadings of a "physically interconnected" municipal separate storm sewer system.

"Runoff Coefficient" means the fraction of total rainfall that will appear at the conveyance as runoff.

"Semi-Arid Areas" means areas with an average rainfall of 10 to 20 inches.

"Small Construction Sites" mean any construction activity that meets the following definition:

(i) Construction sites that will result in the disturbance of greater than **one (1)** acre and less than **five (5)** acres of total land area or less than **one (1)** acre of total land area that is part of a larger common plan of development or sale if the larger common plan will ultimately disturb **one (1)** acre or more.

"Storm Water" means storm water runoff, snow melt runoff, and surface runoff and drainage.

"Storm Water Associated with Construction Activity" means the discharge from any conveyance which is used for collecting and conveying storm water and which is directly related to construction activity. Discharges of storm water from large construction sites, medium construction sites, and small construction sites, as defined in Part I.B.2, (henceforth referred to as storm water discharges from construction activities).

"Storm Water Pollution Prevention Plan" or "SWPPP" means a plan that includes site map(s), an identification of construction/contractor activities that could cause pollutants in the storm water, and a description of measures or practices to control these pollutants.

"Total Maximum Daily Load" or "TMDL" means the sum of the individual wasteload allocations (WLAs) for point sources and load allocations (LAs) for non-point sources and natural background. If a receiving water has only one point source discharger, the TMDL is the sum of that point source WLA plus the LAs for any non-point sources of pollution and natural background sources, tributaries, or adjacent segments. TMDLs can be expressed in terms of either mass per time, toxicity, or other appropriate measure.

"Urbanized Area" means the areas of urban population density delineated by the Bureau of the Census for statistical purposes and generally consisting of the land area comprising one or more central place(s) and the adjacent densely settled surrounding area that together have a residential population of at least 50,000 and an overall population density of at least 1,000 people per square mile as determined by the latest Decennial Census by the Bureau of Census.

ATTACHMENT A

CONSTRUCTION SITE NOTICE

FOR THE
Arkansas Department of Environmental Quality (ADEQ)
Storm Water Program

NPDES GENERAL PERMIT NO. ARR150000

The following information is posted in compliance with **Part I.B.7.a.iii** of the ADEQ General Permit Number **ARR150000** for discharges of storm water runoff from construction sites. Additional information regarding the ADEQ storm water program may be found on the internet at:

www.adeq.state.ar.us/water/branch_npdes/stormwater

Permit Number	ARR150000
Contact Name and Phone Number:	
Project Description: (Including estimated start date and projected end date, or date that disturbed soils will be stabilized.)	
Location of Storm Water Pollution Prevention Plan:	

For Construction Sites Authorized under **Part I.B.6.b** (Small Construction Sites Authorization) the following certification must be completed:

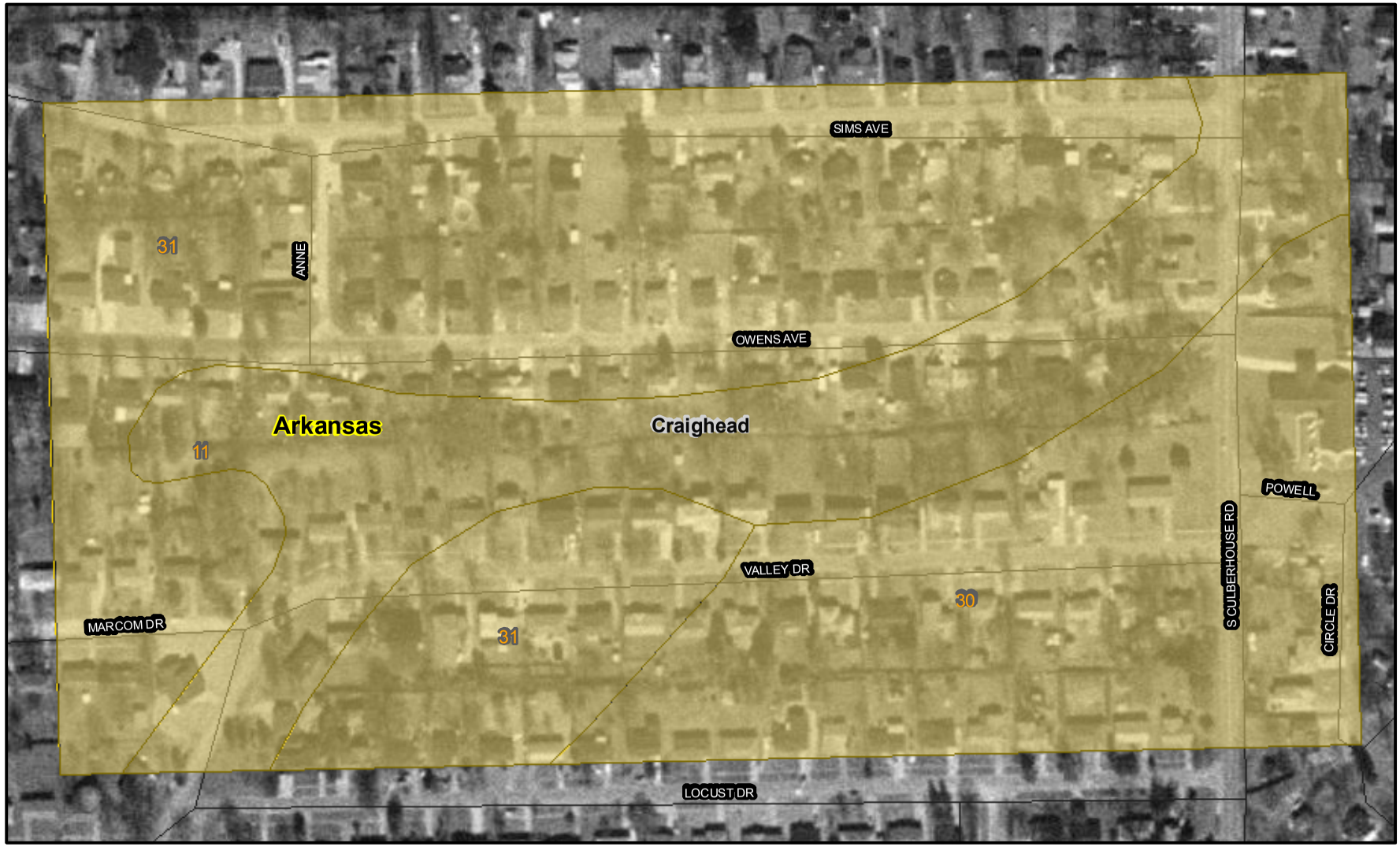
I _____ (Typed or Printed Name of Person Completing this Certification) certify under penalty of law that I have read and understand the eligibility requirements for claiming an authorization under Part I.B.2.a.iii of the ADEQ General Permit Number ARR150000. A storm water pollution prevention plan has been developed and implemented according to the requirements contained in Part I.B.7.a.iii of the permit. A copy of this signed notice is supplied to the operator of the MS4 if discharges enter a regulated small, medium, or large MS4 system as defined in Part II.C of the ADEQ General Permit Number ARR150000. I am aware there are significant penalties for providing false information or for conducted unauthorized discharges, including the possibility of fine and imprisonment for knowing violations.

