PART 2

SPECIAL PROVISIONS

AND

CONTRACT DOCUMENTS

FOR

ESSEN/STARING LARGE DIAMETER SEWER REHABILITATION

CITY-PARISH PROJECT NO. 20-AR-MS-0089

BID DATE: January 19th, 2021
BID TIME: 2:00 PM, LOCAL TIME

PREPARED BY:

JACOBS ENGINEERING

AND

CITY OF BATON ROUGE
PARISH OF EAST BATON ROUGE
DEPARTMENT OF PUBLIC WORKS
SEWER ENGINEERING DIVISION

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To be published three times - Legal

THE ADVOCATE
BATON ROUGE, LOUISIANA

NOTICE TO CONTRACTORS

The City of Baton Rouge and Parish of East Baton Rouge will receive electronic or paper bids for the construction of the following project:

ESSEN/STARING LARGE DIAMETER SEWER REHABILITATION
CITY-PARISH PROJECT NO. 20-AR-MS-0089

PROJECT DESCRIPTION: ESSEN LANE LARGE DIAMETER SEWER REHABILITATION PROJECT – THIS WORK INCLUDES SEWER LINE CLEANING, PRE/POST INSTALLATION TELEVISION INSPECTION, BYPASS PUMPING, SEWER REHABILITATION OF APPROXIMATELY 3000 LINEAR FEET OF CONCRETE GRAVITY MAIN WITH THE OPTION OF USING SLIPLINING, SPIRAL WOUND LINING OR CURED IN PLACE PIPE, MANHOLE REHABILITATION, SITE RESTORATION AND CLEANUP.

Electronic or sealed bids will be received until 2:00 p.m. Local Time, **TUESDAY, January 19th, 2021,** by the Purchasing Division, City Hall, 222 Saint Louis St.,8th Floor, Room 826, Baton Rouge, Louisiana 70802. No bids will be received after 2:00 p.m. on the same day and date.

Electronic bids and electronic bid bonds for the solicitation will be downloaded by the City of Baton Rouge and Parish of East Baton Rouge, Purchasing Division. Electronic bids and electronic bid bonds must be submitted through **www.bidexpress.com** prior to the bidding deadline. Beginning as soon as feasible after the bid closing time all electronic bids will be downloaded and publicly read aloud along with all paper bids received, if any, in Room 806 of City Hall immediately after the 2:00 p.m. bid closing. Bidders and/or their authorized representatives are invited to be present.

Bids, amendments to bids, or request for withdrawal of quotations, received after time specified for bid opening shall not be considered for any cause whatsoever.

Bids shall be firm for a period of sixty (60) days from the date of the opening of bids and no bid shall be withdrawn for any reason during this period of time except as allowed per R.S. 38:2214.C.

Electronic copies of the plans, specifications and contract documents may be obtained online at www.bidexpress.com. Paper copies of the plans, specifications, and contract documents are on file and may be obtained from the **Department of Public Works and Planning Center, Engineering Division, 1100 Laurel Street, First Floor, Room 128, Baton Rouge, Louisiana 70802,** upon payment of **fifty dollars ($50.00)**. (Make checks payable to the City of Baton Rouge and Parish of East Baton Rouge.) Fees for plans, specifications, and contract documents are to cover the cost of reproduction and are non-refundable in accordance with Louisiana Revised Statutes.

A Certified Check or Cashier's Check, payable to the Parish of East Baton Rouge or a satisfactory Bid Bond executed by the Bidder and an acceptable surety, in an amount equal to five percent (5%) of the total bid, shall be submitted with each bid.

Bids shall be received electronically via www.bidexpress.com or on solicitation bid forms furnished by the City of Baton Rouge and Parish East Baton Rouge, and only those bids shall be received by the City-Parish which is

submitted by those Contractors in whose names the **solicitation bid** forms and/or specifications were issued. In no event shall **paper solicitation** forms be issued later than twenty-four (24) hours prior to the hour and date set for receiving proposals.

The Bidder is advised that the City of Baton Rouge and Parish of East Baton Rouge is an Equal Opportunity Employer. Therefore the Bidder is encouraged to utilize minority participation in this contract to the extent possible through the use of small, disadvantaged and women-owned businesses as suppliers or subcontractors. To assist the City-Parish in our efforts to track the minority participation on our construction projects the successful low bidder shall include completed City-Parish form CP DBE-1 (revised 3/6/2012) with the monthly partial payment request.

All Contractors bidding on this work shall comply with all provisions of the State Licensing Law for Contractors, R.S. 37:2150-2163, as amended, for all public contracts. It shall also be the responsibility of the General Contractor to assure that all subcontractors comply with this law. If required for bidding, Contractors must hold an active license issued by the Louisiana State Licensing Board for Contractors in the classification of **"Municipal and Public Works Construction"** and must show their license number on the face of the bid envelope and the Uniform Public Works Bid Form.

In accordance with La. R.S. 38:2214 (B) the City of Baton Rouge and Parish of East Baton Rouge reserves the right to reject any and all bids for just cause. In accordance with La. R.S. 38:2212 (B), the provisions and requirements of this Section, those stated in the advertisement for bids, and those required on the bid form shall not be considered as informalities and shall not be waived by any public entity.

A **mandatory pre-bid conference** will be held at **2:00 P.M., TUESDAY, January 5th, 2021,** in **Department of Public Works and Planning Center, Engineering Division, 1100 Laurel Street, First Floor Conference Room, Room 133, Baton Rouge, LA 70802.** All parties interested in this project must be present no later than 2:05 P.M. to be considered eligible bidders for this project.

For additional information please contact Joseph Young, P.E., Project Engineer at Joseph.Young12@Jacobs.com.

Louisiana Uniform Public Work Bid Form

TO: City of Baton Rouge
Parish of East Baton Rouge
Purchasing Division, Room 826
222 Saint Louis St., City Hall
Baton Rouge, Louisiana 70802
(Owner to provide name and address of owner)

BID FOR: ESSEN/STARING LARGE DIAMETER SEWER REHABILITATION

C.P. Project No. 20-AR-MS-0089

The undersigned bidder hereby declares and represents that she/he; a) has carefully examined and understands the Bidding Documents, b) has not received, relied on, or based his bid on any verbal instructions contrary to the Bidding Documents or any addenda, c) has personally inspected and is familiar with the project site, and hereby proposes to provide all labor, materials, tools, appliances and facilities as required to perform, in a workmanlike manner, all work and services for the construction and completion of the referenced project, all in strict accordance with the Bidding Documents prepared by: The Department of Public Works and dated: September, 2020
(Owner to provide name of entity preparing bidding documents.)

Bidders must acknowledge all addenda. The Bidder acknowledges receipt of the following **ADDENDA**:

No. ____ Dated: _____ No. ____ Dated: _____ No. ____ Dated: _____

No. ____ Dated: _____ No. ____ Dated: _____ No. ____ Dated: _____

TOTAL BASE BID: For all work required by the Bidding Documents (including any and all unit prices* but not alternates) the sum of:

_____ Dollars ($_____)

ALTERNATES: For any and all work required by the Bidding Documents for Alternates.

Alternate No. 1 *(Owner to provide description of alternate and state whether add or deduct)* for the lump sum of:

_____ Dollars ($ _____)

Alternate No. 2 *(Owner to provide description of alternate and state whether add or deduct)* for the lump sum of:

_____ Dollars ($ _____)

Alternate No. 3 *(Owner to provide description of alternate and state whether add or deduct)* for the lump sum of:

_____ Dollars ($ _____)

NAME OF BIDDER: _____

ADDRESS OF BIDDER: _____

_____

LOUISIANA CONTRACTOR'S LICENSE NUMBER: _____

NAME OF AUTHORIZED SIGNATORY OF BIDDER: _____

TITLE OF AUTHORIZED SIGNATORY OF BIDDER: _____

SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER **: _____

DATE: _____

* The Unit Price Form shall be used if the contract includes unit prices. Otherwise it is not required and need not be included with the form. The number of unit prices that may be included is not limited and additional sheets may be included if needed.

** If someone other than a corporate officer signs for the Bidder/Contractor, a copy of a corporate resolution or other signature authorization shall be required for submission of bid. Failure to include a copy of the appropriate signature authorization, if required, may result in the rejection of the bid unless bidder has complied with La. R.S. 38:2212(A)(1)(c) or RS 38:2212(O) .

BID SECURITY in the form of a bid bond, certified check or cashier's check as prescribed by LA RS 38:2218.A is attached to and made a part of this bid

BIDDER'S ORGANIZATION (If the bid is by a joint venture all parties to the bid must complete this form):

BIDDER IS:

AN INDIVIDUAL

Individual's Name: _____

Doing business as: _____

Address: _____

Telephone No.: _____ Fax No.: _____ Cell No.; _____

E-Mail Address: _____

A PARTNERSHIP

Firm Name: _____

Address: _____

Name of person authorized to sign: _____

Title: _____

Telephone No.: _____ Fax No.: _____ Cell No.: _____

E-Mail Address: _____

A LIMITED LIABILITY COMPANY

Company Name: _____

Address: _____

Name of person authorized to sign: _____

Title: _____

Telephone No.: _____ Fax No.: _____ Cell No.: _____

E-Mail Address: _____

A CORPORATION

IF BID IS BY A CORPORATION, THE CORPORATE RESOLUTION MUST BE SUBMITTED WITH BID.

Corporation Name: _____

Address: _____

State of Incorporation: _____

Name of person authorized to sign: _____

Title: _____

Telephone No.: _____ Fax No.: _____ Cell No.: _____

E-Mail Address: _____

CORPORATE RESOLUTION

A meeting of the Board of Directors of _____, a Corporation organized under the laws of the State of _____ and domiciled in _____, was held this _____ day of _____, 20__, and was attended by a quorum of the members of the Board of Directors.

The following resolution was offered, duly seconded and, after discussion, was unanimously adopted by said quorum:

BE IT RESOLVED, that _____ is hereby authorized to submit proposals and execute agreements on behalf of this corporation with the City of Baton Rouge, and Parish of East Baton Rouge.

BE IT FURTHER RESOLVED, that said authorization and appointment shall remain in full force and effect, unless revoked by resolution of this Board of Directors and that said revocation will not take effect until the Purchasing Director of the Parish of East Baton Rouge, shall have been furnished a copy of said resolution, duly certified.

I, _____, hereby certify that I am the Secretary of _____, a corporation created under the laws of the State of _____ domiciled in _____; that the foregoing is a true and exact copy of a resolution adopted by a quorum of the Board of Directors of said corporation at a meeting legally called and held on the ____ day of _____, 20____, as said resolution appears of record in the Official Minutes of the Board of Directors in my possession. This ____ day of _____, 20__.

_____
Secretary

BID BOND
(Required for Bids Over $25,000)

That we, the undersigned,_____, as Principal (Bidder), and_____, as Surety, are hereby held and firmly bound unto the City of Baton Rouge and Parish of East Baton Rouge as Owner, in the penal sum of five percent (5%) of the amount bid for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, successors and assigns.

The Condition of the above obligation is such that whereas the Principal has submitted to the Owner a certain Bid, attached hereto and hereby made a part hereof to enter into an Agreement in writing, for:

ESSEN/STARING LARGE DIAMETER SEWER REHABILITATION
CITY-PARISH PROJECT NO. 20-AR-MS-0089

NOW THEREFORE,

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

(b) If said Bid shall be accepted and the Principal shall execute and deliver a Contract in the Form of Contract attached hereto (properly completed in accordance with said Bid) and shall furnish bonds for his faithful performance of said Contract and for furnishing materials in connection therewith and shall in all other respects perfect the Agreement created by the acceptance of said Bid,

then this obligation shall be void; otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

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

IN WITNESS WHEREOF, Said Principal and Surety have hereunto set their hands and seals, this_____ day of _____, 20 .

PRINCIPAL (BIDDER)	**SURETY**
_____	_____
_____	_____
_____	_____
(Address)	(Address)
By:_____	By:_____
_____	_____
(Typed Name and Title)	(Typed Name and Title)

CITY OF BATON ROUGE
PARISH OF EAST BATON ROUGE
STATE OF LOUISIANA

Department of Public Works
Engineering Division (2008)

CERTIFICATION REGARDING DEBARMENT, SUSPENSION AND OTHER RESPONSIBILITY MATTERS

(1) The party signing below hereby certifies, to the best of his knowledge and belief, that he and the officers, directors, members and/or principals of the represented organization:

(a) are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from any transactions by any governmental body or entity;

(b) have not within a three-year period preceding this certification been found guilty of or had a civil judgment rendered against them for misapplication of funds, fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or Local) transaction or contract; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(c) are not presently indicted for or otherwise criminally or civilly charged by any governmental entity with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and

(d) have not within a three-year period preceding this certification had one or more public transactions (Federal, State or Local) terminated for cause or default.

(2) Where the party signing below is unable to certify to any of the statements in this certification, such party signing below shall attach an explanation to this proposal.

_____
ORGANIZATION NAME

_____
NAME AND TITLE OF AUTHORIZED REPRESENTATIVE

_____
SIGNATURE DATE

CITY OF BATON ROUGE
PARISH OF EAST BATON ROUGE
STATE OF LOUISIANA

Department of Public Works
Engineering Division

INSTRUCTIONS FOR CERTIFICATION REGARDING DEBARMENT, SUSPENSION AND OTHER RESPONSIBILITY MATTERS

1. By signing and submitting this CERTIFICATION REGARDING DEBARMENT, SUSPENSION AND OTHER RESPONSIBILITY MATTERS, the certifying party stipulates that the certification is made in strict accordance with these instructions.

2. The inability of a person to provide the certification required will not necessarily result in disqualification. The certifying party shall submit an explanation of why it cannot provide the certification set out on this form. The certification or explanation will be considered in connection with the determination whether to disqualify the certifying party. However, failure of the certifying party to furnish a certification or an explanation shall disqualify such certifying party from participation in the Project.

3. The certification is a material representation of fact upon which reliance will be placed when this transaction/contract is entered into. If it is later determined that the certifying party knowingly rendered an erroneous certification, in addition to other remedies available, the transaction/contract may be terminated for cause or default and the certifying party shall be liable for all costs, expenses and damages including attorney fees.

4. The certifying party shall provide immediate written notice to the Owner if at any time the certifying party learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

5. The certifying party agrees by submitting this certification that, should the proposed transaction/contract be entered into, the certifying party shall not knowingly enter into any lower tier transaction with a person or entity who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this Project, unless authorized by the Owner in writing.

6. The certifying party further agrees by submitting this certification that it will obtain an identical certification from all lower tier contractors/subcontractors.

7. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required. The knowledge and information of the certifying party is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

8. If the certifying party knowingly enters into a lower tier transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this Project, in addition to other remedies available, the transaction/contract may be terminated for cause or default and the certifying party shall be liable for all costs, expenses and damages including attorney fees.

ESSEN/STARING LARGE DIAMETER SEWER REHABILITATION

NAME OF PROJECT

C.P. Proj. #20-AR-MS-0089 — **PROJECT NUMBER**

January 19th, 2021 — **DATE OF BID**

ATTESTATION CLAUSE REQUIRED BY LA. R.S. 38:2227 (PAST CRIMINAL CONVICTIONS OF BIDDERS)

Appearer, as a Bidder on the above-entitled Public Works Project, does hereby attest that:

A. No sole proprietor or individual partner, incorporator, director, manager, officer, organizer, or member who has a minimum of a ten percent (10%) ownership in the bidding entity named below has been convicted of, or has entered a plea of guilty or nolo contendere to any of the following state crimes or equivalent federal crimes:

(a) Public bribery (R.S. 14:118)
(b) Corrupt influencing (R.S. 14:120)
(c) Extortion (R.S. 14:66)
(d) Money laundering (R.S. 14:23)

B. Within the past five years from the project bid date, no sole proprietor or individual partner, incorporator, director, manager, officer, organizer, or member who has a minimum of a ten percent (10%) ownership in the bidding entity named below has been convicted of, or has entered a plea of guilty or nolo contendere to any of the following state crimes or equivalent federal crimes, during the solicitation or execution of a contract or bid awarded pursuant to the provisions of Chapter 10 of Title 38 of the Louisiana Revised Statutes:

(a) Theft (R.S. 14:67)
(b) Identity Theft (R.S. 14:67.16)
(c) Theft of a business record (R.S.14:67.20)
(d) False accounting (R.S. 14:70)
(e) Issuing worthless checks (R.S. 14:71)
(f) Bank fraud (R.S. 14:71.1)
(g) Forgery (R.S. 14:72)
(h) Contractors; misapplication of payments (R.S. 14:202)
(i) Malfeasance in office (R.S. 14:134)

NAME OF BIDDER — **NAME OF AUTHORIZED SIGNATORY OF BIDDER**

DATE — **TITLE OF AUTHORIZED SIGNATORY OF BIDDER**

SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER

La. R.S. 38:2212.10 AFFIDAVIT

I,_____ , as the authorized representative of the Bidder in accordance with La. R.S. 38:2212.10 hereby certify signing below and by bidding on a contract with the City of Baton Rouge, Parish of East Baton Rouge the following:

(1) The Bidder is registered and participates in a status verification system to verify that all employees in the state of Louisiana are legal citizens of the United States or are legal aliens.

(2) The Bidder shall continue, during the term of the contract, to utilize a status verification system to verify the legal status of all new employees in the state of Louisiana.

(3) The Bidder shall require all subcontractors to submit to the employer a sworn affidavit verifying compliance with Paragraphs (1) and (2) above.

_____
Signature of Affiant

_____
Printed Name of Affiant

_____
Title of Affiant

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

_____
Notary Public

Printed Name of Notary:_____

Bar Roll No./Notary No._____

My Commission Expires: _____

SPECIAL PROVISIONS

The Standard Specifications referred to herein are the 1997 City of Baton Rouge, Parish of East Baton Rouge Standard Specifications for Public Works Construction. The Standard Specifications are hereby amended to include the following Special Provisions and where applicable shall take precedence over the aforementioned Standard Specifications. When any part of the Standard Specifications is unaltered by the following Special Provisions, the unaltered provisions of the Standard Specifications shall remain in effect.

Copies of the Standard Specifications may be obtained from the Department of Public Works, Engineering Division, Room 128, Public Works and Planning Center, 1100 Laurel Street or Post Office Box 1471, Baton Rouge, Louisiana 70821 (Telephone No. [225] 389-3186).

NOTICE TO BIDDERS

For Individual Bids (Quotations) exceeding $25,000, the following shall apply:

a). A Bid Bond, cashier's check or certified check is required to be submitted with the proposal.
b). A Performance and Payment Bond will be required for the contract.
c). The Contract shall be approved by the Metropolitan Council.
d). The Contract shall be recorded with the Recorder of Mortgages.
e). Retainage shall be withheld until receipt of a clear lien certificate following the 45-day lien period after the Metropolitan Council has approved final acceptance of the Contract.

The above requirements of this Notice to Bidders do not apply to individual quotations of $25,000.00 or less.

EXAMINATION OF PLANS, SPECIFICATIONS, SPECIAL PROVISIONS AND SITE OF WORK

Before preparing his bid, each bidder is expected to make a field examination of the proposed work and to fully acquaint themselves with conditions relating to construction and labor so that they may fully understand the facilities, difficulties and restrictions attending the execution of the work under this contract. Bidders should thoroughly examine and be familiar with the Plans, Specifications, and Contract Documents.

Submission of a bid shall be considered prima facie evidence that the bidder has made such an examination and is satisfied as to the conditions to be encountered in performing the work and as to the requirements of the plans, project specifications, and documents.

PART I GENERAL PROVISIONS

SECTION 2 BIDDING REQUIREMENTS Section 2 of the Standard Specifications is amended to include the following:

Bidders are advised to familiarize themselves with Section 2 of the Standard Specifications; particularly the requirements of Subsections 2 – 2 and 2 – 4 which would render the bid irregular.

Indicated below is a sample copy of a Unit Price Bid Form showing how this form is to be properly filled out. For non-electronic submittals, the form may be hand written (all written entries must be in ink) or typed; and it is necessary to **FILL IN ALL BLANK SPACES.** In the event of a conflict between the Unit Price Extension and the Unit Price, the Unit Price shall govern. **SPACES LEFT BLANK SHALL CAUSE THE PROPOSAL TO BE DECLARED IRREGULAR.**

Louisiana Uniform Public Work Bid Form
Unit Price Form

DESCRIPTION: *(Owner to provide)*		**Clearing and Grubbing**		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity X Unit Price)*
2010100	**1**	**LUMP**	**$ 56,000.00**	**$ 56,000.00**
DESCRIPTION: *(Owner to provide)*		**Removal of Concrete Pavement**		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity X Unit Price)*
2020300	**1130**	**SY**	**$ 9.08**	**$ 10,260.40**
DESCRIPTION: *(Owner to provide)*		**Unrestrained Joint Ductile Iron Sewer Force Main (36")**		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity X Unit Price)*
804010Q	**1546**	**LF**	**$ 342.64**	**$ 529,721.44**
DESCRIPTION: *(Owner to provide)*		**Fertilizer**		
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity X Unit Price)*
9030900	**11600**	**LB**	**$ 0.45**	**$ 5,220.00**

Total of the Unit Price extensions must be entered on the Louisiana Uniform Public Bid Form furnished herein.

2-2 PREPARATION OF PROPOSAL FORM: This subsection is deleted and replaced by the following:

Each bidder must submit his bid proposal on the form furnished herein. Altered or substitute forms will not be accepted. The term "altered" shall mean any change in an item, quantity, price, or amount set forth in the unit price form, except where necessary to correct an obvious error in the printed form. The blank spaces in the unit price form provided for each reference item must be filled in according to the requirements of the bid proposal form. The bidder must state the price written in ink or typed, for which he proposes to do each reference item of the work contemplated, and the bidder shall make an extension of the total cost of the reference item which must be inserted at the place indicated in the bid proposal form. Where "no" dollars or "no" cents is part of the price bid, the numeral "0" shall be inserted in the appropriate spaces. Where a Contract item is to be paid by the Owner or others, a price for this purpose will be pre-inserted in the unit price form. In case of a conflict between the Unit Price Extension and the Unit Price, the Unit Price shall govern. Should the Unit Price Extension be illegible, the Unit Price shall govern. Errors in unit price extensions will be corrected. The total bid amount will be the summation of the correct unit price extensions. Any revisions to bid prices shall be initialed by the bidder or the bidder's authorized representative before submitting bid to Owner. The bidder must acknowledge all issued addendums in the place provided in the Uniform Public Works Bid Form.

Sales and Use Taxes: City-Parish and its designated agent(s) are exempt from sales and use taxes of the State of Louisiana and of the City of Baton Rouge, Parish of East Baton Rouge, and associated local taxing jurisdictions on materials incorporated in the Work. Exemption to taxes is specific to SSO Program projects associated with the Consent Decree between the City-Parish, the U.S. EPA and LDEQ. These taxes shall not be included in the Bid. Refer to Special Provision

Sections 3, 6, 7, and 10 for additional information.

All bidders shall be duly registered with the Louisiana Secretary of State and authorized to do business in the State of Louisiana in order to qualify as a bidder. The authority of the signature of the person submitting the bid shall not be acceptable unless one of the following conditions are met:

A. The signature on the bid is that of any corporate officer listed on the most current annual report on file with the Secretary of State, or the signature on the bid is that of any member of a partnership listed in the most current partnership records on file with the Secretary of State.

B. The signature on the bid is that of an authorized representative of the corporation, partnership, or other legal entity and the bid is accompanied by a corporate resolution, certification as to the corporate principal, or other documents indicating authority which are acceptable to the public entity.