_____ _____

Signature and Title Date

EXHIBIT 2

HYDROLOGIC SOIL GROUP RATING FOR CRAIGHEAD COUNTY, ARKANSAS



MAP LEGEND

Hydrologic Soil Group

{Dominant Condition, <}

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available
- Soil Map Units
- Cities
- Detailed Counties
- Detailed States
- Interstate Highways
- Roads
- Rails
- Water
- Hydrography
- Oceans

MAP INFORMATION

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov

Coordinate System: UTM Zone 15

Soil Survey Area: Craighead County, Arkansas
Spatial Version of Data: 1
Soil Map Compilation Scale: 1:20000

Map comprised of aerial images photographed on these dates:
1994

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Tables - Hydrologic Soil Group

Summary by Map Unit - Craighead County, Arkansas

Soil Survey Area Map Unit Symbol	Map Unit Name	Rating	Total Acres in AOI	Percent of AOI
11	Collins silt loam, occasionally flooded	C	11.2	23.5
30	Loring silt loam, 3 to 8 percent slopes	C	12.4	26.0
31	Loring silt loam, 8 to 12 percent slopes	C	24.0	50.5

Description - Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

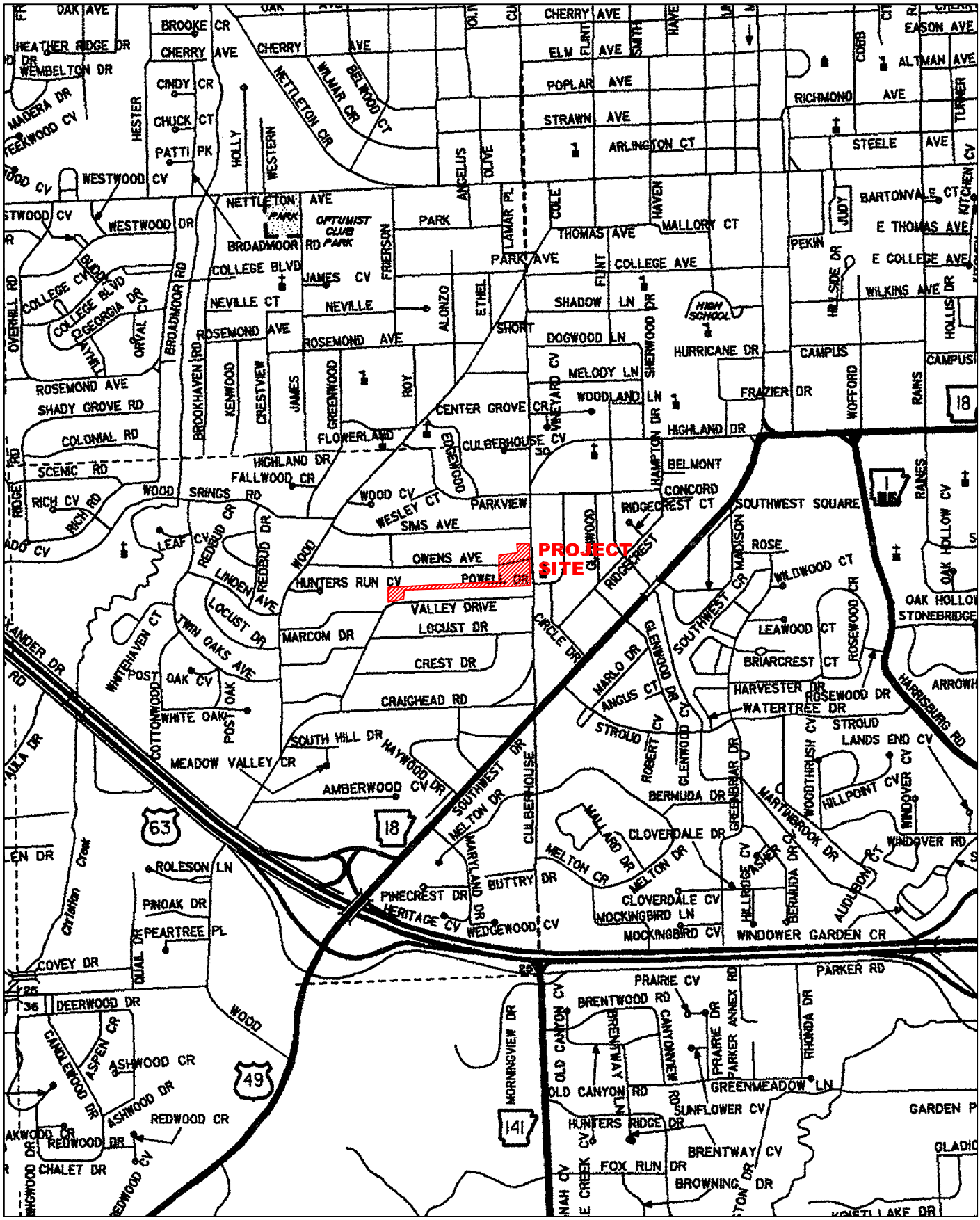
Parameter Summary - Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff:

Tie-break Rule: Lower

EXHIBIT 3



NRS CONSULTING ENGINEERS

TEXARKANA • JONESBORO • HOT SPRINGS

1220 STONE STREET
JONESBORO, ARKANSAS 72401
(870) 972-5316
FAX (870) 932-0432

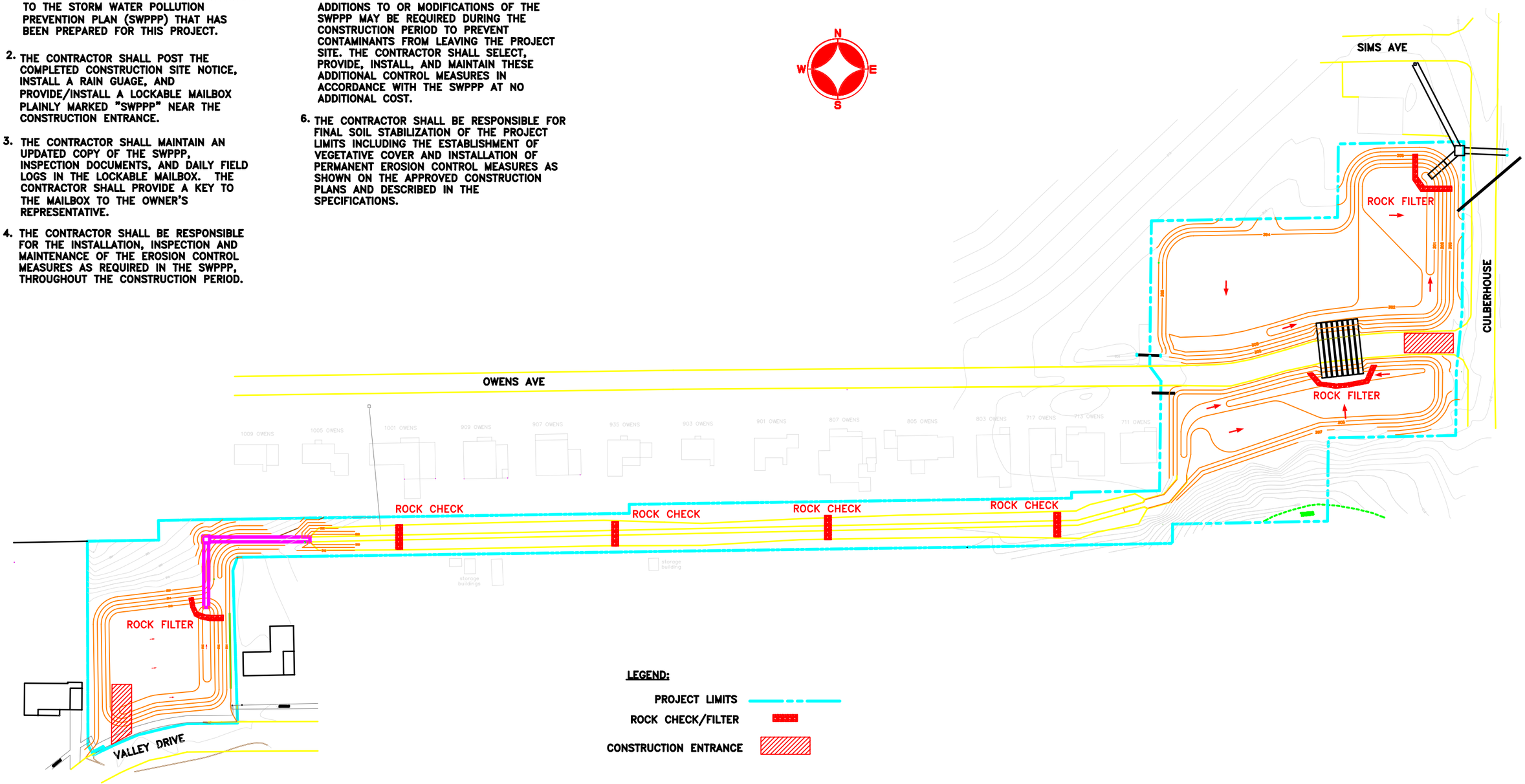
VALLEY AND OWENS DRAINAGE IMPROVEMENTS VICINITY MAP

Scale	Job No.
1" = 600'	
Date	Sheet
FEB 2007	

EXHIBIT 4

NOTES:

1. THE CONTRACTOR SHALL ADHERE STRICTLY TO THE STORM WATER POLLUTION PREVENTION PLAN (SWPPP) THAT HAS BEEN PREPARED FOR THIS PROJECT.
2. THE CONTRACTOR SHALL POST THE COMPLETED CONSTRUCTION SITE NOTICE, INSTALL A RAIN GUAGE, AND PROVIDE/INSTALL A LOCKABLE MAILBOX PLAINLY MARKED "SWPPP" NEAR THE CONSTRUCTION ENTRANCE.
3. THE CONTRACTOR SHALL MAINTAIN AN UPDATED COPY OF THE SWPPP, INSPECTION DOCUMENTS, AND DAILY FIELD LOGS IN THE LOCKABLE MAILBOX. THE CONTRACTOR SHALL PROVIDE A KEY TO THE MAILBOX TO THE OWNER'S REPRESENTATIVE.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE INSTALLATION, INSPECTION AND MAINTENANCE OF THE EROSION CONTROL MEASURES AS REQUIRED IN THE SWPPP, THROUGHOUT THE CONSTRUCTION PERIOD.
5. THE CONTRACTOR IS CAUTIONED THAT ADDITIONS TO OR MODIFICATIONS OF THE SWPPP MAY BE REQUIRED DURING THE CONSTRUCTION PERIOD TO PREVENT CONTAMINANTS FROM LEAVING THE PROJECT SITE. THE CONTRACTOR SHALL SELECT, PROVIDE, INSTALL, AND MAINTAIN THESE ADDITIONAL CONTROL MEASURES IN ACCORDANCE WITH THE SWPPP AT NO ADDITIONAL COST.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FINAL SOIL STABILIZATION OF THE PROJECT LIMITS INCLUDING THE ESTABLISHMENT OF VEGETATIVE COVER AND INSTALLATION OF PERMANENT EROSION CONTROL MEASURES AS SHOWN ON THE APPROVED CONSTRUCTION PLANS AND DESCRIBED IN THE SPECIFICATIONS.



LEGEND:

PROJECT LIMITS

ROCK CHECK/FILTER

CONSTRUCTION ENTRANCE

Date	Revision	By

NRS CONSULTING ENGINEERS

TEXARKANA ◦ JONESBORO ◦ HOT SPRINGS

1220 STONE STREET
JONESBORO, AR 72401
(870) 972-5316
FAX (870) 932-0432

VALLEY AND OWENS DRAINAGE IMPROVEMENTS

SITE PLAN

Scale	Job
1"=100'	
Date	Sheet
FEB. 2007	

EXHIBIT 5

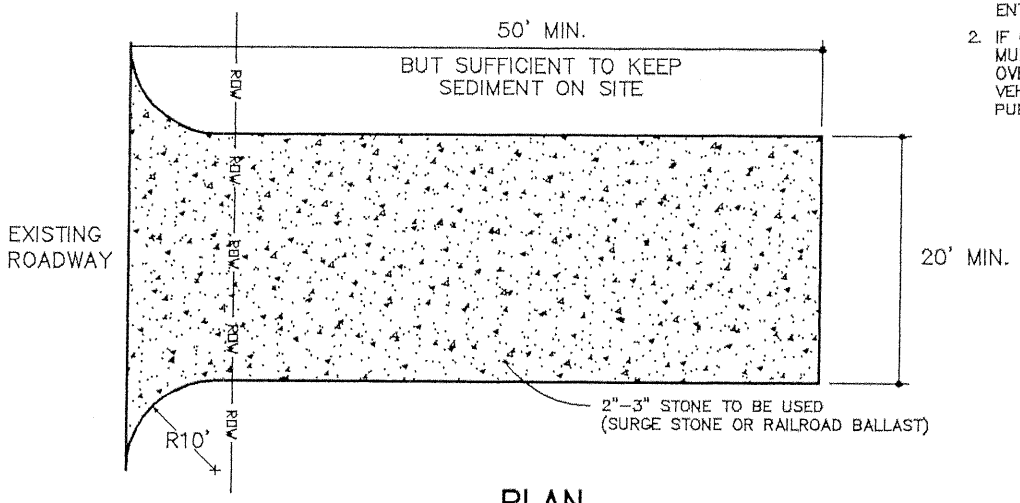
ENDANGERDED SPECIES:

This project site is located in an established residential subdivision. As such, there are no threatened or endangered species affected by the project.

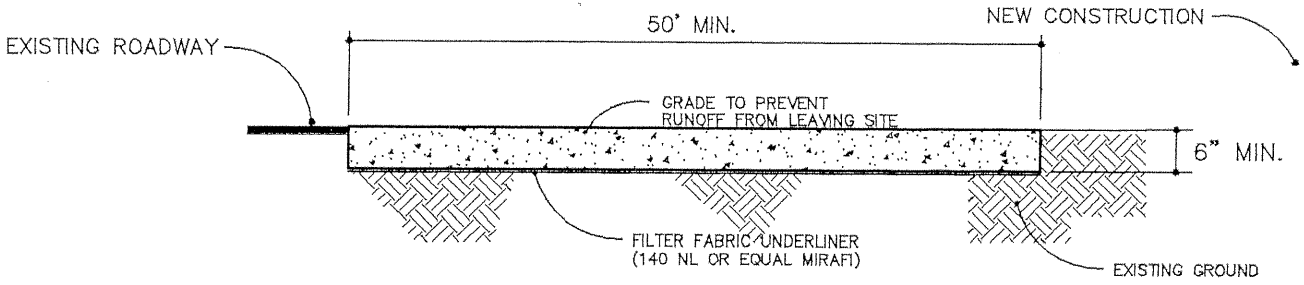
EXHIBIT 6

NOTE:

1. PUT SILT FENCE UP TO INSURE CONSTRUCTION ENTRANCE IS USED.
2. IF CONSTRUCTION ON THE SITE IS SUCH THAT THE MUD IS NOT REMOVED BY THE VEHICLE TRAVELING OVER THE STONE, THEN THE TIRES OF THE VEHICLES MUST ME WASHED BEFORE ENTERING THE PUBLIC ROAD.



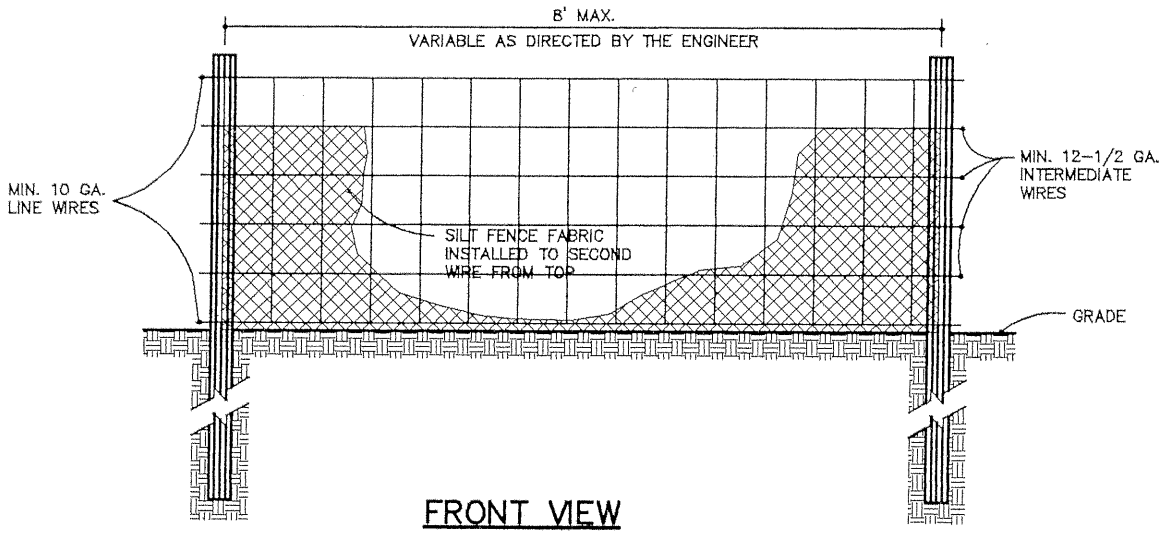
PLAN



CROSS SECTION

CONSTRUCTION ENTRANCE DETAIL

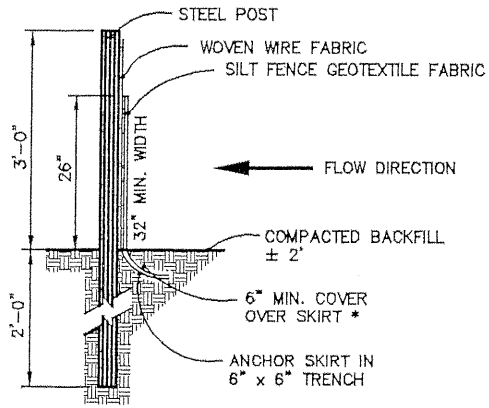
1



FRONT VIEW

NOTE:

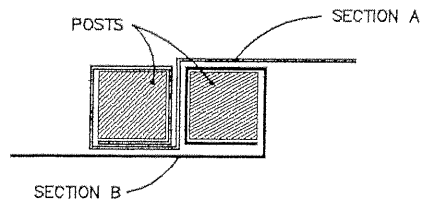
1. SILT FENCE FABRIC SHALL BE 100 X OR EQUAL MIRAFI.
2. END OF SILT FENCE NEEDS TO BE TURNED UPHILL.



SIDE VIEW

NOTE:

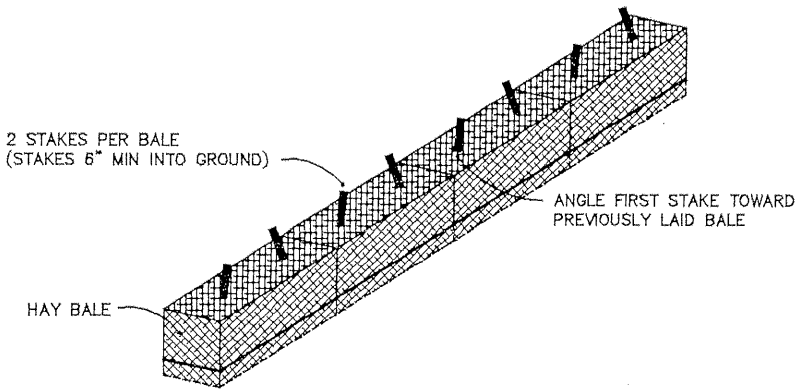
1. POSITION POSTS TO OVERLAP AS SHOWN, MAKING CERTAIN THAT FABRIC FOLDS AROUND EACH POST ONE FULL TURN.
2. DRIVE POSTS TIGHTLY TOGETHER AND SECURE TOPS OF POSTS BY TYING OFF WITH CORD OR WIRE TO PREVENT FLOW-THROUGH OF BUILT-UP SEDIMENT AT JOINT.

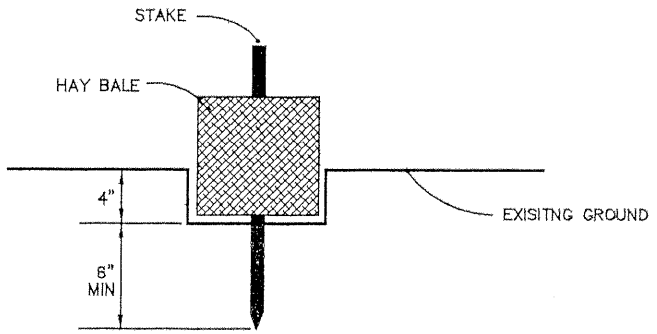


OVERLAP DETAIL

* FOR REPAIR OF SILT FENCE FAILURES, USE No. 57 WASHED STONE.

SILT FENCE DETAIL





NOTE:

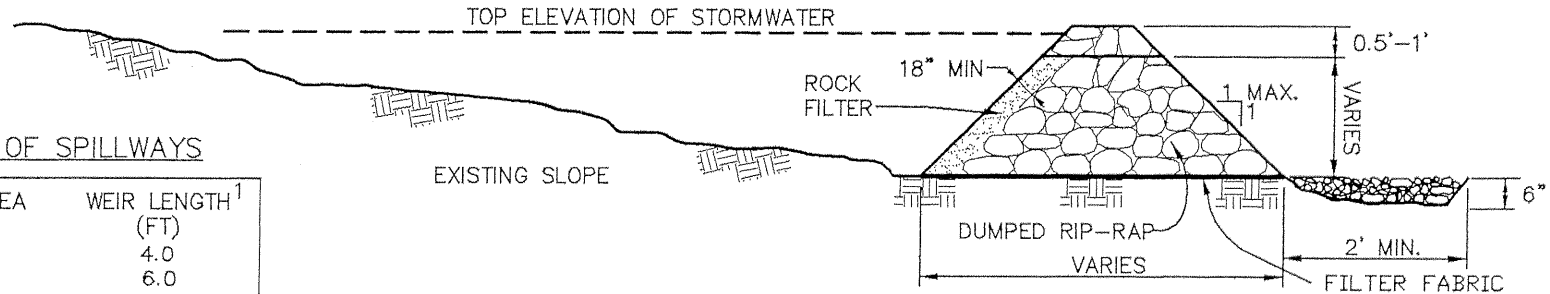
1. HAY BALES SHALL BE EMBEDDED A MINIMUM OF FOUR (4) INCHES AND SECURELY ANCHORED USING 3/8" DIAMETER STEEL STAKES OR 2" X 2" WOOD STAKES DRIVEN THROUGH THE BALES INTO THE GROUND A MINIMUM OF SIX (6) INCHES.
2. HAY BALES SHALL BE INSTALLED SO THAT THE BINDINGS ARE ORIENTED AROUND THE SIDES RATHER THAN ALONG THE TOPS AND BOTTOMS OF THE BALES.
3. NO GAPS SHALL BE LEFT BETWEEN BALES.