C. The corporation, partnership, or other legal entity has filed in the appropriate records of the Secretary of State in which the public entity is located, an affidavit, resolution, or other acknowledged or authentic document indicating the names of all parties authorized to submit bids for public contracts. Such document on file with the Secretary of State shall remain in effect and shall be binding upon the principal until specifically rescinded and canceled from the records of the office.

D. As required by La. R.S. 38:2212.

By signing the bid, the bidder certifies compliance with the above.

For projects requiring a licensed Contractor, the Louisiana State Contractor's License Number shall be entered on the bid envelope and the Uniform Public Works Bid Form. By entering such license number, the bidder certifies that the license number provided is recognized by the Louisiana State Licensing Board for Contractors for the work to be performed under this Project. All bids shall comply with Louisiana law including, but not limited to, La. R.S. 37:2163.

2-3 PROPOSAL GUARANTY: All reference to countersigning bonds shall be deleted.

2-5 DELIVERY OF PROPOSALS: This sub-section of the Standard Specifications is deleted and replaced by the following:

2-5 DELIVERY OF BIDS: Unless delivered electronically through the approved electronic bid submission service, each bid should be submitted in a special sealed envelope furnished by the Engineer, on which the bidder shall indicate the firm's name and address, bid opening date and time, Project number and name, and Louisiana Contractor's license number (if licensed Contractor is required). The Contractor shall certify that the Contractor is licensed under Louisiana's Contractor's Licensing Law R.S. 37:2150-2164 and shall show his license number on the sealed bid envelope. When an envelope other than the one furnished by the engineer is used, it shall be of the same general size and shape and be similarly marked to clearly indicate its contents. When sent by mail, the sealed proposal shall be addressed to the City-Parish at the address and in care of the Purchasing Director. Proposals shall be filed prior to the time and at the place specified in the notice inviting bids. Proposals received after the time for opening bids will be returned to bidder unopened.

2-7 PUBLIC OPENING OF PROPOSALS: Delete the last sentence of this section and replace with the following:

Tabulation of all bids received shall be available for public inspection and are posted for viewing on the following web page: http://www.brgov.com/dept/purchase/bidresults.asp. These bid tabulations

are for informational purposes only and shall not be considered final until reviewed and approved by the Purchasing Director and department concerned.

2-8 QUALIFICATIONS OF BIDDERS: This subsection is amended to include the following:

2-8.1 Other Documentation And Information: In accordance with La. R.S. 38:2212 B.(3)(b) **prior to the opening of all bids,** all Bidders shall fully execute and submit all bid forms required by statute or by the Louisiana Administrative Code to the Purchasing Department. The following forms, included herein as Part 1A "BID FORMS REQUIRED BY STATUTE OR BY THE LOUISIANA ADMINISTRATIVE CODE", shall be submitted prior to the opening of all bids related to a contract for public works either enclosed in a separate envelope or included in their sealed bid envelope. Failure of a Bidder to fully execute and submit these forms prior to the date and time established for the receipt of bids shall result in the bid being declared "non-responsive".

- **Debarment and Suspension:** (Form CD: CERTIFICATION REGARDING DEBARMENT, SUSPENSION AND OTHER RESPONSIBILITY MATTERS). A contractor shall not be allowed to bid on any work if he is presently debarred, suspended, proposed for debarment, or voluntarily excluded from transactions by any Federal department or agency.
- **Past Criminal Convictions:** (Form AT-1: ATTESTATION CLAUSE). In accordance with LA RS 38:2227 a Bidder must attest to past criminal convictions
- **Verification of Employees:** (Form AF-1: Legal Citizen Affidavit). In accordance with LA RS 38:2212.10 a Bidder must be registered and participate in the "E-Verify" Program and conform to the statutory requirements of the law.

2-10 QUANTITIES AND UNIT PRICES:

2-10.4 Unit Prices Or Lump Sum Pay Items: This subsection is deleted and replaced by the following:

Work and materials, equipment, and equipment rental will be paid for in accordance with the unit prices or lump sum reference pay items in the Contract Documents. If no reference pay item is provided for an item of work, material, or equipment required under the Contract Documents, it will be considered as having been included in the prices bid for the pay items in the Contract Documents. The Contractor shall perform all work required in the Contract Documents and accept payment pursuant to the Unit Price Bid Form as full and final compensation for all work performed under the contract including all incidental, overhead, and subsidiary costs and work not measured for payment as described under the individual reference pay items listed in the Uniform Price Bid Form.

The Contractor will be required to provide a breakdown of lump sum items after award of contract to be used for monthly payments purposes.

SECTION 3 AWARD AND EXECUTION OF CONTRACT

3-1 CONSIDERATION OF PROPOSALS: Add the following paragraph to this subsection:

A total bid under $150,000.00 will be considered a quotation and is not within the purview of the Public Bid Law (LA RS 38:2212 et.seq). It is the City-Parish's intent to obtain fair and competitive quotations. However, the City-Parish specifically reserves the right to evaluate quotations, waive irregularities or informalities not affecting price or quality, to accept the quotation which is in the best interest of the City-Parish, and to reject all quotations if that is in the best interest of the City-Parish.

3-2 AWARD OF CONTRACT: This sub-section of the Standard Specifications is deleted and replaced by the following:

3-2 AWARD OF CONTRACT: If the contract is awarded, the award will be made within 45 days after the opening of proposals to the lowest responsible and responsive bidder whose proposal complies with all requirements prescribed in accordance with La. R.S. 38:2215. However, the City-Parish and said bidder, by mutually written consent, may agree to extend the deadline for award by one or more extensions of 30 calendar days. The successful bidder will be notified, by letter mailed to the address shown on the proposal, that the bidder has been awarded the contract.

3-5 EXECUTION OF CONTRACT: This sub-section of the Standard Specifications is deleted and replaced by the following:

3-5 EXECUTION OF CONTRACT: Execution of the contract shall be made in accordance with La. R.S. 38:2215. The contract shall be signed by the successful bidder and returned to City-Parish, with the contract bond and all other required documents, within 15 days after the contract has been received by the bidder. City-Parish will execute the contract within 45 days following receipt from the bidder of the signed contract and bond. If the contract is not executed by the lowest responsible and responsive bidder and the City-Parish within 60 days following award of the contract, the bidder shall have the right to withdraw the bid without penalty. No contract shall be considered as effective until it has been executed by all parties thereto.

The successful low bidder shall include completed LDR Form R-1020 (latest version), "Designation of Construction Contractor as Agent of a Governmental Entity and Exemption Certificate", with return of executed Contract. Similar forms for Subcontractors may be submitted if available. If not available at time of Contract execution, submit as required by Special Provision 10-9. **The dates of the project on the form are to be filled out by the City-Parish, not the Contractor or Subcontractor.**

3-7 SURETY BOND: This subsection is amended as stated:

All reference to countersigning bonds shall be deleted.

3-9 PROTESTS: This sub-section of the Standard Specifications is amended to include the following:

If the City-Parish proposes to disqualify any bidder, either as a potential bidder or as the low bidder, on grounds that such bidder is not a "responsible bidder" City-Parish shall act in accordance with La. R.S 38:2212(X).

SECTION 4 SCOPE OF WORK

4-5 FINISHING AND CLEAN UP: Delete this subsection and replace with the following:

On a daily basis or more often if ordered by the Engineer, the Contractor shall clean up and remove all refuse and unused materials resulting from the work. Upon failure to do so within 48 hours after written order by the Engineer, the work may be done by the City-Parish and the cost thereof deducted from payments for the work. Upon completion of the work and at the end of the day, the Contractor shall remove all materials not used in the work and all equipment and put the work area in a neat and clean condition satisfactory to the Engineer.

It is important that surface restoration, remedial, or follow-up work be done in a timely manner. Contractor shall complete surface restoration in the required timeframes for construction situations dictated below. A variance to these required timeframes may be granted by the Engineer due to project specific conditions.

a. Non paved Surfaces - Surface restoration, remedial or follow-up work shall conform to the following:

1. Restoration shall be started within a one (1) week period following the day of final backfill or completion of a sewer repair or replacement at the repair location and must be completed within one (1) additional week from the date of commencement.

2. Restoration shall begin within a one (1) week period following the day of final backfill or completion of a gravity sewer segment (manhole to manhole) installation and must be completed within one (1) additional week from the date of commencement.

3. Restoration shall lag behind sewer force main installation and final backfill by no more than 1000 ft. and once started, must be completed within one (1) additional week from the date of commencement.

b. Paved Surfaces (roadways and parking lots) – Surface restoration, remedial or follow-up work shall conform to the following:

1. Temporary pavement restoration shall be in accordance with subsection 7-6 and Section 503. Temporary pavement restoration must be started immediately following the final backfill or completion of:

i. a sewer repair or replacement at the repair location,
ii. no more than 500 ft. of gravity sewer or sewer force main installation,

Temporary pavement restoration shall be inspected and maintained on a daily basis by the Contractor as needed until final pavement restoration can be completed.

2. Final pavement restoration shall begin within the time limits dictated in Section 503 after temporary pavement restoration was installed or after testing is completed in the case of force mains, and must be completed within one (1) additional week from the date of commencement, unless otherwise directed by the Engineer.

c. Walks and Drives - Surface restoration, remedial or follow-up work shall conform to the following:

1. Temporary aggregate surfacing shall be used for temporary surfacing for drives and access in accordance with Section 503. It shall be placed immediately after final backfill at each drive location. Temporary aggregate surfacing shall be inspected and maintained on a daily basis by the Contractor as needed until final restoration can be completed.

2. Final restoration shall be started within a two (2) week period following the day of final backfill or completion of repair at the repair location and must be completed within two (2) additional weeks from the date of commencement.

If the above schedules along with any approved variances are not followed, the Owner's representative will issue a formal warning to the Contractor notifying him that failure to start or complete the follow-up work as scheduled will result in a directive to stop work on any future activities, pending the completion of all follow-up work as directed by the Owner's representative. No time extension and/or down time compensation will be considered for a stoppage in work due to the Contractor's failure to comply with the restoration schedule requirements.

In this time between the final backfill or completion of the repair and follow-up work, the Contractor

shall rough grade the site; install erosion control measures; remove all construction material, excess excavation, buildings, equipment and other debris remaining on the job as a result of construction operations; and shall render the site of the Work in a neat and orderly condition. During the time between the final backfill and completion of the permanent pavement repair, the Contractor shall maintain traffic in accordance with Section 7-4 of the specifications at no additional cost to the Owner. Otherwise Contractor may complete surface restoration, remedial or follow-up work immediately after completion of the repair and final backfill.

Post Paving Cleanup: The use of rotary brooms is prohibited. If necessary, cleaning shall be done either manually using brooms and shovels or by use of vacuum sweeper that does not generate dust. Sweeping equipment shall be approved be the Engineer before use.

SECTION 5 CONTROL OF WORK

5-1 SUPERVISION AND INSPECTION: Delete this subsection in its entirety and replace with the following:

The Engineer shall have access to the Work at all times. The Contractor shall furnish all facilities to allow for inspection at the construction site, shops or yards, and shall not cover up work requiring inspection until it has been inspected. If Work is covered up before being inspected, the Contractor shall, at no additional payment, remove such portions of the Work as requested by Engineer to allow inspection.

The Contractor shall notify the Engineer at least twenty-four (24) hours prior to commencing any Work, or resuming Work after shut downs, except for normal resumption of Work following Saturdays, Sundays or holidays. The Contractor shall also provide on a daily basis notification by fax or email to the Owner's designated office of their crews and/or their subcontractor's crews daily work location prior to 7:00 a.m. **The Contractor shall also include on the daily notification of crew assigned to distribute Homeowner Notification Door Hangers. Contractor shall provide one (1) week's notice to the Owner prior to adding more than one (1) additional work crew to the project.**

The Contractor shall provide proper supervision, sufficient and competent labor, and equipment to accomplish the Work within the Contract Time.

The Contractor shall have on the Work site at all times a superintendent who speaks and understands English, is capable of reading and understanding the plans and specifications, effectively communicates with the work force in their native language, and experienced in the type of work being performed, who shall be authorized by Contractor to receive instructions from the Engineer. The superintendent shall have Contractor's authority to agree to and execute orders of the Engineer without delay, and to promptly supply such materials, equipment, tools, labor and incidentals as required.

Whenever the Contractor or the Contractor's superintendent is not present on a particular part of the Work where it may be desired to give direction, orders will be given by the Owner and shall be received and obeyed by the foreman or other representative who may have charge of the particular work in reference to which the orders are given, or the Owner may stop the work until the Contractor or the Contractor's superintendent arrives. This foreman or other representative must also speak and understand English, and be capable of reading and understanding the plans and specifications.

The Contractor shall maintain a telephone for the duration of the Contract, at the Contractor's expense, where the superintendent may be reached directly at all times during and outside of working hours.

The Contractor shall supply all employees and subcontractors working at the site with photo

identification cards. These cards shall be visible at all times while working at the site. The identification cards shall have at a minimum Contractors' name or subcontractors name, employee's name, and employee's photo. The Contractor's and subcontractor's vehicles used at the work site shall have the company name, telephone number, and physical address prominently displayed at all times while on the site. The Contractor shall provide the Owner with a list of all ID badge employees; this list shall be current at all times.

5-7 COORDINATION OF PLANS AND SPECIFICATIONS: This subsection is deleted and replaced by the following:

The Contractor will be furnished 5 sets of plans and specifications without charge. The plans will show such details as necessary to indicate the proposed work and intended result. Any additional working drawings, detail plans or shop drawings required for the work shall be supplied by and at the expense of the Contractor in accordance with subsection 5-8.

The plans, specifications, and other Contract Documents will govern the work to be done. Anything mentioned in the specifications and not shown on the plans, or shown on the plans and not mentioned in the specifications, shall be of like effect as though shown or mentioned in both.

Plans and specifications referred to in the Contract Documents shall be considered as being included in the document in which such reference is made. When a particular specification or standard is referred to, such reference shall be to the specification or standard, including officially adopted revisions and amendments thereto, which is in force at the time of advertising for bids.

In case of conflict, the order of precedence of the following documents in controlling the work shall be:

1. Permit from outside agencies required by law
2. Issued addendums
3. Special provisions
4. Plans
5. Supplemental specifications (only those which are bound to these documents)
6. Standard specifications
7. Standard plans

Calculated dimensions will govern over scaled dimensions.

Change orders and approved revisions to plans and specifications will take precedence over Contract Documents listed above. The Contractor shall take no advantage of any error or omission in the plans or Project specifications. If the Contractor discovers such an error or omission, he shall immediately notify the Engineer. The Engineer will then make such corrections and interpretations as deemed necessary to fulfill the intent of the plans and Project specifications.

5-8 PLANS AND SHOP DRAWINGS: This subsection is deleted and replaced by the following:

5-8 SHOP DRAWINGS, SAMPLES, AND OTHER SUBMITTALS: A maximum of three (3) days after the Notice to Proceed is issued, the Contractor shall submit to the Engineer for review the proposed Schedule of Submittals. The Schedule of Submittals, prepared and maintained by Contractor, shall include required submittals, the time requirements for Engineer's review of the submittals, and the performance of related construction activities. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

5-8.1 Shop Drawing and Submittal Requirements:

a. Before submitting a Shop Drawing or Sample, Contractor shall have:

1. reviewed and coordinated the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;

2. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

3. determined and verified the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

4. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

b. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that submittal, and that Contractor approves the submittal.

c. With each submittal, Contractor shall give Engineer specific written notice of any deviations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review and approval of each such deviation.

5-8.2 Submittal Procedure: Contractor shall provide all submittals, shop drawings, samples, etc. to Engineer for review and approval in accordance with the accepted Schedule of Submittals and requirements of this specification.

The Contractor shall transmit submittals, schedules, product data, shop drawings, requests for information (RFI), and requests for contract change (RFCC) using the Web Tools available on the DPW Program Web Site (i.e., Prolog™). When it is not feasible to make submittals electronically (as in the case of product samples), the conventional approach of using mail or hand delivery may be used. If Contractor submits hardcopy submittals of any kind, 4 copies are required.

Contractor shall upload files to Prolog in Portable Document Format (PDF) as generated by Adobe version 6.0 or higher. Scan documents or convert previously received electronic files from vendors into PDF format before uploading files to Prolog™.

a. Text-only content may be scanned using at least 1-bit line art or grayscale settings to help reduce file size.

b. Image content should be scanned in grayscale unless image is in color.

c. Resolution shall be 300 dpi or greater to allow for character recognition.

d. Perform Optical Character Recognition (OCR) capture on images so text can be searched, selected, and copied from generated PDF file.

e. Provide bookmarks for contents of Shop Drawing allowing navigation through Adobe PDF bookmark window.

f. Operation and Maintenance Manuals:

1. Each electronic manual shall be a single file.

2. Provide linked table of contents (reflecting hard copy manual) that allows users to navigate to each section and subsection of manual from table of contents.

3. Provide bookmarks for table of contents headings, subheadings, tables, and figures allowing navigation through Adobe PDF bookmark window. Nesting of bookmarks to be same as hardcopy table of contents.

4. Links shall be standard blue and underlined.

5. Text/font shall match hard copy manual.

When making submittals electronically, addressee for submittal shall always be Engineer. Owner's representatives will access the materials as necessary through Prolog™. Electronic submittal protocols are discussed in greater detail in the DPW Construction Management Plan available on the DPW Web Site. Key Contractor personnel will receive training from Owner on use of Prolog™ at or around time of Preconstruction Conference.

When electronic submittals are not possible, hard copy submissions in quadruplicate shall be made to Engineer with simultaneous submittal to Project Construction Manager. Correspondence that originates with subcontractors and suppliers shall be submitted through Contractor. Contractor shall review and approve submittals prior to submission.

5-8.3 Engineer's Review: Engineer will conduct a thorough review of Contractor's submittals and return review comments to Contractor within 30 days after receipt in Prolog™.

a. Review will be for general conformance, subject to requirements of the Contract Documents and does not relieve Contractor of the obligation and responsibility to coordinate and plan details of the Work.

b. Review, approval, or other appropriate action regarding Contractor's submissions will be only to check conformity with design concept and for compliance with the Contract Documents.

c. Review will not extend to means, methods, techniques, sequences or procedures of construction (except where a specific means, method, technique, sequence or procedure of construction is indicated in or required by Contract Documents) or to safety precautions or programs incident thereto.

d. Review and approval of a separate component item will not indicate approval of the assembly into which the item is functionally integrated.

e. Response to electronic submittals will be uploaded to Prolog™ and Contractor will be notified by e-mail following upload.

f. Owner reserves right to require written confirmation from Contractor that review comments placed on submittals with status "Make Corrections Noted" will actually be addressed and incorporated.

g. Engineer's review and approval of any Shop Drawing or submittal shall not relieve Contractor from responsibility for any deviation from the requirements of the Contract

Documents unless Contractor has complied with the requirements of 5-8.1(c) and Engineer has given written approval of each such deviation by specific written notation thereof incorporated in or accompanying the Shop Drawing or submittal. Engineer's review and approval of a Shop Drawing or submittal, or of a deviation from the requirements of the Contract Documents, shall not, under any circumstances, change the Contract Time or Contract Price, unless such changes are included in a Change Order.

h. Neither Engineer's receipt, review, acceptance or approval of a Shop Drawing, Sample, or other submittal shall result in such item becoming a Contract Document.

5-8.3 Resubmittal Procedures:

a. Contractor shall address and/or make corrections required by Engineer's comments and shall resubmit in accordance with subsection 5-8.2 for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

b. Resubmittals will be subject to same Engineer review time.

5-9 COOPERATION BY CONTRACTOR: Add the following at the end of this subsection:

The Contractor may be directed by the Engineer to discontinue work if conflicts exist with special events such as parades, sporting events, miscellaneous rallies, and large public meetings or with seasonal conditions, such as Christmas.

Add the following subsection at the end of Section 5 Control of Work:

5-15 FIELD RECORD DRAWINGS: The Contractor shall provide a set of Field Record Drawings for all sanitary sewer Work including both alignment and profile to the Engineer. Drawings should be developed from actual field readings. Raw data should be available for submission at any time upon request. Field Record Drawings having survey data shall be stamped by a Professional Land Surveyor registered in the State of Louisiana. All new fittings, valves, manholes, tie-ins or taps, etc. shall be located by GPS (+/- 1 meter accuracy) based on the La. State Plane Coordinate System (south) as shown on Contract Documents, and shall be provided on the Field Record Drawings. Coordinates shall be in the following format:

State Plane Coordinate System 1983
Zone 1702 – Louisiana South
NAD 83
US Survey Feet
Vertical: NAVD88

Contractor shall legibly mark Field Record Drawings in **red** (ink) to record actual changes made during construction, including, but not limited to:

Title Page:

a. Date of submittal of final field record drawings from Contractor.

Repair Schedule:

a. Edit repair begin and repair end footages on Repair Schedule to actual installation footages.

b. Add actual repair location street address and date in “ADDRESS” column in **blue** ink.

c. Edit pipe diameter, material, and total number of laterals as necessary.

d. Add comments about repair such as: DELETED – *reasoning why*? or EXTENDED REPAIR - *reasoning why*?.

e. Add additional repairs into blank space on repair schedule in **blue** ink. These maybe due to field added repairs, CDR repairs, repairs from CCTV work, or changes from conflict list. Any edits required to this list after it has been entered should be done in **red** ink. Contractor may request additional blank sheets from Engineer.

Plan Sheets:

a. Edit pipe diameters, lengths, repair begin/end footages, etc. as necessary.

b. Edit street names as necessary.

c. Add repair numbers to LEM's, CCTV work, additional repairs from CCTV or CDR's.

d. Highlight in yellow all repairs that were completed.

e. Location of external utility conflicts.

f. Sketch revised repair symbol (example: R/R changed to PR due to conflict, R/R changed to CIPP, CIPP changed to R/R, etc.).

g. Label repairs that are deleted as "DELETED" on the plan sheets.

h. Sketch any map edits (example: new manholes, lines routed differently from originally shown, etc.).

i. Changes made by field orders, Work Change Directive, Change Order, Requests for Information, and Engineer’s written interpretation and clarification using consistent symbols for each and showing appropriate document reference number.

SECTION 6 CONTROL OF MATERIALS

6-7 LIST OF MATERIALS AND EQUIPMENT: Add the following paragraph to this subsection:

Contractor shall submit within 30 days after signing Contract a list of vendors that will be given a sales and use tax exemption certificate. List of vendors shall be maintained and submitted with each monthly payment application as described in Section 10, Measurement and Payment.

6-8 STORAGE OF MATERIALS AND EQUIPMENT: Delete this subsection and replace with the following:

Even though this Project falls under tax exempt status, Contractor shall be responsible and bear risk of loss and damage for materials stored for incorporation into the Work purchased in the name of the City of Baton Rouge, Parish of East Baton Rouge using the sales and use tax exemption certificate.

Portions of the right-of-way may be used for storage and for placing the Contractor's plant and equipment only with prior approval of the Engineer. Materials and equipment shall be stored so as to insure preservation of their fitness for the work, and in a manner that leaves the material and equipment accessible to inspectors. Storage shall not interfere with the prosecution of the work or with public travel and convenience. Whether in public right-of-way or Contractor's own storage yard, Contractor shall store materials in a planned and orderly manner that does not endanger employee or public safety nor create a public nuisance or inconvenience.

Construction materials and equipment may not be stored or parked in streets, roads, or highways after unloading except where such street or road is provided with an acceptable detour approved by the Engineer. All such materials or equipment not installed or used in the construction shall be stored elsewhere by the Contractor at his or her expense.

Excavated or imported material, except that which is to be used as immediate backfill in the adjacent trench, may not be stored in public streets, roads, or highways unless otherwise authorized by the Engineer. After placing backfill, all excess excavated or imported material shall be removed from the site immediately after backfilling operations are completed at the site.