HAY BALE DETAIL

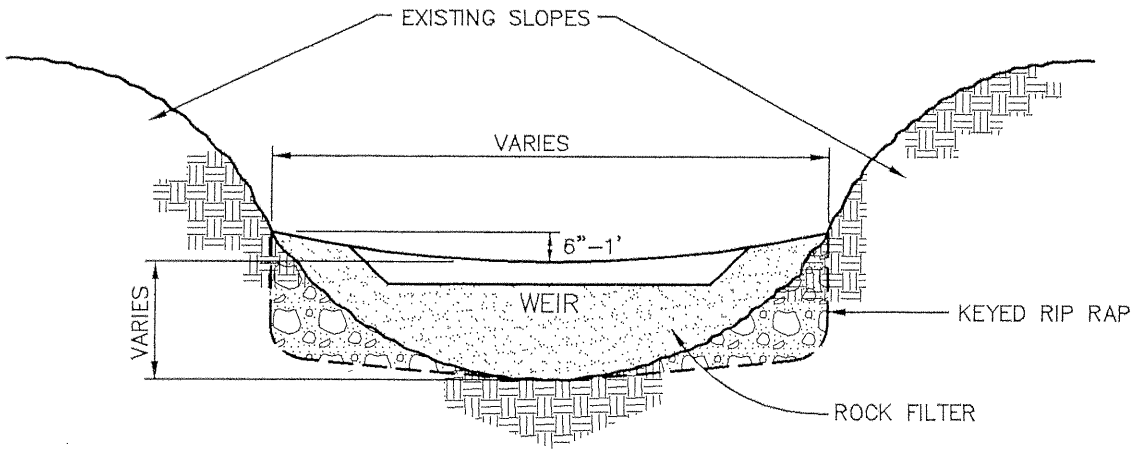
DESIGN OF SPILLWAYS

DRAINAGE AREA (ACRES)	WEIR LENGTH[1] (FT)
1	4.0
2	6.0
3	8.0
4	10.0
5	12.0

[1] DIMENSIONS SHOWN ARE MINIMUM



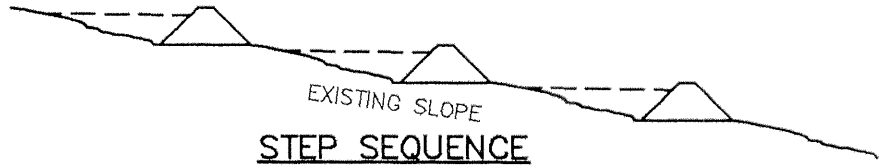
SIDE VIEW



FRONT VIEW

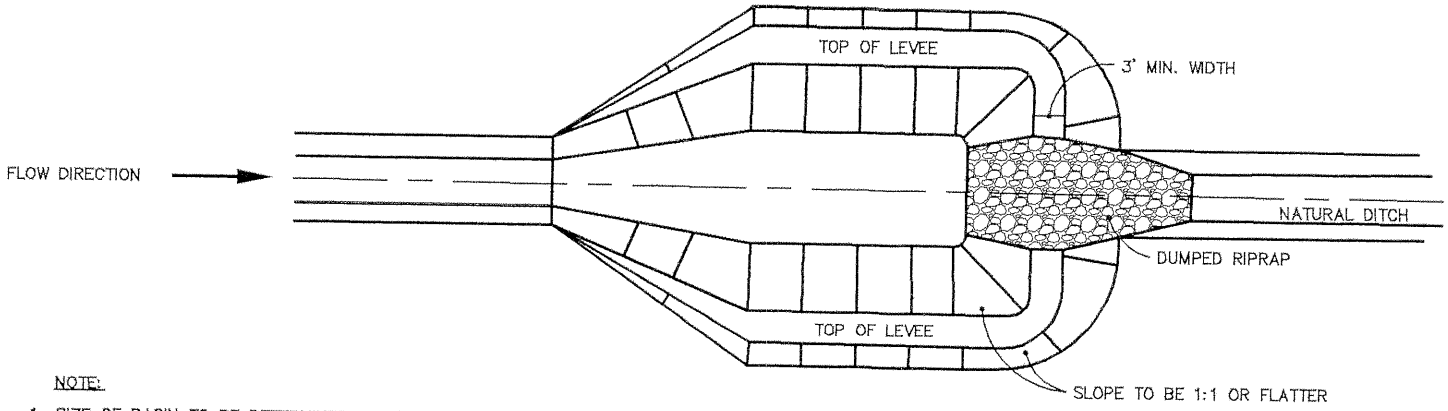
NOTE:

1. HEIGHT & WIDTH DETERMINED BY EXISTING TOPOGRAPHY.
2. KEY RIP RAP INTO THE DAM FOR STABILIZATION.
3. DUMPED RIP RAP SHALL BE RESONABLY FREE OF FINES AND RESONABLY WELL GRADED BETWEEN THE MAXIMUM AND MINIMUM ROCK SIZES SO AS TO PROVIDE A MINIMUM OF VOIDS. IN GENERAL, THE MAXIMUM PIECE SIZE SHALL NOT BE GREATER THAN 18" IN ANY DIMENSION AND APPROXIMATELY 50% OF THE MATERIAL SHALL CONSIST OF PIECES WEIGHING 35 POUNDS OF MORE.
4. ROCK FILTER MATERIAL SHALL CONFORM TO THE GRADING REQUIREMENTS OF AHTD SECTION 303 FOR AGGREGATE BASE COURSE, CLASS 4.



STEP SEQUENCE

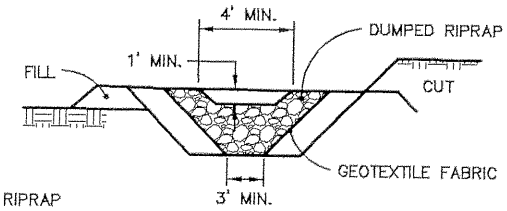
ROCK CHECK DAM DETAIL



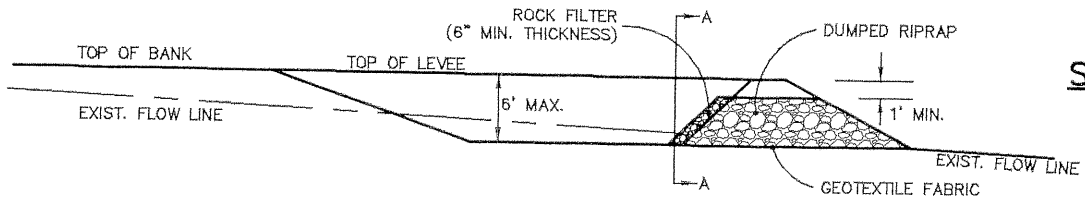
NOTE:

1. SIZE OF BASIN TO BE DETERMINED BY VOLUME REQUIRED (3600 CF/ACRE)AND A MINIMUM LENGTH-TO-WIDTH RATIO OF 2:1 SHALL BE USED.
2. ALL SLOPES TO BE 1:1 OR FLATTER
3. EARTHEN EMBANKMENTS ARE TO BE STABALIZED WITH SEED AND MULCH AT A MINIMUM. GEO-FABRICS ARE TO BE USED AS NECESSARY.

PLAN VIEW

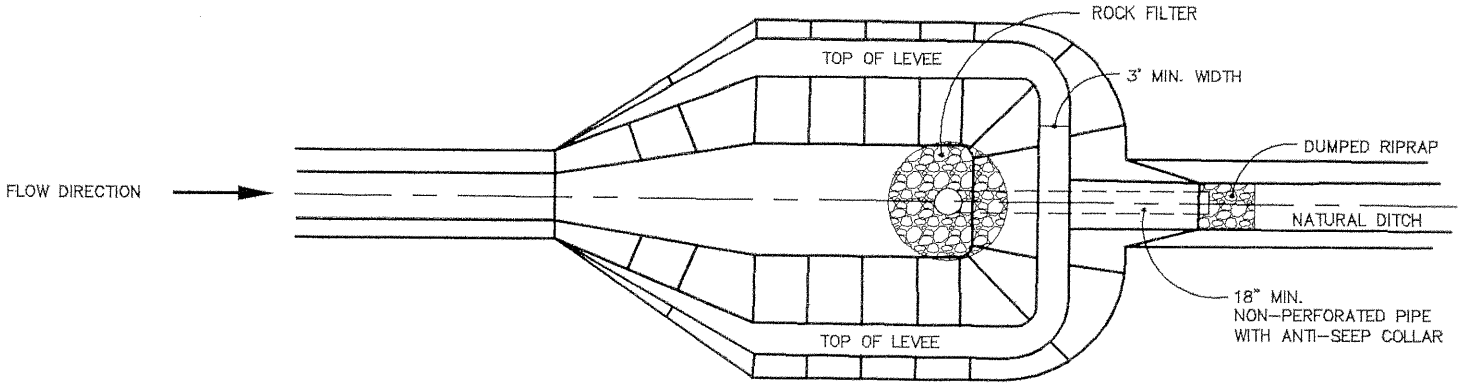


SECTION A-A



SECTION ON FLOW LINE

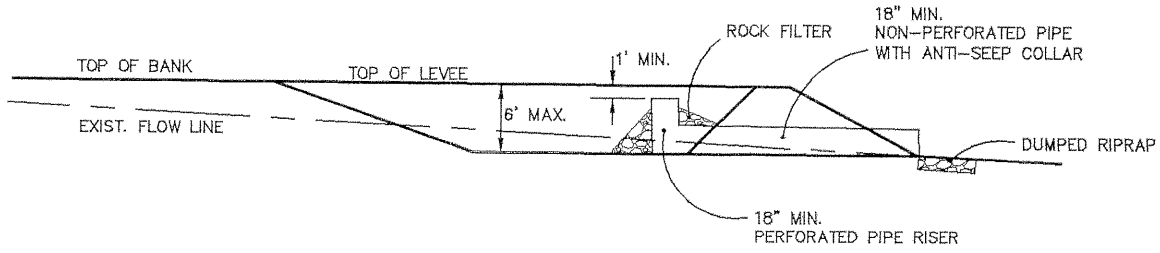
SEDIMENT BASIN WITH RIPRAP OUTLET



NOTE:

1. SIZE OF BASIN TO BE DETERMINED BY VOLUME REQUIRED (3600 CF/ACRE)AND A MINIMUM LENGTH-TO-WIDTH RATIO OF 2:1 SHALL BE USED.
2. ALL SLOPES TO BE 1:1 OR FLATTER
3. EARTHEN EMBANKMENTS ARE TO BE STABALIZED WITH SEED AND MULCH AT A MINIMUM. GEO-FABRICS ARE TO BE USED AS NECESSARY.

PLAN VIEW



SECTION ON FLOW LINE

SEDIMENT BASIN WITH PIPE OUTLET

EXHIBIT 7

INSPECTION LOG

DATE: _____ TIME: _____

WEATHER: _____

LAST RAINFALL EVENT: _____ AMOUNT: _____

LOCATION OF DISTURBANCE: _____

_____

_____

_____

PROBLEMS: _____

_____

_____

_____

CORRECTIVE ITEMS DONE: _____

_____

_____

_____

MISCELLANEOUS ITEMS: _____

_____

_____

_____

_____

_____

VISITORS: _____ _____

_____ _____

_____ _____

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

SIGNATURE: _____

ADDENDUM

ADDENDUM NO. 1

DATE: June 26, 2007

PROJECT NO.: 2007:38

PROJECT: Valley and Owens Drainage Improvements

LETTING DATE: July 5, 2007 @ 2:00 p.m. (Local Time)

LOCATION: City of Jonesboro, 307 Vine Street, Jonesboro, Arkansas 72403

OWNER: City of Jonesboro

ENGINEER: NRS Consulting Engineers, Jonesboro, Arkansas

SUBJECT: STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

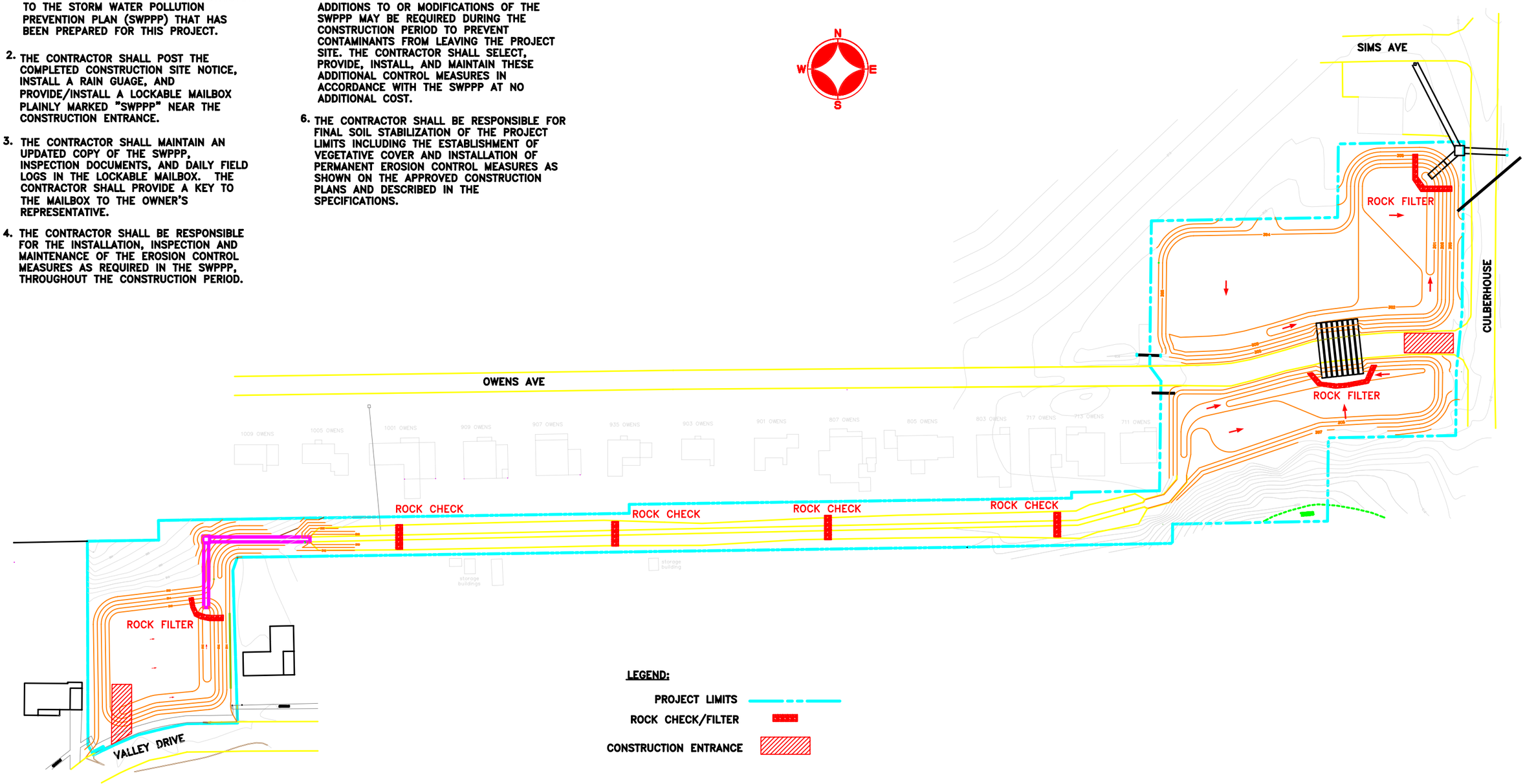
Following is a copy of the "Valley and Owens Drainage Improvements Site Plan" for the SWPPP, Exhibit 4. Bidder is advised to replace the "Valley and Owens Drainage Improvements Site Plan" previously provided in the bid documents with the following REVISED "Valley and Owens Drainage Improvements Site Plan". Again, this document should replace the document that was included in the bid documents as Exhibit 4 of the SWPPP.