6-8.1 Contractor Storage Yards: Unless specified otherwise, the Contractor shall be responsible for providing and maintaining necessary material storage facilities, utilities, field offices, temporary roads, fences, security, etc. for prosecuting the Work. Property used for storage of the materials and equipment should be appropriately zoned. If the Contractor desires to use property that is not appropriately zoned for storage of materials and equipment, the Contractor must obtain permission to do so from DPW. DPW may grant the request after due consideration of the character of the surrounding property, availability of alternative locations, accessibility to adjacent roadways, and the potential nuisance that may be caused by storage on the proposed property. In granting such permission DPW may impose limits on the use of the property including, but not limited to, duration, hours of operation, access, and the nature of materials stored on the property.

a. General:

    1. Ensure material stacks, tiers, and piles are stable and stacked to aid safe handling and loading. Materials should be stored on pallets to discourage rodent infestation. Contractor shall store materials and equipment in accordance with manufacturer's recommendations and erect such temporary structures as required to protect them from damage.

    2. Immediately clean up spills and leaks that create such rodent habitat. Keep work and storage areas clean, orderly and in a sanitary condition.

    3. Keep fire hydrants and water control valves free from obstruction and available for use.

    4. Maintain original site drainage. Install and maintain culverts to allow water to flow beneath access roads.

b. Site security:

    1. Erect and maintain security fencing around perimeter of storage area. Fencing shall be either 6 foot wooden fence or 6 foot chain link with either privacy insert slats or windproofing material. Lockable gates shall be installed at all entrances to the site.

    2. Employ as needed a uniformed guard service to provide watchmen at site during non-working hours.

c. Cleaning:

1. Provide approved containers for collection and disposal of waste materials, debris and rubbish. At least at weekly intervals, dispose of such waste materials, debris and rubbish offsite.

2. At least weekly, brush sweep entry drive, roadways, and walkways. Wet down exterior surfaces prior to sweeping to prevent blowing of dust and debris.

3. Burning or burying of waste materials, rubbish, or other debris will not be permitted on or adjacent to site.

d. Temporary controls:

1. Conduct operations in a way as to cause a minimum of dust. Provide dust-preventative treatment or periodically water to prevent dust. Follow Dust Control BMP in accordance with Standard Plan No. 903-01.

2. Mitigate construction noise and comply with local noise control ordinance.

3. Provide, maintain, and operate temporary facilities to control erosion and sediment releases from the site. These facilities will be included in the Contractor's Storm Water Pollution Prevention Plan.

SECTION 7 LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC: Delete this Section in its entirety and replace with the following:

SECTION 7
LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC

7-1 LAWS TO BE OBSERVED: The Contractor shall keep informed of and comply with Federal and State Laws, local bylaws, ordinances and regulations, and orders and decrees of bodies or tribunals having jurisdiction or authority, which affect those employed on the work or the conduct of the work. The Contractor shall indemnify the City-Parish and its representatives against any claim arising from violation of any law, ordinance, regulation, order or decree by the Contractor or the Contractor's employees.

The contractor shall maintain records as necessary to provide the City-Parish with documentation of minority participation of DOTD certified DBE subcontractors and suppliers. The contractor shall submit monthly reports as part of the monthly partial payment request on form CP DBE-1 to the engineer to document actual payments to DBE's for the previous months reporting period.

The contractor is responsible for the coordination with local law enforcement for the escort of delivery trucks within the limits of the Parish of East Baton Rouge for the delivery of oversize loads (example: precast concrete piles or large pump station wet wells) to the construction site. The contractor shall contact the local law enforcement captain a minimum of forty-eight (48) hours in advance to obtain law enforcement for escorts for the delivery of materials. Fees for police escorts will be at no direct pay.

7-1.1 Taxes, Permits, Certificates and Licenses: City-Parish is exempt from payment of sales and use taxes of the State of Louisiana and of the City of Baton Rouge, Parish of East Baton Rouge, and associated local taxing jurisdictions on materials incorporated in the Work. Contractor and their Subcontractors may be designated as Purchasing Agents for the City-Parish. Upon request, City-Parish will issue the required certificates of tax exemption to Contractor and their

Subcontractors. Exemption does not apply to construction tools or to supplies or materials not incorporated into the Work. Contractor's and their Subcontractors' records involving tax exempt purchases shall be subject to audit by City-Parish and its retained auditors.

LDR Form R-1020, "Designation of Construction Contractor as Agent of a Government Entity and Exemption Certificate", is included in these Contract Documents following Certificate Regarding Debarment and may also be found at http://www.rev.state.la.us/forms/taxforms/1020(11/04)F.pdf. See Special Provision 10-9 for additional requirements.

Except for permits relating to railroad and highway crossings, the Contractor shall procure all necessary permits, licenses and certificates, pay all charges and fees, and give all notices incident to lawful prosecution of the work.

7-1.2 Patented Devices, Materials, and Processes: If the Contractor is required or desires to use any design, device, material or process covered by patent or copyright, the Contractor shall provide for such use by legal agreement with the patentee or owner, and a copy of this agreement shall be filed with the engineer. The Contractor and the surety shall indemnify the City-Parish from all suits, costs, penalties or claims for infringement due to use of such patented design, device, material or process, or any trademark or copyright in connection with the work.

7-2 INSURANCE: This subsection is deleted and replaced by the following:

Contractor shall have and maintain, until final acceptance of the Work by the Owner and Council, the minimum insurance described herein with an insurance company authorized to do business in the State of Louisiana that has an industry rating of at least A-, Class VI, according to Best's Key Rating Guide. Contractor shall deliver to Owner certificates of insurance showing such insurance is in effect prior to execution of the Contract, which certificates shall incorporate a provision that no cancellation or change in such insurance shall be effected without at least thirty (30) days prior written notice being given to the Owner and Engineer. These requirements shall not be construed to limit any obligations of indemnity and/or defense of the Contractor or Surety, but constitutes minimum insurance requirements, which must be provided and maintained.

A. Standard Workmen's Compensation - Full statutory liability under Louisiana law with Employer's Liability Coverage.

B. Commercial General Liability coverage (ISO form CG 00 01) when the Contract amount is as follows:

1. General Aggregate:

CONTRACT AMOUNT	MINIMUM LIMITS OF INSURANCE
Less than 1,000,000	$1,000,000
$1,000,000 to $5,000,000	$2,000,000
$5,000,000 to $10,000,000	$3,000,000
Greater than $10,000,000	$4,000,000

2. Products-Completed Operations Aggregate:

CONTRACT AMOUNT	MINIMUM LIMITS OF INSURANCE
Less than 1,000,000	$1,000,000
$1,000,000 to $5,000,000	$2,000,000
$5,000,000 to $10,000,000	$3,000,000
Greater than $10,000,000	$4,000,000

3. Personal and Advertising Injury:

CONTRACT AMOUNT	MINIMUM LIMITS OF INSURANCE
Less than $5,000,000	$1,000,000
Greater than $5,000,000	$2,000,000

4. Each Occurrence:

CONTRACT AMOUNT	MINIMUM LIMITS OF INSURANCE
Less than $5,000,000	$1,000,000
Greater than $5,000,000	$2,000,000

The above Commercial General Liability coverage shall not be narrowed by endorsement without the express written agreement of Owner.

C. Business Auto Policy - Combined single limit $1,000,000

D. Umbrella Liability: Lower primary limits will be accepted if Umbrella Coverage is provided with limits of at least $1,000,000 in excess of primary coverage shown on the certificate.

E. **If Contract includes Sanitary Sewer Chemical Root Control as part of the scope, the Contractor shall provide and maintain Pollution Liability Insurance.** The coverage shall protect the Contractor, the Owner, and Owner's agents from claims for damages for bodily or personal injury, sickness or disease, including death, and from claims for damages to property and/or the environment, which may arise directly out of the use of chemicals and/or pollution. The minimum limit of such insurance shall be $5,000,000 total loss.

F. The City of Baton Rouge, Parish of East Baton Rouge and the Department of Public Works shall be named on all liability policies described above as "additional insured" as respects liability arising out of the Project; products and completed operations of the Contractor, as well as premises owned, occupied or used by the Contractor. The additional insured coverage shall contain no special limitations on the scope of protection afforded to any additional insured. It is understood that the business auto policy under "Who is an Insured" automatically provides liability coverage in favor of the Owner. Any failure of Contractor to comply with any reporting provision of any policy shall not affect coverage provided to an additional insured.

G. Waiver of subrogation in favor of the City of Baton Rouge and Parish of East Baton Rouge, is required on Worker's Compensation insurance.

H. The certificate holder shall be listed as follows:

City of Baton Rouge and Parish of East Baton Rouge
Attn: Purchasing Division
Post Office Box 1471
Baton Rouge, Louisiana 70821

I. The insurance to be provided by Contractor shall not include any provision, exclusion, or endorsement precluding coverage for claims between insureds and/or additional insureds.

7-2.1 Incomplete Construction: The City-Parish assumes no risk for loss by fire or other casualty to a portion of the project or equipment thereof, whether complete, in process of construction or installation, or stored on the premises, during the life of contract for any portion of the construction except that the Contractor shall not be responsible for loss by fire or other casualty to such portions of the work which the City-Parish is using unless damage occurs as a result of

negligence by the Contractor or as a result of work not completed by the Contractor.

Making of partial payments to the Contractor shall not be construed as creation of an insurable interest by or for the City-Parish or as relieving the Contractors or their sureties of responsibility for loss from all risks (fire, windstorm, explosion, vandalism, flood, etc.) occurring prior to final acceptance of the project.

7-3 FEDERAL AID PROVISIONS: When the United States Government pays a portion of the cost of a project, Federal laws and rules and regulations made pursuant to such laws must be observed by the contractor, and the work shall be subject to inspection of the appropriate Federal agency. Such inspection shall not make the Federal Government a party to this contract and will not interfere with the rights of either party hereunder. Any provisions in the contract documents, including these specifications, which are in conflict with the General Conditions required by the U.S. Government shall be void.

7-4 PUBLIC CONVENIENCE AND SAFETY: Except as otherwise provided herein, the Contractor shall provide for and maintain local traffic at all times. Convenience of the public and protection of persons and property shall be adequately provided for by the Contractor. All work within public streets and/or roadway rights-of-way shall be done in an expeditious manner and cause as little inconvenience to the public as possible.

7-4.1 Use of Premises: The Contractor shall confine construction activities to the project limits; which consist of right-of-way, servitudes and property owned by the City-Parish. With prior approval of the Engineer, adjacent street right-of-way may also be utilized for day-to-day operations. Unless approved by the Engineer or otherwise dictated by an approved lane closure permit, no storage of materials and equipment will be allowed to remain within the right-of-way or servitudes for a duration exceeding 72 consecutive non-working hours. If additional space beyond the construction limits is necessary for staging, the Contractor shall, at his own cost and initiative, make special arrangement.

Each day, after the completion of construction operations, unless otherwise approved by the Engineer, the project limits shall be secured and made accessible to the public by the Contractor. All excess materials and equipment not protected by approved traffic control devices shall be relocated to a staging area or demobilized. Trenches shall be backfilled or barricaded per subsection 7-6. If Contractor will not be continuing work operations within 72 hours, trenches that cannot be backfilled and must remain open shall be protected with steel plates with approval of the Engineer. The Contractor shall not allow any refuse, excavated material, surplus concrete or mortar, or any associated washings, to be disposed upon the paved streets, rights-of-way, into manholes or storm drains.

Materials stored about the work shall be so placed and the work shall be so conducted as to cause the least obstruction to traffic. The Contractor shall make provisions by bridges or otherwise at cross streets, roads, sidewalks and driveways for passage of pedestrians and vehicles. Where bridging is impractical or unnecessary, the Contractor may make arrangements for diversion of traffic and shall, at the Contractor's own expense, provide all material and perform all work necessary for construction and maintenance of roadways and bridges for diversion of traffic.

Sidewalks must not be obstructed. Materials excavated, construction materials, or plant used in the construction shall be placed so as not to endanger the work or prevent access to fire hydrants, water valves, gas valves, manholes for telephone, telegraph, signal or electric conduits, sanitary or storm sewers, and fire alarm or police call boxes.

Where the Contractor is required to construct temporary bridges or make other arrangements for crossing over ditches or streams, the Contractor's responsibility for accidents shall include the roadway approaches as well as the structures of such crossings.

7-4.2 Spill and Dust Control: At all times during construction, including weekends and holidays, and throughout all phases of construction, including work suspensions and until final acceptance of the project, the Contractor shall keep the work site clean and free from rubbish, debris, and prevent the formation of an airborne dust nuisance. The Contractor shall abate dust nuisance by cleaning, sweeping, and sprinkling with water, those excavated areas of dirt or other materials which are prone to causing dust, within both the project site and the storage or staging area. If required or directed by the Engineer, the Contractor shall provide an approved water truck of large capacity with spraying capability. When the amount of traffic and condition of a street or road are such that dust on street or road surfaces constitutes a safety hazard or gross public inconvenience, the contractor shall take proper measures for dust control. The Contractor shall be required to apply water for dust control immediately during construction efforts and within one (1) hour after notification by the Engineer that an airborne nuisance exists.

All hauling trucks or other construction vehicles leaving the work site shall be cleaned of mud or dirt clinging to exterior body surfaces or wheel rims before traveling on streets outside of work site. Spillage resulting from construction vehicle travel or hauling operations along or across any public traveled way shall be removed immediately at the Contractor's expense. Streets shall be cleaned daily by street sweeping, rather than flushing, so as to prevent mud and debris from entering the storm drain system. Cleaning shall be done either manually using brooms and shovels or by use of vacuum sweeper that does not generate dust.

7-4.3 Noise Control: The Contractor shall maintain and operate equipment to minimize noise. Engines shall be equipped with properly functioning mufflers. The Contractor shall limit activity near noise sensitive areas, such as churches, hospitals and schools, so normal activities are not unduly disrupted. The Contractor shall comply with local noise control ordinance.

7-4.4 Traffic Obstructions, Delays and Inconveniences: All public traffic shall be permitted to pass through the Work and the Contractor shall conduct operations that offer the least possible obstruction, delay, and inconvenience to the public, except where approved by the Engineer or in an emergency situation where access may endanger the public. No obstruction of Emergency Vehicles is allowed. The Contractor shall have no amount of work under construction other than what can properly be prosecuted with due regard to the rights and convenience of the public.

7-4.5 Access to Driveways, Houses and Buildings: Safe access shall be maintained at all times for business establishments during construction. Safe and passable pedestrian, bicycle, and vehicular access shall be provided and maintained to fire hydrants, homes, commercial and industrial establishments, churches, schools, parking lots, service stations, motels, fire and police stations, hospitals, and establishments of similar nature. Access to these facilities shall be continuous and unobstructed unless otherwise approved by the Engineer.

7-4.6 Work on Private Property: The Contractor must obtain written permission from any privately owned property owner prior to beginning any work, storing materials or otherwise conducting any operations on said property. A copy of the written approval from the property owner must be submitted to the Engineer before any operations occur on the property.

7-4.7 Hazardous Conditions Created: Whenever the Contractor's operations create a condition hazardous to pedestrians, bicyclists, or the traveling public, the Contractor shall at the Contractor's own expense, furnish, erect and maintain any fences, covers, temporary traffic barriers, barricades, lights, signs and other devices necessary or as directed by the Owner to prevent accidents, damage, or injury to the public or property.

7-4.8 Use of Explosives: The use of explosives will be permitted only when authorized in writing by the Engineer.

7-4.9 Truck Bed Covers: Trucks or other conveyances hauling loose materials on public streets, highways or detours shall be covered to prevent such materials from dropping, sifting, leaking or

otherwise escaping there from. Covering for trucks or other conveyances shall be securely fastened so as to prevent said covering from becoming loose, detached or in any manner a hazard to traffic.

7-5 TRAFFIC CONTROL AND SAFETY: The Contractor shall provide for safe movement of all vehicular, bicycle, and pedestrian traffic through and around the construction operations with as little inconvenience and delay as possible. All Temporary Traffic Control (TTC) Devices shall be installed in accordance with Section 905, the City Parish Temporary Traffic Control Standard Plans, the latest edition of the MUTCD, and the requirements of the National Cooperative Highway Research Program (NCHRP) 350.

7-5.1 Responsibility for Safety: It is the Contractor's sole responsibility to provide for public safety and traffic control. The Owner may review the Contractor's operations and inform the Contractor if an unsafe or hazardous condition is observed. The Contractor may be directed verbally or by written communication to abate the hazard. The Contractor must comply with all directives for hazard abatement immediately and within the timeframe imposed by the Owner. Such direction by the Owner shall not relieve the Contractor from responsibility for public safety or abrogate the obligation to furnish and pay for these devices and measures.

7-5.2 Maintenance of Traffic: Traffic shall be maintained to the extent practical during construction and residents or businesses must not be denied access to their property except when the nature of the work requires closing of the street. The street shall be left open to a maximum extent for collection of garbage, etc. The Contractor shall render the road passable to property owners, postal services and city services when construction operations interfere with use of the street. The Contractor shall do everything practical to provide access to abutting properties for essential services. Cutting of streets for cross pipe, culverts, etc., shall be done in such manner as to avoid blockage of access to abutting property except for compelling reasons.

The Contractor shall provide for and maintain both through and local traffic at all times and shall conduct his operations in such manner as to cause the least possible interference with traffic at junctions with roads, streets and driveways.

Before beginning any operation which will affect any traffic control device (such as loop detectors), the Contractor shall notify TED (225) 389-3246, a minimum of two (2) business days before beginning operations.

7-5.3 Closing of Travel Way(s): A minimum of two (2) days before closing a street or lane(s) to traffic or at least two (2) business days before beginning work that will block traffic, the Contractor shall obtain approval in writing from TED, with copies of such notifications being sent to the Engineer. Signs advising the public of the pending closure shall be provided seven (7) days prior to the street closure. Upon re-opening the street to traffic, the above mentioned officials should be notified to that effect in writing. The Contractor shall notify residents and business owners at least 2 days prior to commencing work which will block access to their property. Access must be restored as soon as possible.

7-5.4 Barricades, Signs, Lights and Watchmen: Where work is performed on or adjacent to a street, alley, school yard or other public place, the Contractor shall furnish and erect barricades, fences, lights and danger signals, shall provide watchmen, and shall take other precautionary measures as necessary for protection of persons or property and the Work. 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. Where a street or highway is closed to traffic, the Contractor shall provide and maintain warning and detour signs at all closures, intersections, and along detours directing traffic around closed portions of the street, highway, or working area. Signs and lights mounted to a barricade must meet National Cooperative Highway Research Program (NCHRP) 350 requirements.

All barricades and obstructions shall be illuminated at night and all lights kept burning from sunset

to sunrise. Barricades shall be equipped with reflector buttons, discs, scotchlite or other light reflecting material satisfactory to the Engineer.

The installation of barricades, signs, lights and other warning devices shall be in accordance with the MUTCD, latest DOTD adopted edition. The Contractor may, as he deems necessary, install additional signs to enhance safety. However, all signs will meet the standards given in the MUTCD.

The Contractor will be responsible for damage to the Work due to failure of barricades, signs, lights and watchmen to protect it. When evidence is found of such damage, the Engineer may order the damaged portion removed and replaced by the Contractor. The Contractor's responsibility for maintenance of barricades, signs and lights, and for providing watchmen shall not cease until the Work has been completed and accepted.

7-5.5 Entering and Leaving Construction Zones: Construction equipment shall enter and leave the roadway by moving in the direction of public traffic. All movements of workmen and construction equipment on or across lanes open to public traffic shall be performed in a safe manner that will not endanger the workmen or the public. When leaving a work area and entering a roadway carrying public traffic, the Contractor's equipment operator shall yield to public traffic.

7-5.6 Pedestrian and Bicycle Traffic: The Contractor shall not block movement of pedestrian or bicycle traffic. The Contractor shall provide for pedestrian and bicycle traffic by phasing construction operations and/or by providing alternative pedestrian and bicyclist access through or adjacent to construction areas. Proper advance notice signage with reasonable detours shall be installed and maintained through all phases of construction. Access to pedestrians and bicycle devices at traffic signals shall be maintained at all times. When crosswalk or other pedestrian facilities are temporarily closed or relocated, temporary alternate circulation paths shall be provided by the Contractor to achieve the maximum accessibility feasible under existing conditions. All components of the temporary alternate circulation path must be ADA compliant and conform to requirements of the MUTCD.

7-6 BARRICADING OPEN EXCAVATION AND TRENCHES: Any excavation or trench permitted by the Engineer to be left open shall be barricaded by the Contractor with Type I, Type II, or Type III barricades with retro-reflective tape and warning lights. Approved construction signs stating "OPEN TRENCH" shall be posted by the Contractor. Any excavation or trench in a roadway or within eight (8) feet of the traveled way not permitted by the Engineer to remain open shall be backfilled or plated and opened to traffic use at the end of the work shift, unless otherwise dictated by an approved lane closure permit. Vehicular travel over backfilled but unsurfaced excavations will not be allowed. The Contractor shall provide a temporary surface suitable for driving in accordance with Section 503.

7-7 WORK IN, AND USE OF STREETS, SERVITUDES AND RIGHTS-OF-WAY: For performance of the contract, the Contractor will be permitted to occupy such portions of streets, alleys, or public places or other rights-of-way or servitudes as provided for by local ordinances, as shown on the plans, or as permitted by the Engineer.

7-7.1 Work in State Highway Rights-of-Way: Where State Highway rights-of-way are encroached upon or intersected by the work, written permission will be obtained by the Owner from the DOTD with regard to methods of construction, materials and safeguards, as shown on the project plans.

7-7.2 Work In Servitude Over Private Property: Where the work passes over or through private property the City-Parish will provide such right-of-way by servitude agreements. Servitude agreements will provide for temporary use of adjacent property for construction purposes. The Contractor shall notify the owner of each property over which the work will pass at least 7 days in advance of any work on said property and arrange for access as provided for in Section 9-4. In

addition, on the day the work is to be performed, prior to commencing the work, the Contractor shall knock on the doors of all structures potentially impacted by the work and personally notify the occupants. Where fences must be removed for construction purposes or access they shall be re-constructed or replaced. The Contractor shall provide adequate temporary fences and gates if necessary to contain or restrict domesticated and farm animals within their proper areas during the work and shall provide access where and when required. The Contractor shall not remove or cut trees, shrubs or landscaping (annual, perennial, or ornamental plantings) without proper authority.

7-7.3 Preservation and Restoration of Property: The Contractor shall protect public and private property and shall take reasonable precaution to avoid damage to such property.

Public or private improvements or facilities within the right-of-way or servitude not designated for removal but visibly evident or correctly shown on the plans which are damaged due to the Contractor's operations shall be restored by the Contractor at the Contractor's sole expense to a condition equal to that existing before such damage, by repairing or rebuilding, or if this is not feasible, a reasonable settlement shall be made with the owner of the damaged property.

In the event the Contractor utilizes property outside the limits of construction, right-of-way or servitudes identified in the Contract Documents, the Contractor agrees to fully indemnify, defend and hold Owner harmless from any and all claims of whatever nature or kind, arising under any theory of law, and to pay for or reimburse any and all expenses, costs and/or damages (including but not limited to attorney fees) incurred by or assessed against Owner, which arise from or are connected with the Contractor’s use or operations on such property.

Except for emergency projects, the Contractor shall give at least 7 days notice, as provided for in Section 9-4, to occupants of buildings on property adjacent to the work to permit occupants to salvage or relocate plants, trees, shrubs, landscaping (annual, perennial, or ornamental plantings), fences, sprinkler systems, signs or other improvements in the rights-of-way or servitudes which are designated for removal or which might be damaged by the Contractor's operation. If occupant or property owner refuse to salvage or relocate any of these facilities or improvements, Contractor shall immediately notify Engineer in writing and allow time for coordination with the property owner. If requested by the occupant or property owner, the Contractor will provide additional reasonable time for salvaging or relocating facilities or improvements within the rights-of-way or servitudes where work is required.

The Contractor shall conduct operations so as to minimize damage to planted areas within the rights-of-way or servitudes. The Contractor shall not trespass on private property and shall take precautions to protect public and private property from damage. The Contractor shall restore any public or private property damaged due to the Contractor's operations to a condition equal to that existing before damage or if this is not feasible, a reasonable settlement shall be made with the owner of the damaged property. If the Contractor fails to do so, or refuses to do so upon notice, the Owner may cause such restoration and deduct costs from payments to the Contractor.

Construction operation may occasionally break limbs, roots, or otherwise damage trees or bushes which overhang or extend into the construction area. When such damage occurs, the Contractor shall neatly cut off and remove the damaged portion. If the damage is extensive or involves large limbs, the Contractor shall, when so directed by the Engineer, contact the Landscape and Forestry Division and follow their instructions.

7-7.4 Right-of-Way: The available servitudes and rights-of-way for the construction of this improvement are those shown on the plans. Additional areas that may be required shall be obtained by the Contractor.

Unless otherwise shown on the plans or directed by the Project Engineer any improvements located within the construction limits may be temporarily removed for the execution of the work. Upon

completion of the work, all items removed shall be reinstalled, and/or relocated, or restored to a condition equal to the condition that existed before the obstruction was removed.

WARNING: The Contractor may not store materials or equipment within the drip line of trees nor may he park equipment within the roadway overnight. Storage space within existing street right-of-way is extremely limited and the Contractor should arrange for adequate storage areas outside the right-of-way, if necessary.

7-7.5 Access for Construction: The hauling of materials and/or equipment shall comply with all legal load and height restrictions, unless otherwise permitted in writing by the Engineer. In addition, the Contractor shall be responsible for any damage done by his moving of materials or equipment (including his subcontractors and/or suppliers) on any public or private roads beyond the project limits, and roads damaged shall be repaired to the satisfaction of the Engineer before final acceptance will be made.

7-8 WORK ON RAILWAY PROPERTY: Where the work encroaches upon the right-of-way of a railway, the Contractor shall observe regulations and instructions of the railway company as to methods of doing the work, or precautions for safety of property and the public. All negotiations with the railway company, except for easement and permit, shall be made by the Contractor. The railway company shall be notified by the Contractor at least five (5) days prior to beginning work on the railroad right-of-way.

A. Railroad provided flagman will be required whenever work is taking place near railroad. Flagman fees are to be paid by the Contractor. The Contractor will be reimbursed for the actual cost of this flagman fee (no markup) under the Railroad Flagman allowance. Actual flagman fee invoice will be required for reimbursement. Total cost may not exceed available contract allowance without prior City/Parish approval. Anticipated flagman fees are as follows:

Illinois Central – Canadian National Railroad: Flagman fees are $700/day.

Kansas City Southern Railroad: Flagman fees are $1000/day
Construction Observation fees are $1500/day
Mobilization fees are $2000/project

B. Contractor shall submit all temporary and permanent shoring calculations and details to railroad for approval prior to any work taking place near railroads. Calculations and details shall be prepared by a Professional Engineer licensed in the State of Louisiana. Shoring calculations and details shall be submitted no later than 30 days after Notice to Proceed has been issued.

The provisions given elsewhere herein, which require the Contractor to protect property against damage, and which place upon the Contractor all responsibility for damage to property, injury to persons, and loss, expense, inconvenience and delay to the owners of property and others, shall apply in connection with railway property. In the protection of railroads, however, the Contractor shall exercise particular care to avoid damage which might result in train wrecks or delays in train service. In the performance of work in close proximity to railroad tracks, the Contractor shall consult with railroad officials in regard to methods of conducting the work, and shall use in the performance of the work methods which are satisfactory to said officials, and the Contractor shall at no direct pay provide such trackwalkers and flagmen as officials deem necessary for protection of railroad property and train service.

The Contractor shall assume the risk of, defend and indemnify the railway company, its officers, directors, employees, agents, successors and assigns against claims, demands, losses, damages and liabilities which arise in connection with the construction; provided, however that no such

defense of indemnity shall be owned with respect to any injury or damage due to the willful misconduct of the railway company, its officers, agents or employees.

In addition to the insurance requirements listed in Section 7.2, before commencing any work under this contract adjacent to or on the premises of the railroad companies, the Contractor shall procure and maintain in force, so long as Work shall continue upon such premises, comprehensive general and automobile liability insurance with contractual liability endorsement and products and completed operation hazards included, which shall provide the following kinds and amounts of insurance:

Illinois Central – Canadian National

A. Contractor is to have Workmen's Compensation - Full statutory liability under Louisiana law with Employer's Liability Coverage.

B. Contractor is to have Auto Liability to $1,000,000.

C. Contractor is to have an occurrence from Railroad Protective Liability Insurance Policy of not less than $5,000,000 (per occurrence) with a $10,000,000 aggregate.

D. Policy must name Illinois Central – Canadian National and Owner as an additional insured.

Kansas City Southern Railroad

A. Contractor is to have Workmen's Compensation - Full statutory liability under Louisiana law with Employer's Liability Coverage.

B. Contractor is to have Auto Liability to $1,000,000.

C. Contractor is to have a Comprehensive General and Contractual Liability of not less than $2,000,000 (per occurrence) with a $4,000,000 aggregate.

D. Contractor is to have an occurrence from Railroad Protective Liability Insurance Policy of not less than $2,000,000 (per occurrence) with a $6,000,000 aggregate.

E. Policy must name Kansas City Southern Railway Company and Owner as an additional insured.

Certificates of insurance shall be provided to the railway company and the Engineer evidencing such insurance coverage. The insurance policies shall provide that the insurance shall not be canceled or materially changed unless fifteen (15) working days notice is given to the railway company. No direct payment will be made for providing the required insurance coverage's by the Contractor.

7-9 PREVENTION OF SOIL EROSION AND WATER POLLUTION: The Environmental Protection Agency's (EPA) National Pollutant Discharge Elimination System (NPDES) program requires discharges from construction sites be managed to prevent pollutants from entering waters of the United States in accordance with the Clean Water Act (33 U.S.C. §1342 (Sections 402(p) and 405 of Public Law 100-4). Authority to issue stormwater discharge permits for construction activities in the state of Louisiana has been delegated to the Louisiana Department of Environmental Quality (LADEQ) by EPA. Currently discharges are regulated through two General Permits: LAR100000 for construction activities that disturb greater than 5 acres and LAR200000 for construction activities that disturb between 1 and 5 acres. The contractor, by signing the contract,

certifies under penalty of law that he understands and will abide by the terms and conditions of the appropriate General Permit.

The Contractor has the day-to-day operational control over the construction activities which occur at the site. Therefore under the General Permit provisions, the Contractor is required to develop a SWPPP (Storm Water Pollution Prevention Plan) for the construction activities associated with the project. Additionally for construction activities that will disturb more than 5 acres, the Contractor is required to file a Notice of Intent (NOI) for the project with LADEQ, and must maintain a copy of both the contractor's NOI and SWPPP at the jobsite. Contractor must submit copies of their SWPPP and NOI to the City-Parish Department of Public Works for informational purposes prior to initiation of construction activities at the site. The contractor shall complete and submit a Notice of Termination (NOT) as operator to the LADEQ after final stabilization of the site, in accordance with the terms of the permit.

The Contractor shall protect the Project and adjoining properties from soil erosion and siltation by effective and continuous erosion control methods. Areas of soil exposed by construction operations shall be kept to a minimum. The SWPPP shall include Section 903 of the Standard Specifications along with the applicable supplemental specifications and special provisions, Standard Plan 903-01 "Storm Water Pollution Prevention Plan Best Management Practices", and Standard Plan 903-02 "Temporary Erosion Control Installation Details".

7-10 RESPONSIBILITY FOR DAMAGE CLAIMS: The contractor shall indemnify the City-Parish, its officers and employees from all suits, actions or claims brought because of injuries or damage sustained by any person or property due to negligent operations of the contractor; due to negligence in safeguarding the work; or use of unacceptable materials in constructing the work; or any negligent act, omission or misconduct of the contractor; or claims or amount recovered from infringements of patent, trademark or copyright; or from claims or amounts arising or recovered under the Workmen's Compensation Act or other law, ordinance, order or decree**.**

7-10.1 Contractor's Responsibility: Until final acceptance of the project by the Council, the contractor shall have the charge and care thereof and shall take every precaution against damage to any part thereof. The contractor shall rebuild, repair, restore or make good all damages to the work before final acceptance and shall bear the expense thereof.

7-10.2 No Waiver of Legal Rights: Upon completion of the work, the City-Parish will make final inspection and notify the contractor of acceptance. Such final acceptance shall not prevent the City-Parish from correcting any measurement, estimate or certificate made before or after completion of the work, nor shall the City-Parish be prevented from recovering from the contractor or surety, or both, such overpayment it may sustain by failure of the contractor to fulfill obligations under the contract. A waiver by the City-Parish of any breach of any part of the contract shall not be a waiver of any other breach.

The contractor shall be liable to the City-Parish for latent defects, fraud or such mistakes as amount to fraud, or as regards the City-Parish's rights under any warranty or guaranty.

FORM CP DBE-1
CONTRACTOR'S MONTHLY DBE PARTICIPATION

CITY PARISH PROJECT: _____ Date: _____

CITY PARISH PROJECT NO. _____
PAYROLL PERIOD: _____
PARTIAL PAYMENT No. _____

The contractor shall list below the actual DBE participation by DOTD certified or City Parish approved subcontractors and/or suppliers utilized over the identified payroll period. (Utilize additional pages as required)

This form shall be submitted to the City-Parish Field Engineering Division with the Contractors monthly partial payment request.

NAME OF CERTIFIED or APPROVED DBE SUBCONTRACTOR OR SUPPLIER	Items of Work This Estimate	Amount Paid This Month	Total Paid To Date
	Total of Actual DBE Participation To Date		

The City of Baton Rouge and Parish of East Baton Rouge is an Equal Opportunity Employer. While no specific goal for this contract has been established, the Contractor is encouraged to utilize minority participation in this contract to the extent possible

To assist the City-Parish in our efforts to track the minority participation on our construction projects the Contractor shall complete this form with their monthly partial payment request

revised 3/6/2012

SECTION 8 UTILITIES

8-4.3 Utilities To Be Adjusted: This subsection is deleted and replaced by the following:

The Contractor shall coordinate with each utility owner to have utilities that are in conflict with the Work relocated. Coordination activities shall include as a minimum communication (verbal and written) with all utilities with facilities potentially in conflict with the Work, meeting with the utility owners on site of conflicts, and working cooperatively with those utilities to schedule any required relocation work by the utilities or their contractors. The Contractor shall provide schedule updates of any change to the schedule of Work to all utilities affected every two weeks. Copies of all communications between the Contractor or subcontractors and the utilities shall be provided to the Engineer is requested.

Owners of utility facilities which require relocation, removal or adjustment shall, if possible, perform this work prior to commencement of the Contractor's work. Where utility work must be done in conjunction with the contractor's work or the work of other utilities (such as sewer rehabilitation work), arrangements for when, how and where the operation is to proceed shall be worked out among the parties concerned.

In this case, the Contractor shall notify public utility companies in writing at least 48 hours (excluding Saturdays, Sundays, and legal holidays) before excavating near their utilities. If a utility that is located outside of a public right-of-way must be relocated in order to perform the work the Contractor shall coordinate with the utility and pay the utility to perform the relocation work. Utility invoice shall be reviewed and approved prior to authorization by the Owner to proceed with the Work. The Contractor will be reimbursed for the actual cost of this relocation plus ten percent (10%) markup. Utility invoice paid receipt or canceled check will be required from Contractor for reimbursement.

In the case of traffic signal utilities, the Contractor shall notify the DPW Traffic Engineer at 389-3246 when traffic signal utilities are encountered. Removal and replacement or relocation of such utilities shall be according to their applicable specifications and direction. Contractor will be reimbursed for the actual cost of replacing or relocating traffic signal utilities such as traffic counting loops, conduit, or fiber optic lines under the utility relocation allowance. Contractor will be required to provide detailed documentation for all costs associated with this Work, which shall be reviewed and approved prior to authorization by the Owner to proceed with the Work. Payment of the allowance for this item will be on the basis of documented and approved expenses plus ten percent (10%).

Total relocation cost may not exceed available contract allowance without prior City/Parish approval.

SECTION 9 PROSECUTION AND PROGRESS OF WORK

9-1 SUBLETTING OF CONTRACT: This subsection is deleted and replaced by the following:

With written permission of the Director, the Contractor may sublet all items of work not designated in the Contract as "Specialty Items" and not more than 50% of the Contract amount. Items designated as specialty items may be subcontracted without written permission of the Director. The Contractor will not be allowed to sublet more that 50% of the material cost. No subcontractor shall sublet any portion of the authorized work without written permission of the Contractor and the Director.

No subcontract will relieve the Contractor of his responsibility under the Contract and Bonds. The Contractor will be as solely responsible to the Owner for any acts or omissions of all subcontractors and all persons employed by any subcontractor. All transactions of the Engineer will be with the Contractor. Subcontractors will be considered only in the capacity of employees or workmen and shall be subject to the same requirements as to character and competency.

To the fullest extent permitted by law, Contractor shall indemnify, defend and hold harmless Owner from any claim of damage, cost expense or amount owed under any lien or claim of privilege, including, but not limited to, attorney fees, involving Contractor's subcontractors or suppliers.

Contractor shall submit list of proposed Subcontractors, including their address and area of assigned work, to Owner prior to Contract execution.

9-2 NOTICE TO PROCEED: This sub-section of the Standard Specifications is amended to include the following:

The Director shall issue to the Contractor a Notice to Proceed with the project or work order not later than 30 calendar days following the date of execution of the contract by both parties, whichever execution date is later. However, the City-Parish and the Contractor, upon mutual written consent of both parties, may agree to extend the deadline to issue the Notice to Proceed.

WORK ORDER TIME LIMIT:

The Contractor shall perform work under this Contract on the dates and at the times specified by written Work Order by the Environmental Services Director or his representative. Work Orders will be issued from time to time during the term of this Contract. A typical Work Order shall consist of approximately 10,000 linear feet of Cured-In-Place Pipe and 125 each of Lateral Connection Sealing and Repair Product (12-24" Top Hat) with duration of 130 calendar days. Approximately three (3) Work Orders will be issued per year. The acceptance of more than two concurrent Work Orders at a time shall be at the discretion of the Contractor. Work shall be complete in all details and ready for final acceptance within the time limits specified in each Work Order. A request by the Contractor for an extension of time will be considered only if, in support of the request, the Contractor shall allege delay in the performance of the Work by either or both of the following causes:

(a) An act of the City-Parish government;
(b) "Fortuitous events" or "events beyond control" as defined in Louisiana jurisprudence.

9-2.1 Preconstruction Conference: Before any Work at the site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules, procedures for handling Shop Drawings, Samples, and other submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.

At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

9-4 PROSECUTION OF WORK: Add the following at the end of this subsection:

The Contractor shall have issued at least 7 days prior to the beginning of any work on the project, including surveying, sewer cleaning, CCTV, service shutdown or reduction in service, and open sewer excavation, an Owner approved **Homeowner Notification Door Hanger**, informing the homeowner of the impending sewer work. The Contractor shall use the relative template for the "Homeowner Notification Door Hanger" provided at the end of the Special Provisions. **The Contractor shall take color photographs of door hangers (all work situations) on homes or businesses as evidence of homeowner notification issuance. The photograph should be date stamped and should include the door hanger placed and street address of the homes or businesses. The Contractor shall notify and submit photographs by email to the**

Construction Manager within one day of door hanger issuance. In addition, on the day the work is to be performed, prior to commencing the work, the Contractor shall knock on the doors of all structures potentially impacted by the work and personally notify the occupants.

In the event that it becomes necessary to partially or completely close a road, notice shall be given to the residents and businesses located on or immediately adjacent to the closed road via an Owner approved Road Closure Door Hanger to be prepared and distributed by the Contractor. The Contractor should submit road closure permit applications to the Department of Public Works, Traffic Engineering Division no fewer than 48 hours in advance of the road closure. A copy of the permit application should be faxed to the Program Communications Team, Public Information Officer (225-341-6854) at the same time it is sent to DPW.

9-4.1 DISQUALIFICATION: Add the following paragraph at the end of this subsection:

In the event the Contractor is placed in default by the City-Parish for failure to accept the contract as bid after being awarded by City-Parish or otherwise unsatisfactory performance, the Contractor may be subject to up to six (6) months suspension from bidding on any City-Parish work. In any event, the contractor is not eligible to re-bid any project for which he has been placed in default.

9-5 LIMITATION OF OPERATIONS: This subsection is deleted and replaced by the following:

The Contractor shall have no more work under construction than what can be properly prosecuted in accordance with the Contract Documents and with due regard to the rights and convenience of the public.

The Contractor shall conduct the work in such manner as will assure the least interference with traffic and shall have due regard to the location of detours and to provisions for handling traffic. The Contractor shall not begin new work to the detriment of work already started, and the Engineer may require the Contractor to finish a section on which work is in progress before work is started on additional sections if the opening of such section is essential to public convenience.

Work shall be done as far as practical during daylight hours on week days. Unless to meet the schedule of completion, or an emergency, special arrangements for which are made, no construction work shall be performed after 10:00 p.m. or on Sundays or holidays, except with permission of the Engineer. Before performing work at said times the Contractor shall give at least 48 hours notice to the Engineer so that inspection can be provided. No work shall be performed at night unless the Contractor has made provisions for proper illumination of the work. The Contractor shall be responsible for complying with noise ordinances while working outside normal working hours, and permission by the Engineer to perform work at night will not relieve the Contractor of complying with local ordinances and laws.

9-7 TEMPORARY SUSPENSION OF WORK: Delete this subsection in its entirety and replace with the following:

The Engineer shall have the authority to suspend the Work wholly or in part. The order to suspend the Work for periods exceeding one (1) day shall be in writing and shall include the reasons for suspension. The Owner will not be responsible for damages because of delays caused by the Contractor.

If the Work is suspended by the Engineer in the interest of the Owner, allowances may be made for the time elapsed during the suspension as hereinafter provided. If the Work is suspended by the Engineer because of failure or refusal of the Contractor to comply with an order of the Engineer or comply with the Contract Documents, or for failure to correct defective workmanship or equipment, the time elapsed during such suspension shall be charged against the Contractor and included as part of the Contract Time.

If the Work is suspended by the Engineer and the Contractor believes that additional compensation and/or Contract Time is due as a result of such suspension, the Contractor shall submit to the Engineer in writing a request for adjustment within seven (7) calendar days of receipt of the notice to resume work. The request shall set forth the reasons and support for such adjustment. Upon receipt, the Engineer will evaluate the Contractor's request. If the Engineer agrees that the cost and/or time required for the performance of the Contract has increased as a result of such suspension and the suspension was caused by conditions beyond the control of and not the fault of the Contractor, its suppliers, or subcontractors, and not caused by weather, the Engineer will make an adjustment (excluding profit) and modify the Contract in writing accordingly. The Engineer will notify the Contractor of his determination whether or not an adjustment of the Contract is warranted.

Failure to timely submit a request for adjustment within the time prescribed shall serve as knowing and voluntary abandonment of claim by the Contractor.

Contractor hereby stipulates and agrees that its sole remedy against Owner or anyone directly or indirectly engaged by the Owner arising from or caused in whole or in part by any force majeure event shall be an extension of the Contract Time. "Force majeure" is hereby defined as an occurrence or manifestation of the forces of nature which could not have been reasonably foreseen and the effect thereof avoided by the exercise of reasonable prudence, diligence or care, or by the use of means which under the circumstances would be reasonable to employ. No adjustment to the Contract amount will be allowed under this clause for escalation in market prices for labor, material, or equipment.

When the Work is suspended for any reason, the Contractor shall store materials in such manner that they will not obstruct or impede traffic unnecessarily nor become damaged; take precaution to prevent damage or deterioration of the Work performed; and provide suitable drainage of the Work by opening ditches, shoulder drains, etc., and erect temporary structures where necessary. The Work shall be resumed when ordered in writing by the Engineer. Liquidated damages shall not accrue during the period in which work is suspended by approval of the Engineer unless suspension is due to failure of the Contractor to perform in accordance with the Contract Documents.

In order to reduce air pollution, the Contractor shall suspend all operations on this project, except those operations necessary to protect against the loss or damage to life or property, on days that the Louisiana Department of Environmental Quality (LaDEQ) forecasts will be "Ozone Alert" days. The order to suspend operations of the project will be in writing and will be sent to the contractor as soon as possible the day before the forecasted "Ozone Alert" day. The Contractor shall resume operations on the project the following day, unless the LaDEQ forecasts that day will also be an "Ozone Alert" day whereupon the Contractor will be issued another one (1) day suspension order in writing.

The Contractor will be granted a one (1) calendar day extension of contract time; however, the City-Parish will not be liable for any additional costs incurred by the Contractor due to an "Ozone Alert" suspension order.

The Contractor shall provide the Engineer a fax number and/or email address at which notification of "Ozone Alerts" may be received, and transmittal of an "Ozone Alert" to that number or email address shall be conclusive proof of proper notification of the Contractor. In the absence of an available fax or email address, the Contractor shall make other arrangements, satisfactory to the Engineer, to receive notifications in a timely manner.

9-8.2.2 ADVERSE WEATHER: This subsection is deleted and replaced by the following:

Based on NOAA data, the following are the normal number of adverse weather days for the parish. An adverse weather day is one on which rainfall or wet soil conditions will prevent the Contractor from performing at least five (5) hours of work on the controlling item as shown on the construction

progress schedule. The normal number of adverse weather days has been considered in determining the Contract Time.

Normal Number of Adverse Weather Days Per Calendar Month

Jan	8	April	6	July	7	Oct	5
Feb	6	May	8	Aug	5	Nov	7
Mar	5	June	6	Sept	5	Dec	7

If the Contractor believes that the actual number of adverse weather days exceeds the normal number of adverse weather days for any month, the Contractor must submit a written request to the Engineer for an extension of Contract Time. Such request shall be accompanied by supporting documentation and shall be received by the Engineer by the 15th of the following month. The Contractor will be notified in writing within fifteen (15) days as to the amount of Contract Time extension, if any, that is deemed justified by the Engineer and will be granted. If the Contractor fails to submit such requests in accordance with the foregoing procedure, no Contract Time extensions based on adverse weather will be considered.

The Contractor shall use the Adverse Weather and Working Day Monthly Report attached herein for tracking and documenting adverse weather days. The documentation shall be submitted as stated above.

9-8.2.3 EXTENSION OF TIME BECAUSE OF UNFORESEEN DELAYS: This subsection is added to the Contract:

If the Contractor believes that the schedule is delayed because of unforeseen conditions, the Contractor must submit a written request to the Engineer for an extension of Contract Time. Such request shall be accompanied by supporting documentation and shall be received by the Engineer by the 15th of the following month. The Contractor will be notified in writing within fifteen (15) days as to the amount of Contract Time extension, if any, that is deemed justified by the Engineer and will be granted. If the Contractor fails to submit such requests in accordance with the foregoing procedure, no Contract Time extensions based on delays because of unforeseen conditions will be considered.

The Contractor shall use the Weather and Working Day Report attached herein for tracking and documenting delays because of unforeseen conditions. The documentation shall be submitted as stated above. In order for a delay to be justified, the Contractor shall have to provide documentation showing that the critical path of the project schedule has been impacted.

ADVERSE WEATHER AND WORKING DAY MONTHLY REPORT

PROJECT NAME _____

PROJECT NUMBER _____

CONTRACTOR _____

MONTH _____

_____ ACTUAL ADVERSE WEATHER DAYS (AAWD) THIS MONTH

_____ ANTICIPATED ADVERSE WEATHER DAYS THIS MONTH AS DEFINED IN CONTRACT

_____ EXCESS ADVERSE DAYS OF THIS MONTH, IF ANY

_____ TOTAL EXCESS OF ADVERSE WEATHER DAYS (FROM THE COMMENCEMENT DATE OF THIS PROJECT OR CONTRACT UNTIL THE END FO THIS REPORT PERIOD)

DATE	AAWD (Y/N)	COMMENTS (REASON FOR ADVERSE WEATHER OR WORKING DAY LOSS, ETC.)	DATE	AAWD (Y/N)	COMMENTS (REASON FOR ADVERSE WEATHER OR WORKING DAY LOSS, ETC.)
1			16		
2			17		
3			18		
4			19		
5			20		
6			21		
7			22		
8			23		
9			24		
10			25		
11			26		
12			27		
13			28		
14			29		
15			30		
			31		

I HAVE REVIEWED THE ABOVE AND CONCUR WITH THE OWNER'S RECOMMENDATIONS.

APPROVE: _____
CONTRACTOR (OR AUTH. REPRESENTATIVE)

DATE: _____

I HEREBY CERTIFY THAT THE ABOVE INFORMATION IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

APPROVE: _____
INSPECTOR

DATE: _____

APPROVE: _____
OWNER (OR AUTH. REPRESENTATIVE)

DATE: _____

9-8.3 FAILURE TO COMPLETE ON TIME: This sub-section of the Standard Specifications is deleted and replaced by the following:

Should the Contractor fail to mobilize within the timeframe specified on any work order or fails to complete the work authorized by any Work Order within the time limit specified, the Owner reserves the right to complete the work through other means upon 24-hour notification. Failure to mobilize on time or failure to complete work on time for two (2) Work Orders over the life of the project shall result in the Contractor being placed in default and cancellation of the Contract.

9-9 DEFAULT OF CONTRACT:

Add the following after item (h) in this subsection:

(i) Fails to comply with any of the requirements of the Contract.

Add the following paragraph to the end of this subsection:

Any contractor placed in default for any of the conditions specified above shall be ineligible to bid any City-Parish work for a period of six (6) months from the date of the default or until the reason for the default is remedied, whichever is earlier.

SECTION 10 MEASUREMENT AND PAYMENT

10-2 SCOPE OF PAYMENT: Add the following paragraph at the end of this subsection:

Contractor shall maintain a list of vendors that have utilized the Tax Exempt Certificate to purchase eligible materials for incorporation in the Work. The list shall also include vendors used by Subcontractors. Contractor shall submit updated list with each request for payment.

10-6 PARTIAL PAYMENTS: Add the following at the end of this subsection:

Partial payment requests shall be submitted by the Contractor via the City-Parish Web Invoice Tool. Application for payments shall include the following support documents and must also be submitted via Web Invoice Tool with the payment request:

a. Application for Payment (monthly)
   1. Cover Sheet
   2. Contractor's Certification Signature Sheet
   3. Web Invoice Tool Spreadsheet
   4. DPW Stored Materials Spreadsheet & Vendor Invoices (if applicable)
   5. Tax Exemption Participation Form
   6. Contractor's Monthly DBE Participation Form
   7. Adverse Weather Report
   8. Pay Sheets
   9. Authorization for Change (Fully Signed) when first billing for associated items (if billing for Change Order)
   10. Authorization for Change Purchase Order (if billing for Change Order)

b. Application for Final Payment
   1. Cover Sheet
   2. Contractor's Certification Signature Sheet
   3. Web Invoice Tool Spreadsheet
   4. *****DPW Stored Materials Spreadsheet and Vendor Invoices

5. *****Tax Exemption Participation Form
6. *****Contractor's Monthly DBE Participation Form
7. *****Adverse Weather Report
8. *****Pay Sheets DPW Final Adjustment of Quantities Spreadsheet
9. Final Change Order (Authorization for Change Fully Signed)
10. Final Change Purchase Order or Resolution (if credit)

*******These items required if other charges besides Final Quantity Adjustments are being invoiced.*

c. Application for Retainage Payment
   1. Cover Sheet
   2. Contractor's Certification Signature Sheet
   3. Web Invoice Tool Spreadsheet
   4. Certificate of Final Completion
   5. Council Final Acceptance Resolution
   6. Lien Certificate

All payment applications that include charges against a contract Change Order must include a copy of the Authorization for Change with all required signatures and the Change Order Purchase Order or Resolution if the Change Order resulted in a credit to the Owner. The Contractor shall not alter the support document forms in any way. Template forms will be provided to the Contractor at the preconstruction meeting. The naming convention for the Adobe (.pdf) files for Payment Application support documents to be entered in the Web Invoice Tool shall be as follows:

a. "Pay App 001 January" – Example for monthly (1st application in January) application for payment

b. "Pay App 001 January Rev 1" – Example for a revised monthly (1st application in January) application for payment

c. "Pay App 002 February Final" – Example for final payment application

d. "Pay App 003 March Retainage" – Example for retainage payment application

Add the following paragraph to the end of this section:

10-9 SALES AND USE TAX EXEMPTION: In order to take advantage of the exemption of sales and use tax, Contractor and each of its Subcontractors shall obtain a LDR Form R-1020 (latest version), "Designation of Construction Contractor as Agent of a Governmental Entity and Exemption Certificate" signed by the designated City-Parish official, prior to purchase of materials for incorporation in the Work. **The dates of the project on the form are to be filled out by the City-Parish not the Contractor or Subcontractor.** Subcontractor tax exempt forms not submitted at time of execution of Contract shall be submitted immediately by Contractor to the SSO Program's Senior Construction Manager assigned to this project upon execution of a new subcontract. The Senior Construction Manager will coordinate the additional Subcontractor tax exemption forms with City-Parish and return to the Contractor.

PART II EARTHWORK

SECTION 201 CLEARING AND GRUBBING

201-4 MEASUREMENT: Delete sentence (b) and replace with the following:

(b) **Removal of Trees:** Removal of trees will be measured per each tree of specified size range removed. Tree diameter shall be measured at a location four feet from ground level and approved by the Engineer.

201-5 PAYMENT: Add the following sentences at the end of (b):

Tree removal under this item shall be at the direction of the Engineer and contractor shall coordinate with the property owner prior to removal and replacement. Trees shall be replaced with that of a reasonable size, typically a 6' tree, as directed by the Engineer. Replacement of trees is included in the cost of this item.

201-6 PAY ITEMS: Add the following pay items:

2010301	Removal of Trees (13" to less than 25")	Each
2010302	Removal of Trees (25" to less than 37")	Each
2010303	Removal of Trees (37" up to and including 60")	Each

SECTION 202 REMOVAL OF STRUCTURES AND OBSTRUCTIONS

202-2 CONSTRUCTION: Delete the last sentence and replace with the following:

When saw cutting of pavements (concrete, asphalt, and concrete with asphalt overlays), walks, etc. is specified, depth of saw cut shall be full depth of the pavement, walk, etc. Saw cutting of pavement shall not be done in advance of pavement removal and sewer improvement by more than two weeks. Saw cutting shall also not be done prior to contacting LA One Call and having utilities marking at the location to be sawcut. Contractor shall notify the Engineer that a utility conflict may exist with the work prior to beginning saw cutting operations. Saw cuts shall be made with a concrete saw for the full depth of the pavement along the perimeter of the pavement, prior to removal as shown in the Contract Documents. Final edges along pavement removal limits shall be straight, clean, solid vertical faces free from loose material prior to pavement restoration. Spalls in the existing pavement resulting from pavement removal in the patch area shall be repaired by extending the removal limits to include spalled areas. Pavement removal for spall repair shall be made at the full patch width. Spalled areas outside of the established pay limits shall repaired at no additional cost to the Owner.

Pavement in the patch area shall be removed by reducing the pavement to appreciable sized pieces by making additional saw cuts or by using jack hammers. The resulting pieces shall be removed by lifting lugs or other approved methods which will not damage the existing base course or the remaining edges. Any other method of removal shall be approved by the Engineer. This approval will be subject to the Contractor demonstrating satisfactory performance without damage to the base course or remaining pavement edges. Deteriorated base course in the patch area shall be removed and replaced with stone as directed by the Engineer. Base course in the patch area damaged by the Contractor shall be removed and replaced with stone as directed at no additional cost to the Owner.

All bituminous materials removed shall become the property of the Contractor and shall be

disposed of beyFond the limits of the right-of-way. To the extent permitted by Section 1004 this material may be used in the Asphaltic Concrete mix.

Portland Cement Concrete driveways which extend into the proposed base course shall be sawed along the proposed edge of the base course and removed. The Contractor shall furnish sufficient suitable material to replace the removed concrete before stabilizing the base. No direct payment will be made for the removal of the concrete driveways nor for the replacement material.

SECTION 203 EXCAVATION AND EMBANKMENT

203-9 PAYMENT: Add the following paragraph at the end of this subsection:

Disposal of Spoil: The Contractor's attention is directed to the fact that under this contract no direct payment shall be made for the disposal of surplus excavation and/or materials required to be removed. The cost for disposing of this excessive material shall be included in the bid price for the various items bid for the work.

PART V PAVEMENTS

SECTION 501 ASPHALT CONCRETE PAVEMENT: Delete this Section in its entirety and replace with Section 1151.

SECTION 502 PORTLAND CEMENT CONCRETE PAVEMENT

502-2 MATERIALS: Add the following to the end of this subsection:

The high early strength concrete shall contain a modified hydraulic cement capable of producing concrete with a minimum compressive strength of 3000psi in 24hrs as specified

a. Design Submittals: This specification shall be performance based and the contractor shall be responsible for submitting the mix design to conform to these specifications and meet the following requirements:

    1. Within 14 days after contract notice to proceed, the Contractor must propose specific concrete mix design proportions for concrete placed under this Specification. In this case, the Contractor shall meet these requirements:

        i. Ensure that all materials are from approved sources.
        ii. Have all materials tested before they are used.
        iii. Have the laboratory verify that the proposed proportions will produce concrete that develops 3,000 psi within 24 hours.

    2. The concrete acceleration admixtures may be either of the following:

        i. Calcium chloride
        ii. A chemical admixture

    3. The Engineer must authorize chemical admixtures before they are used for concrete. Admixtures will be approved only if an acceptable concrete design is established in the laboratory with materials representative of those proposed for use.

502-6 PLACING CONCRETE: Add the following at the end of this subsection:

When high early strength concrete is required, the Contractor shall provide sufficient labor and equipment to place, consolidate and screed each batch of concrete within one (1) hour after the introduction of the cement and first mixing water into the mix, or per manufacturer's recommendations. Mixing time plus travel time from the plant to the job site shall not exceed 30 minutes. Placing shall be continuous between transverse joints without the use of intermediate bulkheads.

502-9 CURING AND PROTECTION: After the first paragraph of subsection 502-9 (a), add the following:

In the case of high early strength concrete, the Contractor shall finish the concrete as specified in subsection 502-7. Curing compound shall be applied immediately after finishing (double quantities).

502-11 ACCEPTANCE REQUIREMENTS: After the second paragraph of subsection 502-11 (a), add the following:

No traffic shall be permitted on the high early strength concrete pavement until a minimum compressive strength of 3000psi is obtained and the surface shall meet the surface tolerance requirements as specified in the standard specification.

502-12 MEASUREMENT: Add the following to the end this subsection:

Measurement for high early strength concrete pavement shall be the actual number of square yards restored as determined by field measurements and as approved by the Engineer. The high early strength concrete pavement shall be 8 inches thick.

Measurement for restoring portland cement concrete pavement with asphalt overlay shall be the actual number of square yards restored as determined by field measurements and as approved by the Engineer. Portland cement concrete pavement shall be 8 inches thick and asphalt overlay shall match existing (1 ½ inches minimum). Asphalt concrete pavement for overlay shall be in accordance with Section 501.

502-13 PAYMENT: Delete this sentence in its entirety and replace with the following:

Payment for Portland cement concrete pavement will be made at the contract unit price per square yard, which includes all labor, materials, equipment, furnishing and placing concrete, admixtures, batch plant fees, finishing, curing, forming, joint material, dowel bars, tie bars, and restoring existing traffic markings and symbols.

Payment for early strength concrete pavement will be full compensation for furnishing all labor, materials, equipment, and includes furnishing and placing concrete, admixtures, batch plant fees, finishing, curing, forming, joint material, dowel bars, tie bars, and restoring existing traffic markings and symbols.

Payment for restoring portland cement concrete pavement with asphalt overlay will be full compensation for furnishing all labor, materials, equipment, and includes furnishing and placing concrete, finishing, curing, forming, joint material, dowel bars, tie bars and asphalt overlay, and all else incidental thereto for which separate payment is not provided under other items in the Bid Form.

502-13 PAY ITEMS: Add the following at the end of the pay items list:

5020208	High Early Strength Concrete Pavement (3000 psi at 24 hrs)	Square Yard
5021108	Restore Portland Cement Concrete Pavement with Asphalt Overlay	Square Yard

SECTION 503 TEMPORARY PAVEMENT RESTORATION:

Add the following Section 503 after Section 502:

SECTION 503
TEMPORARY PAVEMENT RESTORATION

503-1 DESCRIPTION: This work consists of furnishing, placing, compacting, and maintaining a temporary pavement surface suitable for driving in accordance with these specifications and in reasonably close conformity with the lines, grades, thicknesses, and typical cross sections shown on the plans, as measured in the field, or as established by the Engineer. This work is typically associated with utility installations such as conduits, storm drains, sanitary sewers and force mains that must be trenched across roadways.

503-2 MATERIALS: Allowable materials for temporary pavement surface restoration are aggregate surfacing or hard surfacing. Hard surfacing is considered cold mix asphalt (CMA) pavement or steel plates.

a. Aggregate surfacing shall meet the following requirements:

    1. Stone or crushed concrete in accordance with Section 1001-4.1
    2. Reclaimed Asphalt Pavement (RAP) in accordance with Section 1001-7.5

b. CMA shall meet the following requirements:

    1. Listed as a preapproved commercial high performance cold mix material on the LADOTD Qualified Products List 75.

    2. Mixture shall have a minimum shelf life of twelve months thereby remaining workable and retaining its performance characteristics during that time.

    3. Mixture, once in place and compacted, must be capable of withstanding changes in weather conditions, exposure to weighted conditions and continuous traffic flow.

    4. Material may be stored by stockpile or may be containerized. Handling, storage, and stockpiling of material shall be done in strict accordance with the manufacturer's recommendations.

c. Structural steel shall conform to Section 602.

503-3 SUBMITTALS:

a. Data submittal showing that selected material meets requirements of subsection 503-2.

b. If bulk quantity is to be supplied by a local batch plant, then proof of mix certification by one of the preapproved commercial high performance cold mix material manufacturers listed on the LADOTD Qualified Products List 75 shall be submitted.

c. For conditions that require a steel plate on trench widths greater than 48 inches or a support structure (wide excavation with multiple plates), the system must be

designed by a Professional Engineer licensed in the State of Louisiana and submitted to the Owner before use.

503-4 CONSTRUCTION REQUIREMENTS: Contractor shall install temporary pavement surfacing immediately after completion of utility installation and final (secondary) backfill and compaction of utility trench. Refer to Section 4-5 for specific timing requirements. Roadway trench cut shall be backfilled and temporarily surfaced or plated in accordance with specification and opened to traffic use at the end of the work shift, unless otherwise dictated by an approved lane closure permit.

Vehicular travel over backfilled but unsurfaced excavations will not be allowed. The Contractor shall provide a surface suitable for driving consisting of either aggregate or hard surfacing in accordance with Table 503-1. Temporary Aggregate Surfacing is only allowed when **all** aggregate table criteria are met. Temporary Hard Surfacing is required when **any** of the hard surface table criteria is met.

TABLE 503-1

Temporary Surface Type	ADT	Posted Speed Limit	Time Temporary Surfacing to Remain in Place Under Traffic
Aggregate	≤5000	≤45 mph	4 weeks or less
Hard	>5000	>45 mph	Greater than 4 weeks but no more than 60 days

Should the Contractor's operation or sequence of construction extend the time an aggregate surface is to remain in place under traffic beyond four weeks, the Contractor shall within one week place Temporary Hard Surfacing at no additional cost to the Owner or complete final pavement restoration. Temporary Hard Surfacing shall consist of at least 3 inches of CMA over 6 inches of stone base or steel traffic plates placed over the excavated area of sufficient width and thickness as indicated in subsection 503-4.3. If the Contractor fails to meet these requirements, the Engineer will issue a formal warning to the Contractor notifying him that failure to start or complete the follow-up work as scheduled will result in a directive to stop work on any future activities, pending compliance as directed by the Engineer.

Contractor shall inspect and maintain the temporary surfacing as necessary for traffic and to stay within acceptable surface tolerances as dictated in subsection 503-4.2e for the duration of its temporary use on the Project.

Construction requirements shall be as prescribed in the following subsections.

503-4.1 Aggregate: The Contractor shall place, shape, compact and maintain the aggregate as necessary for temporary pavement surfacing. The Contractor shall maintain and replenish the aggregate surfacing as necessary or as directed by the Engineer during its time in place under traffic at no additional cost to the Owner. When aggregate surfacing is no longer necessary the Contractor shall remove and dispose of the aggregate surfacing.

503-4.2 Cold Mix Asphalt Pavement:

a. **Weather Limitations (CMA):** Cold mix asphalt concrete pavement courses shall be placed only when the air temperature is 20°F or above. When paving operations are discontinued because of rain, the mixture in transit shall be protected until the rain ceases. The surface on which the mixture is to be placed shall be swept to remove as much moisture as possible and the mixture may then be placed subject to removal and replacement at no additional cost to the Owner if contract requirements

are not met.

b. **Surface Preparation:** Contractor shall ensure final edges along pavement cut limits are straight, clean, solid vertical faces free from loose material prior to pavement restoration. Remove excessive water and any loose stone or debris from the surface of the stone base. Adjacent pavement surfaces shall be swept clean of dust, dirt, caked clay and loose material.

c. **Spreading and Finishing:** The temporary surfacing material may be spread and finished by hand to the satisfaction of the Engineer. Patch material shall not be cast from the truck to the grade. During spreading operations, material shall be thoroughly loose and uniformly distributed. Material that has formed into lumps and does not break down readily will be rejected. The surface shall be checked before rolling and irregularities corrected. The temporary surfacing material shall be place and compacted in layers of no more than two inches in thickness.

   Spreading, finishing and compaction of the temporary surfacing material shall leave the surface smooth and level with the edge of existing pavement. While the surface is being compacted and finished, the edges shall be shaped to a neat line.

d. **Compaction:** Immediately after the mixture has been spread, it shall be thoroughly and uniformly compacted. Contractor shall compact each layer with mechanical compaction equipment such as vibratory plate compactor or single-drum vibratory roller. Larger patches may use a ride on or walk behind compactor. Use of pneumatic tires is not an acceptable means of compaction. To prevent adhesion of the patch material, plates and wheels of rollers shall be kept properly moistened.

   Surface of mixtures after compaction shall be smooth and true to cross slope and grade within the tolerances specified. Mixtures that become loose, broken, contaminated or otherwise defective shall be removed and replaced with fresh material compacted to conform with the surrounding mixture.

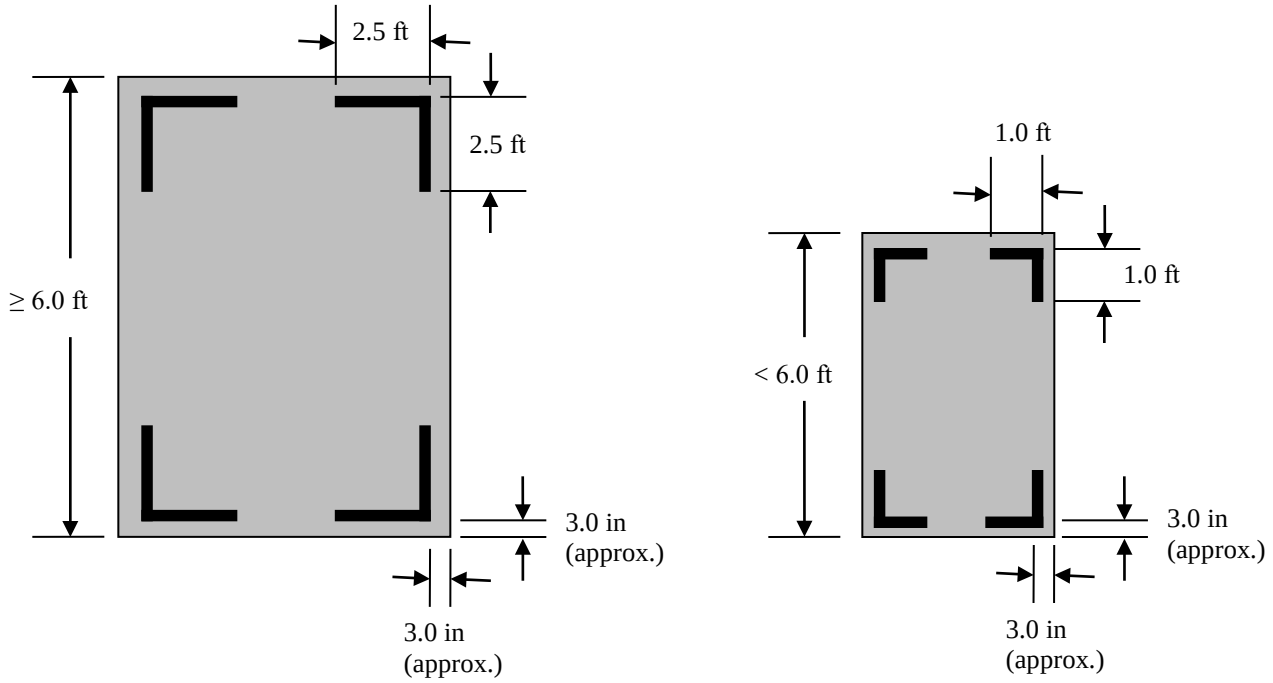
   For CMA, the finished pavement shall have a tightly knit surface free of cracks, tears, ripples or other deficiencies. All deficiencies shall be corrected at the Contractor's expense and the Contractor shall adjust his operations to correct the problem. This may require the Contractor to adjust the mix or furnish additional or different equipment.

e. **Surface Tolerances:** The distance at any point from a ten (10) foot straight edge to the surface shall not exceed one-half (1/2) inch in any direction. Lumps or depressions exceeding this tolerance shall be corrected by removing defective work and replacing with new material as directed.

503-4.3 Steel Plates: The use of steel plates shall be approved by the Engineer prior to installation and conform to the following:

a. Steel plates, in the roadway, shall have the name and 24-hour emergency telephone number of the Contractor responsible for maintaining the plates stenciled on the roadway pavement adjacent to the plates. Painted text shall be in white lettering, using chalk based paint. The text shall be neatly stenciled lettering, a minimum of four (4) inches in height and shall be maintained in a neat and legible condition for the duration of the plate placement.

b. Steel plates, in the roadway, shall be marked on all four corners with durable and highly reflective white pavement marking tape no less than 4 inches in width. The marking dimensions shall not be less than those recommended below:



c. Steel plate width and thickness requirements:

   1. Steel plate bridging shall be designed for HS20-44 truck loading.

   2. Excavation width of 48 inches or less shall have a minimum thickness of 1-1/4 inch.

   3. Thickness of steel plates for trench widths exceeding 48 inches shall be designed by a Professional Engineer licensed in the State of Louisiana.

d. Steel plates must be large enough to allow a minimum of 18 inches of bearing on all sides of the excavation for roadways with traffic speeds less than 45 mph.

e. Trench walls and adjacent soils shall be sufficiently stabilized prior to the use of steel plates for bridging.

f. Steel plates are not allowed for use to cover an excavation on roadways with speed limits of 45mph or greater.

g. Whenever steel plates are used to cover an excavation on roadways where the

related work is to take place for longer than two (2) weeks, the steel plates must be recessed into the existing pavement, milling out the pavement surface to ensure that the top of plate elevation matches the existing elevation of the adjacent pavement surface.

h. Whenever steel plates are used to cover an excavation on roadways for less than two (2) weeks, the steel plates may be placed on top of the existing pavement with transitional cold mix asphalt concrete ramps against all vertical edges of the plates. All ramping must be accomplished to provide a minimum angle of approach of twelve to one (12:1), providing a smooth, gradual transition between the existing pavement and the plate. Steel plates shall be anchored to the roadway surface with pins or spikes on the four (4) outermost corners with additional pins placed as necessary to assure security of the plate. Pins shall be installed such that they do not protrude above the plate surface anymore than necessary to anchor the plate and shall not create a hazard for the motoring or pedestrian public. Steel plates should be welded together to prevent shifting/bouncing where necessary. No corner of any steel plate shall protrude into traveled way that may create a hazard to the motoring public.

i. Steel plates shall be textured to provide a non-skid surface in dry and wet conditions. Plate riding surface shall be manufactured with or coated to provide a nominal coefficient of friction of 0.35 as determined by California Test Method (CTM) 342. Other standard tests for determining skid resistance may be approved by the Engineer, however it must be capable of verifying the skid-resistant surface provided is equal to or greater than the adjacent existing street or roadway surface.

j. All steel plates used for bridging excavations, whether in the travel way or not, shall be without permanent deflection or other deformations such as chains, attachments, weldments, or irregularities that can constitute a hazard.

k. “STEEL PLATE AHEAD” and “BUMP” warning signs shall be properly posted and maintained in advance of all roadway plates placed on the surface of the pavements. “STEEL PLATE AHEAD” warning signs shall be properly posted and maintained in advance of all roadway plates that are inlaid into the pavement surface.

l. The Contractor is responsible for maintaining the steel plates until the roadway is properly backfilled and restored. The Contractor shall be responsible for any damages or injuries which may occur as a result of the use of steel plates.

503-5 MEASUREMENT: Temporary pavement surfacing will be measured by the square yard complete in place based on required minimum depths (9” for aggregate, 3” for CMA and 6” Stone Base; 1-1/4” for steel plate) as restored within the limits shown in the Contract Documents and as approved by the Engineer.

Material lost, wasted, rejected or applied contrary to the specifications will not be measured for payment. CMA needed to ramp steel plate edges will not be measured for payment.

503-6 PAYMENT: Payment for temporary pavement surfacing will be full compensation for furnishing all labor, materials, equipment, and incidentals required to produce the materials, preparing the surfaces on which the materials are placed, hauling the materials to the work site, placing and compacting the materials and base, maintaining and replenishing the temporary pavement surfacing for the duration of its temporary use on the Project, and the removal and disposal of temporary surfacing and base as necessary to place final pavement restoration.

503-7 PAY ITEMS:

Item No.	Item	Unit
5031000	Temporary Pavement Surfacing	Square Yard

PART VIII SANITARY SEWER WORK

Delete this part in its entirety and replace with the following:

SECTION 801
EXCAVATION, BACKFILLING, AND COMPACTION
FOR SANITARY SEWERS AND RELATED STRUCTURES

801-1 DESCRIPTION: This Work shall include, but not necessarily be limited to, excavation and trenching operations to install pipe, manholes, pump stations, and other structures and all related work such as shoring, bracing, water handling, and miscellaneous clearing and grubbing; filling and grading under and around sanitary sewer structures; and all backfilling, compaction, grading, import of backfill material, disposal of surplus and unsuitable materials.

801-2 GENERAL:

a. All work shall be performed in compliance with L.R.S. 40:1749.11-22, "Louisiana Underground Utilities and Facilities Damage Prevention Law", OSHA regulations and applicable codes, ordinances, and standards of governing authorities having jurisdiction.

b. Open excavations, including incomplete manholes and pump stations, shall be barricaded and posted with operating warning lights in accordance with Federal, State and local requirements.

c. Public and private structures, utilities, driveways, sidewalks, pavements, and other facilities shall be protected from damage caused by settlement, lateral movement, undermining washout, construction activities, and other hazards created by these operations. All settlement or other damage caused by the Contractor's operations shall be repaired within 7 days, or the facilities shall be replaced, at the Contractor's sole expense and at the discretion and direction of the Engineer. This includes the warranty period as well.

d. Any investigative geotechnical work is the responsibility of the contractor and shall be submitted to the owner as part of the submittal of schedules.

801-3 MATERIALS:

a. **Definitions:**

1. **Sanitary Sewer Bedding/Backfill Materials:** Bedding and initial backfill material shall be a sand-aggregate mixture. The aggregate shall be free of angular stones that could score, crack, or puncture the pipe. The sand-aggregate mixture shall meet the following gradation:

Sieve Size	Percent Passing
1-1/2 inch	95-100
No. 4	30-50
No. 10	20-45
No. 200	0-10

2. **Usable Excavated Soils:** Usable excavated soils shall have a maximum PI of 25

and a maximum organic content of 5 percent. Soils with a silt content of 50 percent or greater and also a PI of 10 or less will not be allowed. Soil shall be tested at Owner's option by the Owner's testing lab. Usable excavated material may be neatly stockpiled at the site where designated by the Engineer provided there is an area available that will not interfere with the Owner's access nor inconvenience traffic or adjoining property owners.

3. **#610 Stone Backfill:** The 610 Stone shall be one hundred percent quarried material. The stone shall pass the ASTM soundness test and abrasion test. Soundness loss shall not exceed fifteen percent when subjected to five cycles of the magnesium sulfate soundness test in accordance with AASHTO 104. The stone shall show an abrasion loss of not more than forty percent when tested in accordance with AASHTO 96. The 610 Stone backfill shall meet the following gradation:

Sieve Size	**Percent Passing**
1-1/2 inch	100
1 inch	90-100
3/4 inch	70-100
No. 4	35-65
No. 40	12-32
No. 200	5-12

4. **#57 Stone Backfill:** The stone shall be one hundred percent quarried material. The stone shall pass the ASTM soundness test and abrasion test. Soundness loss shall not exceed fifteen percent when subjected to five cycles of the magnesium sulfate soundness test in accordance with AASHTO 104. The stone shall show an abrasion loss of not more than forty percent when tested in accordance with AASHTO 96. The 57 Stone backfill shall meet the following gradation:

Sieve Size	**Percent Passing**
1-1/2 inch	100
1 inch	90-100
1/2 inch	25-60
No. 4	0-10
No. 8	0-5
No. 200	0-1

5. **Imported Clay Fill:** Where shown on the Drawings or as directed by the Engineer, clay shall be imported from a borrow site approved by the Engineer. Soils meeting the Unified Soil Classification CL and free of organic material are acceptable clay fill. The clay material shall have the following properties:

   i. Maximum Liquid Limit of 50
   ii. Maximum Plasticity Index of 30
   iii. Organic content less than 5%.

6. **Geotextile Fabric:** The geotextile fabric shall consist of a nonwoven geotextile fabric Class B, C, or D, as contained in the latest edition of the LADOTD QPL.

7. **Controlled Low-Strength Material (CLSM)**: CLSM shall consist of Type I Portland Cement, Class C or F Fly Ash, sand, and water in the following proportion per cubic yard:

i. Portland Cement 50 pounds
ii. Fly Ash – Class C or F 125 pounds
iii. Sand 2900 pounds
iv. Water 50 to 65 gallons

Mixing and hauling equipment shall conform to Section 1005.

8. **Select Imported Material**: Selected soils are natural soils with a maximum PI of 20, maximum Liquid Limit of 35, and a maximum organic content of 5 percent. Soils with a silt content of 50 percent or greater and also a PI of 10 or less will not be allowed. Any select material used to supplement or replace unusable excavated soil shall meet these requirements and must be approved by the Engineer.

9. **Granular Material:** Granular material shall be non-plastic and siliceous material, and shall comply with the following gradation:

Sieve Size	**Percent Passing**
1/2 inch	100
No. 10	75-100
No. 200	0-10

b. **General:** The Contractor shall notify the Engineer of the source of each material. At the request of the Engineer, the Contractor shall furnish for testing and approval a representative sample of each material weighing approximately fifty (50) pounds, at least ten (10) calendar days prior to the date of anticipated use of such material.

Select materials shall be furnished as required from approved off-site sources and hauled to the site. Disposal of unsuitable material is specified in Section 801-7.

c. **Structural Fill:** Structural fill shall be used below spread footing foundations, slab-on-grade floors, and other portions of structures. Structural fill material shall be as defined on the drawings. If not defined elsewhere in the Contract Documents acceptable structural fill materials are non-expansive clay with a Plasticity Index between 10 and 25, a maximum Liquid Limit of 45, less than 5% organics, and free of degradable material or debris. Well-graded crushed stone aggregate such as an ASTM D1241 gradation C stone may also be acceptable.

Any structural fill material encountered during the excavation may be stored in segregated stockpiles for reuse. All material that, in the opinion of the Engineer, is not suitable for reuse shall be handled as specified herein for disposal of unsuitable materials.

d. **Trench Backfill:** Backfill methods for trenches, as shown on the Contract Documents, are classified into three zones, bedding, initial backfill, and secondary backfill. Bedding and initial backfill material shall be the sand-aggregate mixture as described in Section 801-3.a.1. Secondary backfill material shall be as follows:

1. In locations where any part of the trench pay limit (as defined on the Contract Documents) falls under existing asphaltic or PCC roadways and/or existing parking lots, the secondary backfill shall be:

i.#610 Stone material in dry trenches,

ii. #57 Stone in wet trenches or in wet trench bottoms,
iii. #610 Stone material above the groundwater line in wet trenches,
iv. CLSM when shown on the Contract Documents or as directed by the Engineer.

2. In locations where any part of the trench pay limit (as defined on the Contract Documents) falls within 10 feet of an existing major structure foundation, the edge of an existing road/shoulder/back of curb, or under the limits of a future asphaltic or PCC roadway/parking lot to be constructed subsequent to sanitary sewer installation; the secondary backfill shall be the sand-aggregate mixture as described in Section 801-3.a.1. In these situations the sand-aggregate material shall be placed and compacted to within 3.5 feet of the surrounding grade, and usable excavated soils shall be placed and compacted for the remainder of the backfill to surrounding or specified grade.

3. In areas outside those described above, secondary backfill material shall consist of usable excavated soils supplemented by select imported fill, as approved, or the materials listed above to replace unusable excavated soil.

e. **Manhole and Pump Station Bedding and Backfill:** Bedding material used below base foundations of manhole and pump station structures shall be #57 stone material, encapsulated in geotextile fabric. The material shall be placed in maximum 12 inch lifts with each lift rodded and vibrated to orient the stone and eliminate voids to create uniform bedding support for the pipe.

The manhole and pump station structures shall be backfilled with granular material or as specified on the Plans. In the case of manholes within existing or planned roadways alignments, the granular material shall be placed and compacted to within 2 feet of the surrounding grade, and #610 stone shall be placed and compacted for the remainder of the backfill to surrounding or specified grade. In the case of manholes located in unimproved surface areas, the granular material shall be placed and compacted to within 2 feet of the surrounding grade, and useable excavated soil shall be placed and compacted for the remainder of the backfill to surrounding or specified grade.

f. **Geotextile Fabric:** In trenches requiring the use of #57 Stone, this material shall be encapsulated in geotextile fabric. Geotextile fabric shall be class B, C, or D.

g. **Controlled Low-Strength Material (CLSM):** CLSM shall be used to backfill trenches where shown on the Drawings or as directed by the Engineer.

801-4 PRE-INSTALLATION INSPECTION PROCEDURE: Prior to the start of any pipe laying activities, the Contractor shall perform proposed pipe installation procedures for inspection purposes at the location shown on the Drawings or as determined by the Engineer. Contractor shall submit all relevant submittals, and have received approval from Engineer prior to scheduling of pre-installation inspection procedure. The purpose of this inspection is to demonstrate how the trench will be excavated, the bedding will be placed, and the initial and secondary backfill placed and compacted. In addition, at the time of the final surface restoration for paved areas, a mock-up pavement restoration sample will be performed. At least one mock-up will be performed for each type of pavement restoration (asphalt and PCC) required on the Project. This mock-up will demonstrate how the pavement will be restored in accordance with the Contract Documents and serve as the standard required for all remaining pavement restoration for the Project.

a. At a minimum, the following pre-installation inspections are required:

1. Linear pipeline projects – Contractor shall lay first 200 linear feet of pipe.
2. Rehabilitation projects – Contractor shall perform first 4 point repairs (2 under pavement and 2 outside of pavement). Also first 200 linear feet of removal and replacement of pipe.

b. The pre-installation inspection procedure shall be as follows:

1. Contractor shall schedule timing of the pre-installation inspection with the Engineer and provide a minimum 72 hour notice prior to inspection.
2. Contractor shall layout pavement removal limits in agreement with the Engineer and perform pavement removal as specified.
3. Contractor shall excavate trench as specified.
4. Pipe bedding shall be placed and compacted in bottom of trench as specified.
5. Pipe sections shall be placed on pipe bedding in trench as specified.
6. Initial and secondary backfill shall be placed and compacted as specified. The in-place density shall be measured after each lift of initial and secondary backfill as specified. Additional lifts of initial and secondary backfill shall not be placed until the previous lift has met the specified density. If tests on a lift of backfill show that the specified density is not obtained, the Contractor shall increase the amount of coverages, decrease the lift thicknesses or obtain a different type of compactor until the specified densities are obtained.
7. The Contractor shall demonstrate to the Engineer precautions taken to maintain the compaction of the backfill when moving the trench box.
8. Pipe deflection shall be measured 48 hours after the completion of backfilling. The maximum deflection shall be as specified. If the pipe deflection exceeds the specified deflection, the installation shall be judged to not meet this Section and the Contractor shall repeat the pre-installation inspection procedure.
9. After concurrence of the procedures, the Contractor may continue work. The Contractor shall use the pipe pre-installation procedure, which no exception was taken by the Engineer, for the installation of the pipeline. If during the course of work, it is determined that the established procedure is not producing the specified results, the Contractor shall repeat the pre-installation inspection procedure to determine a new installation procedure which will produce the desired results and is acceptable to the Engineer. The Contractor shall repeat as many times as necessary, the pre-installation inspection procedure at no cost to the Owner.
10. The Contractor shall submit in writing to the Engineer, the established procedure in such detail that it can be followed and repeated consistently by any personnel change that may occur throughout the project. Any change to the established procedure, including but not limited to means, methods, or equipment shall require another successful pre-installation inspection procedure and revised detailed procedure write-up before additional pipe installation.

c. Contractor shall schedule timing of the pavement restoration mock-up with the Engineer and provide a minimum 72 hour notice prior to mock-up. Contractor shall remove temporary surfacing and base, install and finish permanent pavement restoration as specified. After concurrence of the procedures and final pavement restoration product, the Contractor may continue pavement restoration work. This mock-up pavement restoration will serve as the established standard for all remaining pavement restoration for the Project.

801-5 PLACEMENT OF FILL:

a. Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills.

b. Material placed in fill areas shall be deposited within the lines and to the grades shown on the Contract Documents or as directed by the Engineer, making due allowance for settlement/shrinkage of the material. Fill shall be placed only on properly prepared surfaces that have been inspected and approved by the Engineer. If sufficient fill material is not available from excavation on site, the Contractor shall provide select material as may be required.

c. Fill shall be brought up in substantially level loose lifts of maximum of eight (8) inches in depth and compacted throughout the site, starting in the deepest portion of the fill. During the process of dumping and spreading, all roots, debris, and other objectionable material shall be removed from the fill areas. The entire surface of the Work shall be maintained free from ruts and in such condition that construction equipment can readily travel over any section. All fill materials shall be placed and compacted "in-the-dry."

d. Where trench backfill and compaction work is following pipe laying or where the entire area of the backfilling cannot be completed with full area lifts, the trench backfill will be benched.

    1. Benches shall be a maximum of three lifts tall.
    2. Benches shall be separated by a minimum 8 foot horizontal distance.

e. If the compacted surface of any layer of material is determined to be too smooth to bond properly with the succeeding layer, it shall be loosened by harrowing or by another approved method before the succeeding layer is placed.

f. Fill shall not be placed against concrete structures until they have been in place a minimum of fourteen (14) days or have been shown to reach a minimum of 75% of their design compressive strength.

801-6 EXCAVATION: Excavation consists of removal and handling of material encountered when establishing required grade elevations in accordance with the Contract Documents.

a. **Trench Excavation:** Excavation of trenches required for the installation of pipes and ducts shall be made to the depths required to accommodate placement of bedding material as shown in the Contract Documents. Widths shown on the Contract Documents are the established pay limits and may be adjusted to provide appropriate room for bracing, supporting, and dewatering facilities if necessary with prior approval of the Engineer. Excavation outside the established pay limits shall be at no additional cost to the Owner.

b. **Additional Excavation:** When excavation has reached required subgrade elevations, notify the Engineer or his representative who will make an inspection of conditions. If unstable, unsatisfactory bearing materials are encountered at the required subgrade elevation, carry excavation deeper and replace the additional excavated material with #57 Stone wrapped in geotextile fabric or CLSM as directed by the Engineer. Sand-aggregate bedding shall then be placed and compacted over the #57 Stone separated by the geotextile fabric or placed and compacted over the CLSM.

Removal of unstable material and its replacement as directed beyond the authorized limits will be paid under the #57 Stone Backfill unit bid item and in accordance with the Contract Documents.

c. **Excavation for Pipelines, Manholes, Pump Stations and Structures:** Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 feet, and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, other construction, and for inspection, or as shown on the Contract Documents.

   Care shall be taken not to disturb the bottom of excavation. Trim bottoms to required lines and grades to leave solid base to receive required bedding material. The pipe or duct shall be evenly supported on the bedding material. Bell holes shall be made as required.

   The bottom of the excavations shall be firm and dry. Sides of excavations are to be maintained in a safe condition until the completion of backfilling.

801-6.1 Shoring and Bracing in Excavations:

a. The Contractor shall be fully responsible for designing, constructing, and maintaining cofferdams consisting of shoring and bracing, as required, to support the sides of excavations to prevent any movement which could in any way reduce the width of the excavation below that necessary for proper construction, and to protect adjacent structures, existing utilities, and/or foundation material from disturbance, undermining, or other damage. Care shall be taken to prevent voids outside of the shoring, but if voids are formed they shall be immediately filled with suitable material (either useable excavated soils or selected imported material if approved by Engineer), compacted by hand or mechanical means to condition judged visually comparable to condition of adjoining native soil.

b. As part of the submittal of schedules and other data indicating the plan of Work, the Contractor shall provide drawings of the planned supporting system (including the sequence of installation and removal). This submittal is not for review by the Engineer but for informational purposes only. The Engineer shall use the schedule in tracking the progress of the Work. The drawings shall be stamped by a Professional Engineer licensed in the State of Louisiana and be of sufficient detail to adequately disclose the method of operation that the Contractor plans to use for each of the various stages of construction. The Work shall not begin until such drawings are reviewed and any questions posed by the Engineer have been adequately addressed by the Contractor.

c. Wooden trench shoring for pipes is not to be withdrawn when driven below mid-diameter of any pipe, and no wood shoring shall be cut off at a level lower than two (2) feet above the top of any pipe or no more than two (2) feet below natural ground, unless otherwise directed by the Engineer.

d. All steel trench shoring and bracing not left in place shall be carefully removed in such a manner as not to endanger the construction or other structures, existing utilities, existing piping, or personnel and property. Care shall be taken not to disturb or otherwise injure any finished facility. All voids left or caused by withdrawal of shoring shall be immediately refilled with **Sanitary Sewer Bedding/Backfill Materials as defined herein** and rammed/compacted with tools especially adapted for that purpose, by hydraulic compaction, or as otherwise directed.

e. The right of the Engineer to order shoring and bracing left in place shall not be construed as creating any obligation on the Engineer's part to issue such orders. In addition, the Engineer's failure to exercise this right to do so shall not relieve the Contractor from liability for damages to persons or property occurring from or on the Work occasioned by negligence or other cause, growing out of a failure on the part of the Contractor to leave in place sufficient shoring and bracing to prevent any caving or moving of the ground.

f. The Contractor may construct the cofferdams and shoring outside the neat lines of the foundation for pipes and manholes, unless indicated otherwise, to the extent deemed desirable for the planned method of operation so long as it does not encroach on areas outside the limits of the Work. Shoring shall be plumb and securely braced and tied in position. Shoring, bracing, and cofferdams shall be adequate to withstand all pressures to which the existing or new structure or excavation will be subjected. Pumping, bracing, and other work within the cofferdam shall be done in a safe manner and shall avoid disturbing any completed construction. The Contractor shall provide the necessary clearances and dimensions to correct any movement or bulging that may occur.

g. The Contractor shall maintain shoring and bracing in excavations regardless of time period excavations will be open, and shall carry down shoring and bracing as excavation progresses.

h. As an alternate to shoring, the Contractor is authorized to utilize an OSHA approved mechanical trench box or slide-rail system, the size and construction of which shall be designed for the intended depth/loads. Documentation of the trench box or slide-rail system shall be submitted to the Engineer for informational purposes only.

801-6.2 Dewatering, Drainage and Flotation:

a. The Contractor shall furnish all materials and equipment and perform all work required to install and maintain the drainage systems necessary for handling groundwater and surface water encountered during construction of structures, pipelines, and compacted fills. The Contractor is responsible for providing temporary power for any pumping operation that may be required.

b. The Contractor is responsible for complying with the requirements and obtaining necessary permits of all agencies having jurisdiction and control over use of groundwater and matters affecting well installation, water discharge, and use of existing storm drains and natural water sources. Because the review and permitting process may be lengthy, the Contractor is required to take early action to pursue and submit for the required approvals so that construction is not delayed beyond that represented to the Engineer.

c. Prior to excavation, the Contractor shall submit detailed drawings and design calculations descriptive of the proposed means and method of dewatering and maintaining dry conditions to the Engineer. This submittal shall be prepared and sealed by a Professional Engineer licensed in the State of LA. The Contractor shall be responsible for the satisfactory performance of the system and for correcting any disturbance of natural bearing of soils or damage to structures caused by the dewatering system or by interruption of the continuous operation of the system as specified.

d. The Contractor shall construct and place all pipelines, concrete work, structural fill, bedding, and base course in-the-dry (no standing water in the trench). In addition, the Contractor shall make the final twenty-four (24) inches of excavation for this work in-the-dry, and not until the groundwater level is a minimum of twelve (12) inches below proposed bottom of excavation. The Contractor shall provide means and methods to control the potential for excavation base instability from either excess hydrostatic water pressures or basal heave in the design of their shoring system.

e. The Contractor shall, at all times during construction, provide and maintain proper equipment and facilities to promptly remove and dispose of all water entering excavations and shall keep such excavations dry to obtain a satisfactory undisturbed subgrade foundation condition. Dewatering shall be required until the fill, structure, or pipes to be built have been completed to the extent that they will not be floated or otherwise damaged by allowing water levels to rise or return to natural elevations.

f. Wellpoints or larger wells may be required, with the approval of the Engineer, for predrainage of the soils prior to final excavation for deeper below-ground structures or piping, and for maintaining the lowered groundwater level. If so, this system shall be designed by a Professional Engineer licensed in the State of LA. A copy of the subsurface characterization, calculations, layout, and narrative descriptive of operation through removal and/or abandonment shall be submitted for information and comment. After comment has been offered and questions answered, the Contractor may proceed with installation. Wellpointing and larger wells shall be maintained until construction has been completed to such an extent that the structure, pipeline, or fill will not be floated or otherwise damaged. Wellpoints or larger wells shall be surrounded by suitable filter sand and no fines shall be removed by pumping. The Contractor may be required to demonstrate the adequacy of the proposed system and filter sand by means of a test installation at the direction of the Engineer. Discharge water shall be clear, with no visible soil particles in a one-quart sample.

g. If requested by the Engineer, the Contractor's proposed method of dewatering shall include a minimum of two (2) each 2-inch diameter, Schedule 40 PVC operating groundwater observation wells, with factory slotted screen and appropriate sand pack. The observation wells shall be screened within each stratum to be dewatered at each structure as directed by the Engineer. A bentonite seal and grout shall be provided above the screened depth to the surface. Observation wells are to be used to determine/monitor the water level during construction of the structure. Locations of the observation wells shall be at structures and along pipelines as approved by the Engineer and at no additional cost to the Owner. During backfilling and construction, water levels shall be measured in observation wells at frequencies as directed by the Engineer. Contractor shall be responsible for maintaining and repairing/replacing damaged observation wells during the project. Removal or abandonment of observation wells shall be as directed by the Engineer.

h. While dewatering for new construction in the vicinity of existing structures, depletion of the groundwater level underneath these existing structures may cause settlement of within the site footprint and at some distance beyond the footprint. To avoid this settlement, the groundwater level under these structures shall be maintained by appropriate methods. In conditions where dewatering in excess of 20 gpm for over 24 hours is anticipated, a professional engineer specializing in geotechnical engineering should evaluate the potential for settlements created by dewatering that may be detrimental to existing structures. This evaluation should include an investigation of the specific soil and groundwater conditions to a depth of at least 2

times the depth of the excavation including the permeability and compressibility of the various soil strata (either by direct measurement or by empirical methods), an interpretation of the water table drawdown at the location of any potentially affected structure(s), the duration of the dewatering program, and the resulting amount of settlement that will be created at the structure(s).

801-7 DISPOSAL OF UNUSABLE AND SURPLUS MATERIAL: If at the time of excavation it is not possible to place any material in its proper section of the permanent structure, it shall be stockpiled in approved areas for later use. No extras will be considered for the stockpiling or double handling of excavated material. Unusable and surplus excavated materials, unless specified otherwise, shall become the property of the Contractor. Contractor shall remove and dispose of unusable or surplus material off of the project site at an appropriate disposal site approved by the Engineer. Unusable material includes all paving removed for the Work.

801-8 BACKFILLING AROUND STRUCTURES, MANHOLES, PUMP STATIONS AND PIPELINES:

a. All backfill shall be placed in layers having a maximum thickness of eight (8) inches in loose state and shall be compacted as specified in 801-9 of this Section.

b. Backfilling shall be carried up evenly on all walls of an individual structure simultaneously. No backfill shall be allowed against walls until the walls and their supporting slabs, if applicable, have attained sufficient strength as described previously. Backfilling shall be subject to approval by the Engineer.

c. Backfilling shall be carried up evenly on both sides of the pipeline. Contractor shall take special care to ensure proper support, compaction and elimination of voids under the haunches of the pipe.

d. In the case of trenches across or along roadways with open ditch drainage refer to subsection 801-11c for backfill and protection of roadside ditch sloped areas.

e. In locations where pipes pass through structure walls, the Contractor shall take the following precautions to consolidate the backfilling up to an elevation of at least one (1) foot above the bottom of the pipes:

    1. Place sand-aggregate bedding and initial backfill in such areas for a distance of not less than three (3) feet either side of the centerline of the pipe in level loose layers not exceeding eight (8) inches in thickness. Compact each layer.

    2. Place and thoroughly compact adjacent layers simultaneously.

f. The final finished surface of filled areas shall be graded to smooth, true lines, strictly conforming to grades indicated on the grading plan, and no soft spots or uncompacted areas will be allowed in the Work.

g. Temporary bracing shall be provided as required during construction of all structures to protect partially completed structures against all construction loads, hydraulic pressure, and earth pressure. The bracing shall be capable of resisting all loads applied to the walls as a result of backfilling. Contractor shall take precautions as to not disturb the compaction of the backfill when removing the bracing.

h. Controlled Low Strength Material placement will cause hydrostatic uplift pressure on the pipe in cases where bedding and initial backfill material may not be used.

Therefore, the Contractor shall anchor the pipe to remain on its intended alignment and grade. Contractor shall submit to the Engineer a pipe anchorage plan for the use of CLSM backfill. The plan shall include at a minimum:

1. Anchor/ballast material,
2. Size and weight of each,
3. Required spacing
4. Dams to confine the CLSM

At a minimum the anchorage shall be located at the pipe joints and midpoints. The anchoring/ballasting system shall be designed and stamped by a Professional Engineer licensed in the State of Louisiana. In addition to the anchorage system the CLSM shall be placed in incremental lifts around the pipe. Each lift shall be allowed to attain partial set before placing the next lift. The recommended incremental lifts are as follows:

1. First lift = 1/4 pipe outer diameter (OD)
2. Second lift = 1/3 OD
3. Third lift placed to the pipe crown
4. Remainder of backfill may be placed in one lift

Anchoring system is not required when bedding and initial backfill material is used in accordance with Standard Plan 801-01.

801-9 COMPACTION:

a. **General:** Contractor shall control soil compaction during construction and obtain the minimum required percentage of the maximum dry densities as specified herein and as shown on the Contract Documents. **Soil compaction with a backhoe bucket or any other heavy apparatus not designed specifically for soil compaction is not allowed**. The Contractor shall maintain the backfill for a period of one year after Final Acceptance and shall restore any backfill that fails and repair any pavement or other structures, which may be damaged as a result of backfill failure. It shall be the Contractor's responsibility to notify the Engineer in writing that the compaction tests as required can be performed.

The frequency for density tests will be a minimum of one test per lift per 100 linear feet of trench excavation and one randomly selected test per 2,500 square feet of excavation for open areas. If the density tests indicate that the Work does not meet specified density requirements, the Engineer may require additional density tests to determine the extent of the deficient Work at the Contractor's expense. The Contractor will not be allowed an extension of Contract Time as a result of any density testing. The Contractor shall be required to remove, replace and compact deficient Work at no additional cost to the Owner.

It is the Contractor's responsibility to provide equipment and labor as needed to achieve the required compaction as specified herein. Should the rates of compaction fall below the values specified herein; the Engineer has the right to instruct the Contractor to alter his work and/or to provide different equipment to assure that the required backfill quality is consistently achieved. Any decision by the Engineer to forgo such instructions shall in no way relieve the Contractor of his responsibility to provide backfill of the specified quality.

b. **Percentage of Maximum Density Requirements:** Compact subgrade, and fill

materials to not less than the following percentages of maximum dry density as determined in accordance with ASTM 698, the Standard Proctor Test.

1. **Structural Fill below Spread Footing Foundations, Slabs-on-Grade, and other Portions of Structures**: Structural fill shall be place in horizontal lifts not exceeding eight-inch (8") loose thickness, or less if necessary to obtain proper compaction. Moisture content shall be within 3% of optimum as determined in accordance with ASTM D698, with stability present. Clay structural fill shall be compacted full depth to a minimum of 95 percent of the maximum dry density. Granular structural fill, with less than 5% passing the No. 200 Sieve shall be compacted full depth to at least 75% of the relative density as determined by ASTM D4253 and D4254.

2. **Manholes, Pump Stations, Structures, and Buildings:** Areas adjacent to structures shall be compacted with vibratory mechanical compaction equipment approved by the Engineer. Compact eight-inch (8") loose lifts to a minimum of 95 percent of the maximum dry density as determined by ASTM D698. Moisture content of backfill material shall be within 3% of optimum as determined in accordance with ASTM D698. Granular backfill, with less than 5% passing the No. 200 Sieve, shall be compacted to at least 75% of the relative density as determined by ASTM D4253 and D4254.

   The #57 stone bedding shall be placed in maximum 12" loose lifts, rodded and vibrated to orient the stone and eliminate voids to create uniform bedding support for the pipe, with the material compacted to 100% of the materials maximum dry rodded weight in accordance with ASTM C29.

3. **Compaction of Bedding and Initial Backfill Material:** Bedding and initial backfill shall be compacted. Compact eight-inch (8") loose lifts to a minimum of 95 percent of the maximum dry density as determined by ASTM D698. Bedding material will be rodded and vibrated to orient the stone and eliminate voids to create uniform bedding support for the pipe. Bedding material will not be compacted until rodding is complete. Moisture content of bedding and initial backfill material shall be within 3% of optimum as determined in accordance with ASTM 698.

4. **Compaction of Backfill Directly Under Existing Pavements:** Secondary backfill directly under existing pavements (roadways and parking lots) shall be #610 Stone material and placed in loose layers of eight (8) inches and compacted. Backfill shall be compacted with vibratory compaction equipment to not less than 95 percent of the maximum dry density as determined by ASTM D698. Moisture content of backfill material shall be within 3% of optimum as determined in accordance with ASTM 698.

5. **Compaction of Backfill Near Existing Structures and Pavements or Directly Under Future Pavements:** Secondary backfill within 10 feet of an existing structure foundation, the edge of an existing road/shoulder/back of curb, and/or directly under the limits of a future asphaltic or PCC roadway/parking lot to be constructed subsequent to sanitary sewer installation shall be bedding and initial backfill (sand-aggregate) material. In this situation the sand aggregate material shall be placed and compacted to within 3.5 feet of the surrounding grade, and usable excavated soils or select imported fill for the remainder of the backfill to surrounding or specified grade. Both materials shall be placed in loose layers of eight (8) inches and compacted. All backfill shall be compacted with vibratory

compaction equipment to not less than 95 percent of the maximum dry density as determined by ASTM D698. Moisture content of backfill material shall be within 3% of optimum as determined in accordance with ASTM 698.

6. **Unstable Subgrades or Wet Trench Bottoms:** If trench bottoms contain unstable subgrades, peat and muck bottoms, or wet bottoms that cannot be pumped dry, then at the direction of the Engineer, #57 Stone encapsulated in geotextile fabric, shall be used in accordance with the Standard Detail 801-01. #57 Stone shall be placed and compacted in lifts sufficient to provide a suitable, non-yielding working surface for the required construction operations.

7. **Compaction of All Other Backfill:** Where a trench is in open ground and the backfill is not influenced by loading conditions, secondary backfill shall be as shown on the Contract Documents and compacted in loose layers of eight (8) inches and compacted to a minimum 90 percent of the maximum dry density. If the Contractor is unable to dry the excavated soil to an appropriate moisture content in order to achieve the required rate of compaction, he shall request authorization from the Engineer to deem the excavated soil as unusable and replace with imported select material for backfill. The final surface shall be left in a condition equal to that originally found at the start of the Work. The backfill shall be finished over the trench flush with the ground surface. The Contractor will add backfill material monthly during the contract duration and during the warranty period to compensate for settlement and erosion.

c. **Moisture Control:** Contractor shall condition subgrade or fill material to moisture content sufficiently near optimum to accommodate compaction meeting the required percent compaction. When the material is too dry to be compacted efficiently, the Contractor shall uniformly apply water to soil material and thoroughly mix the soil to achieve moisture content near the optimum level to facilitate compaction. Contractor shall remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.

d. Incidental compaction due to traffic by construction equipment will not be credited toward the required minimum compaction as required for any material.

801-10 GRADING:

a. **General:** Uniformly grade areas within limits of grading under this Section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades as are required or shown on the Contract Documents.

b. **Grading Outside Building Lines:** Grade areas adjacent to building lines, as shown on the Drawings, to drain away from structures and to prevent ponding. Finish surface free from irregular surface changes and to within not more than 0.10 feet above or below the required elevation.

c. **Grading Surface of Fill under Building Slabs:** Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of one-half inch when tested with a ten (10) foot straightedge.

d. During the process of excavation, the grade shall be maintained in such condition that it will be well drained at all times. When directed by the Engineer, temporary

drains and drainage ditches shall be installed to intercept or divert surface water that may affect the prosecution or condition of the Work.

e. The Engineer reserves the right to make adjustments or revisions in lines or grades if found necessary as the Work progresses, in order to obtain satisfactory construction.

801-11 MAINTENANCE:

a. **Protection of Graded Areas:** Protect newly graded areas from traffic and erosion. Keep areas free of trash and debris and repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

b. **Protection of Sloped Areas:** If a fill section or backfilled trench zone falls within a sloped area then Contractor shall place an erosion control blanket over the slope. Areas requiring an erosion control blanket shall be approved prior to placement. After materials are placed and spread, lumps, stones, roots and other foreign matter shall be removed from the area. Erosion control blanket shall be placed in a timely manner to prevent erosion. Payment for the erosion control blanket shall be in accordance with Section 903.

c. **Protection of Roadside Ditch Sloped Areas:** In the case of roadways with open ditch drainage - when any portion of a sewer (sanitary or storm) excavation trench limit falls within 1 foot inside or 5 feet outside the existing pavement edge, the Contractor shall place and compact Imported Clay Fill for the length of the trench excavation as shown on the Roadside Ditch Slope Stability Treatment Detail included at the end of this Section.

   After placement and compaction of the clay material, a layer of topsoil shall be placed on the slope. The topsoil shall be seeded and fertilized in accordance with Section 903. Once the topsoil has been seeded and fertilized the Contractor shall overlay the topsoil with an Erosion Control Mat in accordance with Section 903. The Contractor shall maintain existing roadside slopes, ditch side slopes and ditch flow lines by undercutting existing grades for placement of the clay fill and topsoil. The cost of the topsoil, seeding, and erosion control matting shall be included in the Imported Clay Fill pay item.

d. **Reconditioning Compacted Areas:** Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.

801-12 MEASUREMENT:

a. **Sewer Point Repair Excavation, Backfill, and Compaction:** Measurement for the excavation, bedding, backfill and compaction for each sewer line point repair shall be made on a linear foot basis, measured to the nearest whole foot, for the depths listed under this Item of the Bid Form. Payment for excavation on each sewer point repair will be based on the actual length of main line pipe replaced plus one (1) additional foot of excavation on each end, up to and including twenty-two (22) feet in length. When tying into a manhole, measurement will be based on the actual length of main line pipe replaced (from outside face of manhole) plus one (1) additional foot of excavation on one end only. The other end will be paid for under the Bid Item for connection to existing manhole. Any additional excavation, authorized by the Engineer, beyond the twenty-two (22) foot sewer point repair excavation limit will be

paid for under the Sewer Remove and Replace Excavation, Backfill, and Compaction Bid Item.

The depth will be the average of measurements taken every twenty (20) feet, or as determined by changes in ground elevation, measured from ground elevation to the pipe invert along the horizontal centerline of the existing pipe. Trench width shall be as specified in the Contract Documents.

b. **Sewer Remove and Replace Excavation, Backfill, and Compaction:** Measurement for the excavation, bedding, backfill, and compaction for each sewer line remove and replacement as designated in the Contract Documents, shall be made on a linear foot basis, measured to the nearest whole foot, for the depths listed under this Item of the Bid Form. Payment for excavation will be based on the actual length of main line pipe replaced plus one (1) additional foot of excavation on each end. When tying into a manhole, measurement will be based on the actual length of main line pipe replaced (from outside face of manhole) plus one (1) additional foot of excavation on one end only. When tying into a manhole on both ends, measurement will not include one (1) additional foot of excavation on either end that is tied into the manhole. It will be paid for under the Bid Item for connection to existing manhole.

   The depth will be the average of measurements taken every 25 feet, or more often as determined by changes in ground elevation, measured from ground elevation to the pipe invert along the horizontal centerline of the existing pipe. Trench width shall be as specified in the Contract Documents.

c. **Sewer Service Lateral Excavation, Backfill, and Compaction:** Measurement for the excavation, bedding, backfill, and compaction for sewer service laterals shall be made on a linear foot basis, measured to the nearest whole foot, from the edge of the mainline trench pay limit of excavation, bedding, backfill, and compaction to the end of the each sewer service lateral repair. The additional footages on the ends do not apply to sewer service laterals.

d. **#57 Stone Backfill:** Measurement for #57 stone backfill shall be the in-place measure of the number of cubic yards of limestone required to be used as needed and as authorized by the Engineer due to unstable material encountered in the trench bottom.

e. **#610 Stone Backfill:** Measurement for #610 stone backfill shall be the in-place measure of the number of cubic yards of backfill required to be used as needed and as authorized by the Engineer.

f. **Select Material for Backfill:** The Contractor shall use all such usable excavated soils available from excavations made in this Contract prior to supplying select material from other sources. Measurement for select material for backfill shall be the in-place, compacted measure of the number of cubic yards of select material required to be used as needed and as authorized by the Engineer. Select material does not include transporting, placing, and compacting usable excavated soils from excavations made in the Contract.

   Select material used to fill voids resulting from unauthorized excavation outside the established pay limits, or where required for dewatering, shall not be measured for payment even though the Engineer ordered their use.

g. **Imported Clay Fill:** Measurement for this item shall be the in-place measure of the

number of cubic yards of imported clay fill required to be used as needed and as authorized by the Engineer.

h. **Controlled Low Strength Material:** Measurement for CLSM will be by the cubic yard from plant batch tickets.

i. **Sand-Aggregate for Secondary Backfill:** Measurement for sand-aggregate mixture for secondary backfill shall be the in-place measure of the number of cubic yards of secondary backfill required to be used as needed and as authorized by the Engineer.

801-13 PAYMENT:

a. **Sewer Point Repair Excavation, Backfill, and Compaction:** Payment for this Item will be full compensation for miscellaneous clearing and grubbing, traffic control, trench excavation, trench dewatering, shoring and bracing, bedding, backfilling, compaction, restoring the trench surface to grade, top soiling, test pits, and driving and removing shoring and bracing, in accordance with the Contract Documents. Sand-aggregate for bedding and initial backfill material and useable excavated soil for secondary backfill, as shown on City-Parish Standard Detail 801-01 shall be included in this pay item. When required, special bedding and backfill material such as #57 Stone Backfill, #610 Stone Backfill, CLSM Backfill, Sand-Aggregate for Secondary Backfill, and Select Material for Backfill required for Work associated with Sewer Pipe will be paid for under the relative pay item. Sewer pipe and fittings required for sewer point repairs will be paid for under the relative pay item in Section 802.

b. **Sewer Remove and Replace Excavation, Backfill, and Compaction:** Payment for this Item will be full compensation for miscellaneous clearing and grubbing, traffic control, trench excavation, trench dewatering, shoring and bracing, bedding, backfilling, compaction, restoring the trench surface to grade, top soiling, test pits, and driving and removing shoring and bracing, in accordance with the Contract Documents. Sand-aggregate for bedding and initial backfill material and useable excavated soil for secondary backfill, as shown on City-Parish Standard Detail 801-01 shall be included in this pay item. When required, special bedding and backfill material such as #57 Stone Backfill, #610 Stone Backfill, CLSM Backfill, Sand-Aggregate for Secondary Backfill, and Select Material for Backfill required for Work associated with Sewer Pipe will be paid for under the relative pay item. Sewer pipe and fittings required for sewer point repairs will be paid for under the relative pay item in Section 802.

c. **Sewer Service Lateral Excavation, Backfill, and Compaction:** Payment for this Item will be full compensation for miscellaneous clearing and grubbing, traffic control, trench excavation, trench dewatering, shoring and bracing, bedding, backfilling, compaction, restoring the trench surface to grade, top soiling, test pits, and driving and removing shoring and bracing, in accordance with the Contract Documents. Sand-aggregate for bedding and initial backfill material and useable excavated soil for secondary backfill, as shown on City-Parish Standard Detail 801-01 shall be included in this pay item. When required, special bedding and backfill material such as #57 Stone Backfill, #610 Stone Backfill, CLSM Backfill, Sand-Aggregate for Secondary Backfill, and Select Material for Backfill required for Work associated with Sewer Pipe will be paid for under the relative pay item. Sewer pipe and fittings required for sewer point repairs will be paid for under the relative pay item in Section 802.

d. **#57 Stone Backfill:** Payment for this Item will be full compensation for removal and disposal of unstable subgrade material when encountered in trench bottoms; geotextile fabric; and #57 stone backfill furnished transported, placed, and compacted to replace unstable subgrade material as shown in the Contract Documents and not specifically included under other Bid Items.

e. **#610 Stone Backfill:** Payment for this Item will be full compensation for #610 stone backfill furnished transported, placed, and compacted as shown in the Contract Documents and not specifically included under other Bid Items.

f. **Select Material for Backfill:** Payment for this Item will be full compensation for select material furnished from sources other than excavations made in this Contract, transported, placed, and compacted as ordered by the Engineer and not specifically included under other Bid Items. No payment will be made for usable excavated soil obtained from excavations made in this Contract.

g. **Imported Clay Fill:** Payment for this Item will be full compensation for imported clay material, transported, placed, and compacted as ordered by the Engineer. The cost of the topsoil, seeding, and erosion control matting associated with the Roadside Ditch Slope Stability Treatment shall be included in this pay item.

h. **Controlled Low Strength Material:** Payment for this Item will be full compensation for CLSM backfill, including pipe anchorage, furnished, transported and placed as ordered by the Engineer.

i. **Sand-Aggregate for Secondary Backfill:** Payment for this Item will be full compensation for sand-aggregate mixture required as secondary backfill furnished transported, placed, and compacted as shown in the Contract Documents and not specifically included under other Bid Items.

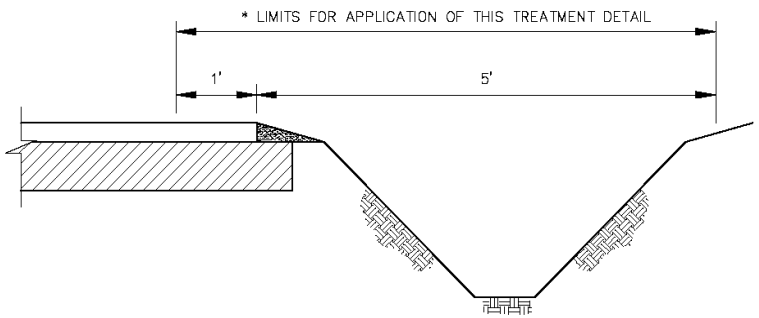
801-14 PAY ITEMS:

Trench Depth Schedule

0	=	0	-	6	Feet
1	=	6.1	-	8	Feet
2	=	8.1	-	10	Feet
3	=	10.1	-	12	Feet
4	=	12.1	-	16	Feet
5	=	16.1	-	20	Feet
6	=	20.1	-	24	Feet
7	=	24.1	-	28	Feet
8	=	28.1	-	32	Feet
9	=	32.1	-	36	Feet

Item No.	Item	Unit
801100_	Sewer Point Repair Excavation, Backfill, and Compaction (_' – _' depth)	Linear Foot
801200_	Sewer Remove and Replace Excavation, Backfill, and Compaction (_' – _' depth)	Linear Foot

8012100	Sewer Service Lateral Excavation, Backfill, and Compaction	Linear Foot
8013000	#57 Stone Backfill	Cubic Yard
8013100	#610 Stone Backfill	Cubic Yard
8013200	Select Material for Backfill	Cubic Yard
8013300	Imported Clay Fill	Cubic Yard
8013400	Controlled Low Strength Material	Cubic Yard
8013500	Sand-Aggregate for Secondary Backfill	Cubic Yard



(1) EXISTING PAVEMENT BASE TO REMAIN

(2) EXISTING ASPHALTIC CONCRETE SURFACING TO REMAIN

(3) REQUIRED FULL DEPTH ASPHALT CONCRETE BASE (PG 64-22)

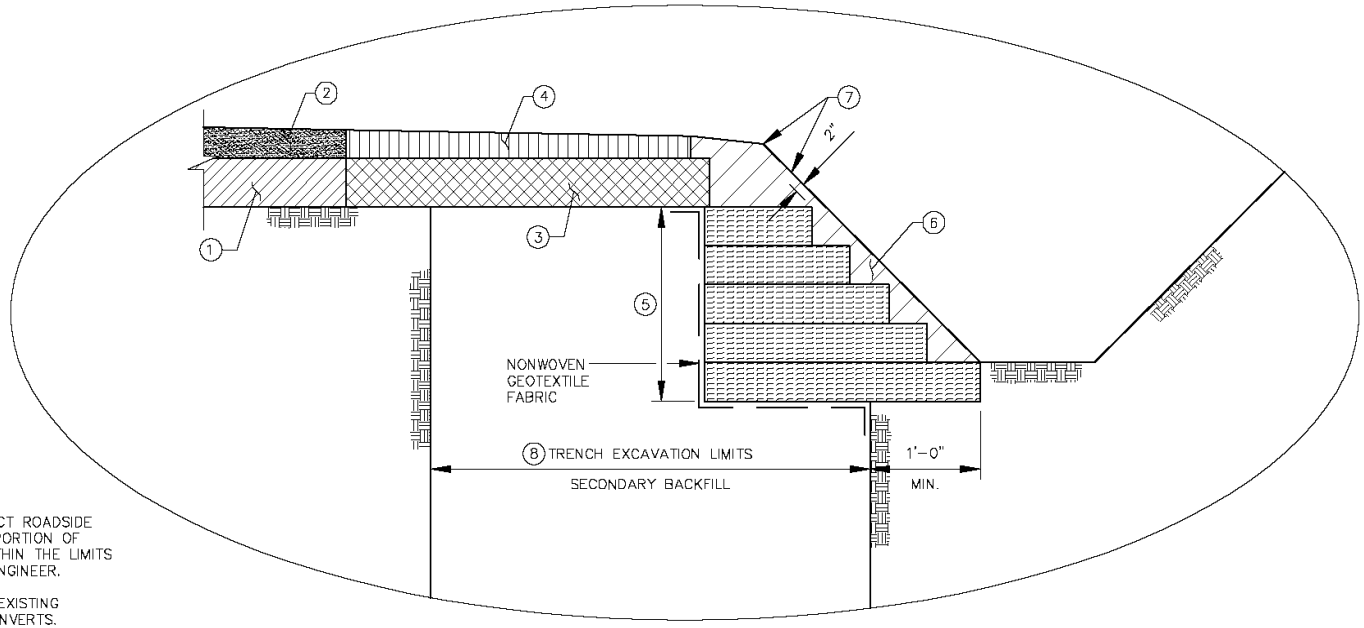
(4) REQUIRED ASPHALTIC CONCRETE SURFACING (TYPE B MIX, (PG-76-22M) 4" MIN. DEPTH)

(5) REQUIRED COMPACTED CLAY, 8" LOOSE LIFTS. THE COST OF IMPORTING, PLACING, AND COMPACTING THE CLAY SHALL BE INCLUDED IN THE PRICE PER CUBIC YARD FOR IMPORTED CLAY FILL

(6) REQUIRED TOPSOIL (SEEDED PER SPECIFICATION SECTION 903)

(7) REQUIRED EROSION CONTROL BLANKET

(8) SEWER PIPE REPAIR EXCAVATION (SEE STANDARD PLAN 801-01)



NOTES:

1. *CONTRACTOR SHALL CONSTRUCT ROADSIDE DITCH TREATMENT WHEN ANY PORTION OF TRENCH EXCAVATION FALLS WITHIN THE LIMITS SHOWN, OR AS DIRECTED BY ENGINEER.
2. CONTRACTOR SHALL MAINTAIN EXISTING ROADSIDE SLOPES AND DITCH INVERTS.
3. PLACEMENT AND COMPACTION OF CLAY, TOPSOIL (INCLUDING SEED) AND EROSION CONTROL BLANKET SHALL BE INCLUDED IN THE IMPORTED CLAY FILL PAY ITEM.

ROADSIDE DITCH SLOPE STABILITY TREATMENT DETAIL

N.T.S.

SECTION 802
GRAVITY SEWER PIPE

802-1 DESCRIPTION: This Work shall consist of furnishing all labor, materials, equipment, and incidentals required to remove and dispose of existing gravity sewer pipe if required, perform point repairs, remove and replace repairs and install new gravity sanitary sewer lines and fittings.

802-2 MATERIALS: Materials shall conform to the following Sections and Subsections:

a.	Plastic Pipe	1016-1.1
b.	Ductile Iron Pipe	1016-1.2
c.	Steel Pipe	1016-1.3
d.	Fiberglass Reinforced Polymer Pipe	1016-1.4

When a foreign manufactured material is proposed for use, have material tested for conformance to applicable ASTM requirements by certified independent testing laboratory located in the United States. Certification from any other source is not acceptable. Furnish copies of test reports to the Engineer for review. Cost of testing shall be borne by the Contractor.

Contractor shall provide sewer pipes with the inside diameter shown on the Contract Documents. Diameters shown on the Drawings and listed in the pay items represent the required inside diameters, regardless of pipe material.

When an item for gravity "Sewer Pipe" is included in the contract, the Contractor has the choice to select from the following list of pipe materials in accordance with the specified inside diameters:

- Less than 18” (inside diameter) – PVC, HDPE and Ductile Iron
- 18” up to but not including 21” (inside diameter) – PVC, HDPE, Ductile Iron, or FRP
- 21” up to and including 24” (inside diameter) – PVC, HDPE, FRP, Ductile Iron, or Large Diameter Closed Profile PVC
- 27” up to and including 48” (inside diameter) – HDPE, FRP, Large Diameter Closed Profile PVC, or Ductile Iron
- Greater than 48” (inside diameter) – FRP

802-3 SUBMITTALS:

a. The Contractor shall submit to the Owner prior to receiving the Notice to Proceed at the pre-construction meeting, a list of materials to be furnished and the names of the suppliers.

b. The Contractor shall submit for approval, complete, detailed shop drawings of all pipe and fittings.

c. The Contractor shall submit and shall comply with the pipe manufacturer’s recommendations for handling, storing and installing pipe and fittings.

d. The Contractor shall submit pipe manufacturer’s certification of compliance with these Contract Documents.

802-4 CONSTRUCTION:

802-4.1 Open Trench: Trenching construction consists of trench excavation, bedding, laying of pipe on grade, backfill, compaction, grading and incidentals in accordance with Section 801.

802-4.1.1 Pipe Laying: Pipe shall be laid in accordance with the manufacturer's instructions and as specified as follows:

a. During pipe laying, trenches shall be kept dry. After each day's operations, and at other times when pipe laying is discontinued for more than one (1) hour, ends of the pipe shall be capped or plugged until pipe laying is resumed.

b. Pipe laying shall not advance backfilling by more than 100 feet without approval by the Engineer.

c. Pipe laying shall begin at downstream end of line. Bell or groove ends of pipe shall be placed facing upstream. Bell holes shall be excavated to assure that only the pipe barrel shall bear upon the trench bedding material. No blocking under the pipe will be permitted.

d. Extreme care shall be used when handling and installing pipe and fittings. Under no circumstances shall pipe or fittings be dropped either into the trench or during unloading. The interior of the pipe shall be kept clean of oil, dirt, and foreign matter.

e. When necessary to cut and machine all pipe in the field, the appropriate tools as recommended by the pipe manufacturer, shall be used. A "full insertion mark" shall be provided on each field cut pipe end. Field-cut pipe shall be beveled with a beveling tool specifically made for the pipe material.

802-4.1.2 Pipe Jointing: The jointing of the pipe shall be done in strict accordance with the pipe manufacturer's instructions and shall be done entirely in the trench. Joints and gaskets shall comply with Subsection 802-2 and the relative pipe material. Workmen who are certified by the pipe manufacturer to join the pipe shall only perform pipe jointing. They should perform the work as follows:

a. Expend extreme care to keep the bells of the pipe free from dirt and rocks so joints may be properly assembled without overstressing the bells.

b. Provide lubricant, place and drive home newly laid sections. Use of backhoes or similar powered equipment will not be allowed unless protective measures are provided and approved in advance by the Engineer.

c. Install pipe to "full insertion mark" where provided.

802-4.2 Trenchless: Trenchless construction consists of technologies and methods utilized for installing sewer pipelines and services with minimal surface disruption and destruction resulting from excavation. Trenchless Construction shall conform to the following sections:

Pipe Bursting	811
Jacked & Bored Pipe / Casing	817
Horizontal Directional Drilling	818
Microtunneling & Pipe-Jacked Tunnels	819

802-4.3 Remove and/or Abandonment of Existing Gravity Sewer Pipe: This section addresses the removal and/or abandonment of the existing gravity sewer pipe and all appurtenances which are being removed (or abandoned) as detailed on the Contract Documents.

a. Abandon Sewer Pipe: If an existing sewer pipe is shown to be abandoned in place on the Contract Documents, the Contractor shall be responsible for evacuating or

"swabbing" the existing sewer pipe of all sewage before it is abandoned. This sewage shall be treated as hazardous material and disposed of using the proper criteria from the La. Department of Environmental Quality. Subsequently, the entire length of the pipe shall be filled with flowable fill and capped as noted on the Drawings or as directed by the Engineer.

b. Plug and Abandon Sewer Pipe: If an existing sewer pipe is shown to be plugged and abandoned in place on the Contract Documents, the Contractor shall be responsible for evacuating or "swabbing" the existing sewer pipe of all sewage before it is abandoned. This sewage shall be treated as hazardous material and disposed of using the proper criteria from the La. Department of Environmental Quality. Subsequently, the pipe shall be plugged approximately 18 inches into each end of the pipe and capped as noted on the Drawings or as directed by the Engineer.

c. Remove Sewer Pipe: If an existing sewer pipe is shown to be removed on the Contract Documents, the Contractor shall completely remove the sewer pipe. The removal trench shall be backfilled in accordance with the provisions of Section 801 or as directed by the Engineer. The Contractor shall be responsible for evacuating or "swabbing" the existing sewer pipe of all sewage before it is removed. This sewage shall be treated as hazardous material and disposed of using the proper criteria from the La. Department of Environmental Quality.

d. Remove and/or Abandon Sewer Pipe:

    1. If an existing sewer pipe is shown as remove and/or abandon in place on the Contract Documents, the Contractor has the option to either completely remove the sewer pipe or abandon the sewer pipe. The Contractor shall be responsible for evacuating or "swabbing" the existing sewer pipe of all sewage before it is abandoned or removed. This sewage shall be treated as hazardous material and disposed of using the proper criteria from the La. Department of Environmental Quality.

    2. If removed, the removal trench shall be backfilled in accordance with the provisions of Section 801 or as directed by the Engineer.

    3. If abandoned, the entire length of the pipe shall be completely filled with flowable fill.

802-5 NEW PIPE-EXISTING PIPE CONNECTIONS: Connections between existing and new pipe, with the exception of HDPE pipe, shall be jointed with non-shear repair couplings conforming to ASTM C425 and ASTM C1173. The stainless steel outer sleeve and clamping bands used in conjunction with the molded rubber sleeve shall conform to ASTM A 240 Series. When using the non-shear repair coupling, the gap between the two pipes shall be no more than ¼".

When non-shear repair couplings are not available for a particular size or material, connections between existing and new pipe shall be jointed using flexible elastomer couplings with a 300 stainless steel band for each end and adjusting screws capable of sustaining an applied torque in excess of 80 inch-pounds. When dissimilar pipe materials are joined, the Contractor shall use flexible couplings that are resistant to the corrosive action of the soils and sewage, and that provide a permanent watertight joint.

Connections between existing and new HDPE pipe shall be jointed with HDPE electrofusion couplings in accordance with subsection 1016-1.1.2. Prior to ordering materials, Contractor shall

check existing pipe diameters and take care to provide matching pipe and coupling to make proper connection.

802-6 PIPE-MANHOLE CONNECTIONS: All sewer pipe shall be connected to new manholes with either flexible rubber boot connectors or integrally cast flexible connectors installed in accordance with the manufacturer's instructions. Then the opening on the inside and outside of the manhole shall be grouted (non-shrink) if necessary, to achieve a watertight seal.

For existing manhole connections, pipe shall be connected with a hydraulic cement material having a set time of no more than two (2) minutes; compressive strength of 600 psi at one (1) hour, 1,000 psi at twenty-four (24) hours; bond of 40 psi at one (1) hour, 80 psi at twenty-four (24) hours. These requirements apply whether it is a connection to an existing sanitary sewer manhole or connections through a storm water conflict manhole, junction box, or inlet.

In the case of HDPE pipe, in addition to the flexible manhole connectors and non-shrink grout, electrofusion flex restraints shall be permanently attached to the pipe to prevent movement. HDPE flex restraints shall be in conformance with subsection 1016-1.1.2.

802-7 SERVICE LATERAL CONNECTIONS: Connections between the existing service lateral and the new/rehabilitated sewer main line shall be in accordance with the Contract Documents. Existing sewer service lateral and house connections shall be adjusted as required avoiding conflicts with the new Work. New pipe and fittings shall be furnished and installed as necessary and in accordance with the Contract Documents.

a. Service lateral connections located within the limit of a rehabilitation method or repair are required to be replaced (regardless of construction method) in both directions up to the property line with a clean-out and pad installed at the property line. Construction shall be in accordance with the appropriate typical drawings in the Contract Documents. The exception to this is with service lateral connections on mainlines to be rehabilitated with CIPP lining. In this case, unless a point repair or remove and replace repair is shown on the plans, service lateral connections on mainlines to be CIPP lined will receive a lateral connection sealing and repair product (top hat) in accordance with Sections 808 and 809.

b. Service lateral vertical connection stacks shall be required in accordance with the Contract Documents.

c. New service lateral terminations, required prior to private service connection and cleanout installation, shall be required in accordance with the Contract Documents and stubbed a minimum of 3 feet above ground and capped.

d. In association with mainlines previously rehabilitated with CIPP lining:

    1. Connections between the service lateral and a main line, which has previously been repaired by a CIPP lining process, shall be made with six (6)-inch Flexible saddle wyes with corrosion resistant series 300 stainless steel clamps capable of sustaining an applied torque of 60 inch-pounds. In cases where a vertical stack is repaired, the PVC saddle wye shall be used in place of the flexible wye.

    2. Host pipe shall be removed to expose the full circumference of the CIPP liner around the wye connection, to allow for installation of the saddle with a sealant product such as Hydrophilic Water Stop. The interface between pipe and CIPP liner shall be sealed around the entire circumference of the wye

connection with an approved non-shrink grout.

e. In association with Slip Lining:

1. After the liner pipe has been inserted in the host pipe, given the appropriate relaxation period, and secured in the upstream and downstream manhole, all existing services shall be reconnected. A portion of the host pipe, at the liner pipe around each service connection shall be removed to expose the liner pipe to provide adequate working space for making the new service connection. The Contractor shall reconnect the services to the liner pipe using compressive-fit service connections such as Inserta-Tee or approved equal.

2. Prior to backfilling, the portion of the host pipe removed for service reconnection shall be sealed to preclude migration of the backfill material into the annular space or loss of grout material during grouting of the annular space between the liner pipe and host pipe. This area may be sealed with an approved non-shrink grout or the portion of host pipe removed may be replaced and grouted.

f. In association with HDPE (HDPE Pipe or Lining Material):

1. The method of saddle connection to the main line shall be by Gasketed Electrofusion Branch Saddles by Central Plastics, or approved equal in conformance with subsection 1016-1.1.2. Personnel certified by a manufacturer of polyethylene pipe in the proper methods of installing electrofusion fittings shall carry out installation of electrofusion saddles in strict conformance with the manufacturer's printed instructions. Installation shall include all equipment, labor, materials, and incidentals. Saddle material shall be compatible with the main line pipe or lining material.

802-8 ACCEPTANCE TESTS FOR NEW PIPE: Installed sewer lines shall pass one or more of the following tests performed by the Contractor as directed by the Engineer. Contractor shall perform the test in the presence of the Engineer or his representative. Contractor shall coordinate testing with surface restoration requirements of Section 4-5. Any removal or replacement of temporary or final surface restoration by the Contractor to investigate leaks shall be done so at no additional cost to the Owner.

802-8.1 Leakage Tests: Sewer lines shall be tested for leakage as follows:

Low Air Pressure Test - manhole to manhole reach of pipe for sewer pipe 30" in diameter and smaller; individual joints for sewer pipe larger than 36" in diameter

Infiltration Test - for sewer pipe greater than 30" in diameter with groundwater equal to or greater than 2 feet above top of pipe (with approval of Engineer)

Exfiltration Test - for sewer pipe greater than 30" in diameter with groundwater less than 2 feet above top of pipe (with approval of Engineer)

802-8.1.1 Low Air Pressure Test: This practice defines the proper procedures for acceptance testing of installed gravity sewer pipe using low-pressure air, to provide assurance that the pipe, as installed, is free from significant leaks. Included are requirements for equipment accuracy, safety precautions, line preparation, test method, and minimum holding times. Applicable sections of ASTM F1417 shall also apply.

a. For Pipes 30” in Diameter and less (Manhole to Manhole Reach)

1. Only lines tested after backfilling to final grade will be considered for acceptability. Acceptance will be dependent on a passing test. However, the installer as a presumptive test to determine the condition of the line prior to backfilling may also use this test. During sewer construction, all service laterals, stubs and fittings into the sewer test section shall be properly capped or plugged to prevent air loss that could cause an erroneous air test result. It may be necessary and is always advisable for the Contractor to restrain gasketed caps, plugs, or short pipe lengths with bracing stakes, clamps, and tie-rods or wire harnesses over the pipe bells.

2. Unless otherwise specified, the Contractor shall furnish all the necessary equipment and be responsible for conducting all low-pressure air tests. In addition, the Contractor shall be responsible for any necessary repair work on sections that do not pass the test at no additional cost to the Owner.

3. The Engineer shall witness all low-pressure air tests and verify the accuracy and acceptability of the equipment utilized. The Engineer will inform the Contractor regarding acceptable methods of repair in the event one or more sections fail to pass the low-pressure air test.

4. Ensure that all plugs are installed and braced to prevent blowouts. As an example of the hazard, a force of 250 pounds is exerted on an 8-inch plug by an internal pipe pressure of 5 psig, and a force of 2,250 pounds is exerted on a 24-inch plug by an internal pressure of 5 psig. The Contractor must realize that sudden expulsion of a poorly installed plug, or of a plug that is partially deflated before the pipe pressure is released, can be very dangerous. For this reason, it is recommended that every plug be positively braced against the manhole walls, and that no one be allowed in the manhole adjoining a line being tested while as pressure is maintained in the line.

5. Internal pressure of more than 9 psig shall not be permitted except for leak location equipment where the plugs are firmly tied together. Contractor should verify maximum allowable pressure recommended by pipe manufacturer.

6. Use either mechanical or pneumatic plugs. All plugs shall be designed to resist internal testing pressures without the aid of external bracing or blocking. However, the Contractor shall internally restrain or brace the plugs to the manhole wall as an added safety precaution throughout the test.

7. Air test gauges shall be laboratory-calibrated test gauges, and if required by the Engineer, shall be recalibrated by a certified laboratory prior to the leakage test. Air gauges shall have a size and pressure range appropriate for the pipe being tested.

8. All pressurizing equipment used for low-pressure air testing shall include a regulator or relief valve set no higher than 9 psig to avoid over-pressurizing and displacing temporary or permanent plugs. As an added safety precaution, the pressure in the test section should be continuously monitored to make certain that it does not, at any time, exceed 9 psig. (It may be necessary to apply higher pressure at the control panel to overcome friction in the air supply hose during pressurization.)

9. To facilitate test verification by the Engineer, all air used shall pass through a single, above ground control panel. The aboveground air control equipment shall include a shut-off valve, pressure relief valve, input pressure gauge, and a continuous monitoring pressure gauge having a pressure range from 0 to at least 10 psi. The continuous monitoring gauge shall be no less than 4 inches in diameter with minimum divisions of 0.10 psi and an accuracy of plus or minus 0.04 psi. Two separate hoses shall be used to: 1) connect the control panel to the sealed line for introducing low-pressure air, and 2) a separate hose connection for constant monitoring of air pressure build-up in the line. This requirement greatly diminishes any chance for over-pressurizing the line.

10. If pneumatic plugs are utilized, a separate hose shall also be required to inflate the pneumatic plugs from the above ground control panel.

11. After a manhole-to-manhole reach of pipe has been backfilled to final grade and compacted, prepared for testing, and a 24-hour waiting period has elapsed, the plugs shall be placed in the line at each manhole and secured.

12. The Contractor is advised to seal test all plugs before use. Seal testing may be accomplished by laying one length of pipe on the ground and sealing it at both ends with the plugs to be checked. The sealed pipe should be pressurized to 9 psig. The plugs shall hold against this pressure without bracing and without any movement of the plugs out of the pipe. No persons shall be allowed in the alignment of the pipe during plug testing. It is advisable to plug the upstream end of the line first to prevent any upstream water from collecting in the test line. This is particularly important in high groundwater situations.

13. When plugs are being placed, the pipe adjacent to the manhole shall be visually inspected to detect any evidence of shear in the pipe due to differential settlement between the pipe and the manhole. A probable point of leakage is at the junction of the manhole and the pipe, and this fault may be covered by the pipe plug, and thus not revealed by the air test.

14. Low-pressure air shall be slowly introduced into the sealed line until the internal air pressure reaches 4.0 psig. If the groundwater table is above the sewer being tested, the air pressure shall be increased 0.43 psi for each foot that the water table is above the invert of the sewer, up to a maximum of 9.0 psig. After a constant pressure of 4.0 psig (greater than the average groundwater back pressure) is reached, the air supply shall be throttled to maintain that internal pressure for at least 2 minutes. This time permits the temperature of the entering air to equalize with the temperature of the pipe wall.

15. When temperatures have been equalized and the pressure stabilized at 4.0 psig (greater than the average groundwater backpressure), the air hose from the control panel to the air supply shall be shut off or disconnected. The continuous monitoring pressure gauge shall then be observed while the pressure is decreased to no less than 3.5 psig (greater than the average backpressure of any groundwater over the pipe). At a reading of 3.5 psig, timing shall commence with a stopwatch.

16. If the time shown for the designated pipe size and length (see Table 8-1 1.0 PSIG Air Test Pressure Drop) elapses before the air pressure drops 0.5 psig, the section undergoing test shall have passed. The test may be discontinued once

the prescribed time has elapsed even though the 0.5 psig drop has not occurred. If the pressure drops 0.5 psig before the appropriate time shown in Table I has elapsed, the air loss rate shall be considered excessive and the section of pipe has failed the test.

17. If the section fails to meet these requirements, the Contractor shall determine at their own expense the source, or sources, of leakage, and shall repair or replace all defective materials or workmanship to the satisfaction of the Engineer. The extent and type of repair, which may be allowed, as well as results, shall be subject to the approval of the Engineer. The completed pipe installation shall then be retested and required to meet the requirements of this test.

TABLE 8-1
1.0 PSIG Air Test