Addendum Issued by:

Jason A. MacDonald, EI
NRS Consulting Engineers
1220 Stone Street
Jonesboro, Arkansas 72401
Phone: 870-972-5316

NOTES:

1. THE CONTRACTOR SHALL ADHERE STRICTLY TO THE STORM WATER POLLUTION PREVENTION PLAN (SWPPP) THAT HAS BEEN PREPARED FOR THIS PROJECT.
2. THE CONTRACTOR SHALL POST THE COMPLETED CONSTRUCTION SITE NOTICE, INSTALL A RAIN GUAGE, AND PROVIDE/INSTALL A LOCKABLE MAILBOX PLAINLY MARKED "SWPPP" NEAR THE CONSTRUCTION ENTRANCE.
3. THE CONTRACTOR SHALL MAINTAIN AN UPDATED COPY OF THE SWPPP, INSPECTION DOCUMENTS, AND DAILY FIELD LOGS IN THE LOCKABLE MAILBOX. THE CONTRACTOR SHALL PROVIDE A KEY TO THE MAILBOX TO THE OWNER'S REPRESENTATIVE.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE INSTALLATION, INSPECTION AND MAINTENANCE OF THE EROSION CONTROL MEASURES AS REQUIRED IN THE SWPPP, THROUGHOUT THE CONSTRUCTION PERIOD.
5. THE CONTRACTOR IS CAUTIONED THAT ADDITIONS TO OR MODIFICATIONS OF THE SWPPP MAY BE REQUIRED DURING THE CONSTRUCTION PERIOD TO PREVENT CONTAMINANTS FROM LEAVING THE PROJECT SITE. THE CONTRACTOR SHALL SELECT, PROVIDE, INSTALL, AND MAINTAIN THESE ADDITIONAL CONTROL MEASURES IN ACCORDANCE WITH THE SWPPP AT NO ADDITIONAL COST.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FINAL SOIL STABILIZATION OF THE PROJECT LIMITS INCLUDING THE ESTABLISHMENT OF VEGETATIVE COVER AND INSTALLATION OF PERMANENT EROSION CONTROL MEASURES AS SHOWN ON THE APPROVED CONSTRUCTION PLANS AND DESCRIBED IN THE SPECIFICATIONS.



LEGEND:

PROJECT LIMITS

ROCK CHECK/FILTER

CONSTRUCTION ENTRANCE

Date	Revision	By

NRS CONSULTING ENGINEERS

TEXARKANA ◦ JONESBORO ◦ HOT SPRINGS

1220 STONE STREET
JONESBORO, AR 72401
(870) 972-5316
FAX (870) 932-0432

VALLEY AND OWENS DRAINAGE IMPROVEMENTS

SITE PLAN

Scale	Job
1"=100'	
Date	Sheet
FEB. 2007	

ADDENDUM NO. 2

DATE: July 2, 2007

PROJECT NO.: 2007:38

PROJECT: Valley and Owens Drainage Improvements

LETTING DATE: July 5, 2007 @ 2:00 p.m. (Local Time)

LOCATION: City of Jonesboro, 307 Vine Street, Jonesboro, Arkansas 72403

OWNER: City of Jonesboro

ENGINEER: NRS Consulting Engineers, Jonesboro, Arkansas

SUBJECT: CHAIN LINK FENCING AND GATES

Following is a copy of Section 02821 “Chain Link Fencing and Gates”. Bidder is advised to replace the Section 02821 “Chain Link Fencing and Gates” previously provided in the bid documents with the following REVISED Section 02821”Chain Link Fencing and Gates”. Again, this document should replace the document that was included in the bid documents.

Addendum Issued by:

Jason A. MacDonald, EI
NRS Consulting Engineers
1220 Stone Street
Jonesboro, Arkansas 72401
Phone: 870-972-5316

SECTION 02821

CHAIN LINK FENCING AND GATES

PART 1. GENERAL

1.01 SCOPE

A. This item covers the construction of new fence as shown on the Plans and in accordance with these Specifications.

1.02 SUBMITTALS

A. Shop Drawings: Submit plans and details indicated extent of fences, locations of gates, and details of attachment and footings. Indicate means and methods for surface preparation and finishing.

1.03 QUALITY ASSURANCE

A. Comply with Standard Specifications for Public Works Construction, current edition.

PART 2. PRODUCTS

2.01 MATERIALS

A. Concrete: Class 500-C-2500 concrete furnished as prescribed in Section 201-1 "Concrete, Mortar, and Related Materials" of the Standard Specifications for Public Works Construction or may be provided in the following volumetric proportions:

Portland Cement	1 part.
Fine Aggregate	2 parts.
Coarse Aggregate (¼" to 1½")	4 parts.
Water	7½-gallons, maximum per sack of cement.

B. Chain Link Fence Fabric: Conforming to ASTM A-392, Class C2 zinc coating, 2.00-ounces minimum per square foot of uncoated wire surface, hot-dipped galvanized after weaving, and top and bottom edges knuckled.

1. Fabric for perimeter fencing and interior fencing shall be 9-gauge woven wire with 2-inch mesh, unless otherwise specified. For 16-feet high fences, the upper 8-feet of fabric may be 11-gauge. Fences 12-feet high or less shall be furnished with single width fabric.
2. Installed fence fabric shall be free from barbs, icicles, or other projections and installed fence fabric with such defects will be deemed defective work.

C. Posts, Top Rails, Brace Rails, and Gate Frames: Standard weight, galvanized, welded or seamless steel pipe conforming to ASTM A-53, with a minimum yield strength of 35,000-psi. Reinforcing wires shall be of high carbon steel; and gate hinges, post caps, barbed wire supporting arms, stretcher bar bands, and other parts shall be of steel, malleable iron, ductile iron, or equal except that ties and clips may be of aluminum.

a. Posts, gate frames, rails, and braces shall conform to the dimensions and weights shown in Table.

Item	Height	Nominal Pipe Size (Inches)	Outside Diameter (Inches)	Weight (Pounds per Foot)	Footings* Diameter (Inches)	Footings* Depth (Inches)
Top Rail, Brace Rails, and Transom Rails	Up to 10′	1¼	1.660	2.27	N/A	N/A
	10′-1″ to 16′	1½	1.900	2.72	N/A	N/A
Line Posts	Up to 6′	2	2.375	2.65	16	36
	6′-1″ to 8′	2	2.375	2.65	18	36
	8′-1″ to 10′	2½	2.875	5.79	18	48
	10′-1″ to 16′	3	3.5	7.58	24	56
Terminal, Corner Angle & Pull Posts	Up to 8′	2½	2.875	5.79	18	36
	8′-1″ to 10′	2½	2.875	5.79	18	48
	10′-1″ to 16′	3	3.5	7.58	24	56
Pedestrian Gate Posts	Up to 8′	2½	2.875	5.79	24	36
Gate Frames	Up to 8′	1½	1.900	2.72	N/A	N/A
Double-Leaf Swing Gate Posts	Up to 8′	3½	4.000	9.11	24	56

* Embed posts into footing 6″ less than the depth of the footing. Deviations from footing Schedule will require soil test and Engineer review.

D. Post Caps: Malleable iron, ASTM A-47, Grade 32510, designed to fit snugly over posts with a minimum projection of 1½" below top of posts. Post caps shall be manufactured with a curved top.

E. Eye Tops: Malleable iron, ASTM A-47, Grade 32510, designed to fit over line posts, and for through passage of top rail.

F. Expansion Sleeve Couplings for Top Rail: Steel, 6" long, designed to fit tightly on inside of rail, fitted with raised center.

G. Rail Ends for Top Rails and Brace Rails: Malleable iron, ASTM A-47, Grade 32510, with holes to receive ⅜" bolts for securing to rail end bands.

H. Tension Bands and Bands for Securing Rail Ends: Mild steel flats, at least ⅛" x 1", except tension bands in gates shall be ⅛" x ¾". Bolts for use with tension bands and rail end bands shall be ⅜" x 1½".

I. Tension Bars: Mild steel flats at least 3/16" x ¾".

J. Tension Wire for Installation at Bottom of Fabric: 6-gauge steel wire, conforming to requirements of AISI Steel Products Manual, Carbon Steel Wire, Section 16, merchant quality, galvanized, soft temper with Type I coating.

K. Turnbuckles for Installation with Tension Wire: Eye and eye type, drop forged steel, right and left hand threads, at least ⅜" screw diameter with at least 4½" of take-up.

L. Tie Wire: Aluminum ties 6-gauge for fastening fabric to posts, top rails, and brace rails. At bottom tension wire, 9-gauge galvanized hog rings shall be installed.

M. Finish of Metal Parts: Post caps, couplings, rail ends, tension bands, tension bars, turnbuckles, rivets, bolts, and other metal parts and fittings shall be hot-dipped galvanized after fabrication, except bolts, which may be galvanized or cadmium-plated. Galvanizing shall conform to ASTM A-569, 0.15% maximum, and ASTM A-47.

N. Paints for Refurbishing Existing Fence Posts, Rails, and Accessories: As required to provide the galvanized color of a new installation.

O. Fence Cap: Shall be an extruded corrugated pipe that fits over standard chain link fencing, bright safety yellow in color, attached to fence using color matched zip ties. The fence cap shall come in 250-feet rolls for this project.

P. Backstop Pads: Shall be furnished similar to those installed on other existing fields in the park.

PART 3. EXECUTION

3.01 INSTALLATION

A. Install fences to heights indicated on the Drawings.

B. Space fence posts at equal intervals between terminal, angle, corner, and gate posts, and not more than 10-feet apart measured from center to center of posts. In curved fence sections having a radius of 50-feet or

less, space posts not more than 5½' apart. Install posts so that top of eye of post caps are level with top of fabric.

C. Install angle or corner posts at each change in direction of 15° or more, at change of 5% or more in grade of fencing, and at the beginning and end of curved fence sections.

D. Install terminal posts at ends of runs of fencing. Install gateposts on both sides of driveway and pedestrian gates. For double-leaf gates, net opening between gate posts shall be gate size as indicated on the Drawings, plus 3½"; for single leaf gates, net opening shall be gate size plus 2½".

E. Where a fence is to be installed on a curb, construct footings with top of footing level with the lower finish grade. Align posts, set plumb and true before placing footings. Remove splattered concrete from exposed pipe surfaces while concrete is still soft. In bituminous surfaced areas, install seal coat on top of concrete footings.

F. Install fences with top rail. Top rail shall pass through eye tops and be secured at ends with rail-end fittings and bands.

G. Install fences over 10-feet in height, in addition to top rail, with a horizontal mid-rail set at mid-heights of fence.

H. In fences higher than 10-feet, install brace rails at angles, corners, and terminals at ¼ and ¾ of fence height. Provide one horizontal brace rail in panels adjacent to terminal, angle, corner, and gateposts, install at mid-height of fence and rigidly secured to posts with rail end fittings and bands. Provide horizontal brace rails, as specified, in panels of curved sections having a radius of 50-feet or less. Brace rails are not required in fencing 4' or less in height.

I. Provide a transom rail and fabric at top of pedestrian gate openings. Install transom rail 6'-8" above high point of grade at gate opening. Ends of transom rails shall be pinned or riveted to rail end fittings with ¼" mild steel rivets. Pin or rivet must go through rail and peen. Welding on rail ends is not permitted.

J. Install bottom tension wire a minimum of 3" from grade for fencing, and provide a turnbuckle for each 150-feet of wire or fractional part thereof. Turnbuckles are not required in runs of 25-feet or less. Install ends of tension wires to posts in a manner to prevent slipping or loss of tension. Turn end of wire around post twisted at 3-times around wire. At turnbuckles, wire through eye and twist end at least 3-times around wire. Cut tail of bottom wire flush.

K. Install fence fabric on inward facing side of posts. Install fence fabric with top edge projecting above top rail of fence.

L. Install bottom of fence fabric to clear finish grades, except on bituminous surface install ¾" above such surface. Locally shape and trench ground surfaces where necessary to provide uniform top and bottom alignment of fabric.

M. Tightly stretch fabric and at terminal, pull corner, angle, and gateposts, secure with tension bars extending full height of fence. Secure tension bars to posts with bolted tension bands spaced not more than 14" apart.

N. Bands and Ties: Install bands and ties in accordance with the following schedule:

15 bands on 16-feet fence	16 ties on 16-feet fence
11 bands on 12-feet fence	12 ties on 12-feet fence
7 bands on 8-feet fence	7 ties on 8-feet fence
6 bands on 6-feet fence	6 ties on 6-feet fence
4 bands on 4-feet fence	4 ties on 4-feet fence

O. Fasten fabric to line posts with wire ties spaced not more than 16" apart. Where 6-gauge aluminum ties are furnished, hook the tie at both ends. Installation of hooked ties with links is not permitted.

P. Fasten fabric to top rails, mid-rails, brace rails, with wire ties spaced not more than 18" apart. Bend back ends of tie wires so as not to be a hazard. At bottom tension wire, install hog rings spaced not more than 18" apart. Where 2 fabrics are furnished, lap the fabrics one mesh at mid-rail and tie both fabrics with 9-gauge wire or 6-gauge aluminum ties to midrails.

Q. Field welds shall be cleaned of flux and spatter, damaged galvanized removed, burrs and projections ground off, properly prepared, then heavily coated with "Galviz" or "Galvabar", or approved equal. Install coating in accordance with written recommendations of manufacturer.

R. Fabrication of Gates

1. Frames: Fabricate gate frames from steel pipe of size specified, with joints at corners miter cut and continuously welded to sides.
2. Fabric: Install fence fabric to side members with tension bars and tension bands as specified, spaced not more than 14" apart. Tension bars shall extend full height of gate. Install fence fabric to top and bottom members and to brace rail with wire ties as specified for top rails, spaced not more than 12" apart.
3. Latches: Gate latches and strikes shall be furnished. Weld gate latches and strikes to gate posts and frames. Welding shall be performed before gate frames are galvanized, or welds shall be finished as specified for field welds.
4. Hinges: Install and adjust hinges, burr or center punch threads of gate hinge bolts to prevent removal of nuts. Install three (3) hinges on each post for swing gates more than 16-feet wide.
5. Grind welds flush and smooth. Hot-dip galvanize fabricated parts after welding, or finish as specified for field welds.

3.02 INSTALLATION ON TOP OF CONCRETE WALLS

A. Posts for fences on top of new concrete or concrete masonry walls shall be installed in 24-gauge galvanized iron inserts one (1") inch larger than the outside post diameter. Wall thickness for such installation shall be 8"

minimum. Depth of embedment of post shall not be less than 15" for fence height not exceeding 4'. Install post plumb, true, and fill joint space with cement grout or "Por-Rok", as manufactured by Hallemite Manufacturing Co., or approved equal, finished flush with top of wall. Remove excess grout and clean posts.

B. Fencing on Gravity Walls: Post of fence not exceeding 8' high shall have a minimum of 15" embedment in gravity walls with a top width of 10" minimum and side of 1H:4V. Where the height of gravity wall from top to bottom, within 5' from each side of a post, is less than 22", provide concrete fence post footings and embed posts in accordance with the schedule of posts and footings as set forth in this section.

C. Do not install footings on existing walls without the review of the Engineer.

3.03 FENCING ADJUSTMENTS

A. Where the finish grade is raised 6" or less, cut and re-knuckle the existing fence fabric. Adjust tension wire and tie to fabric. Bottom of fence fabric shall be installed ¾" above finish grade.

B. Where the finish grade is lowered 6" or less, demolish the fence footing flush with the finish grade and adjust the fabric and its attachments. Bottom of fence fabric shall be installed ¾" above finish grade.

C. Post footings and fabrics that require readjustment after installation shall be entirely replaced.

3.04 INSTALLATION OF GATES

A. Provide gates of the sizes indicated on the Drawings. Allow clearance on gates of 1½" at bottom and 1" on top. Construct gates installed in sloping areas to conform to the grade. Provide an opening in each gate for access to locking device or padlock. Knuckle ends of fabric cut for opening to eliminate hazards.

B. Sliding Gates and Swing Barricade Gates: Fabricate and install as indicated on the Drawings.

3.05 COMPLETION

A. Completed fencing shall form continuous units between points indicated with required parts, accessories, and fittings provided and installed. Clean exposed metal surfaces of cement, grout, and other foreign substances.

B. Fill in holes left by removal of existing fence footings, except in areas where grading work is indicated or specified, to existing grade with clean earth thoroughly compacted to at least same density as adjoining soil.

3.06 PROTECTION

A. Protect the work of this section until Substantial Completion.

3.07 CLEANUP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION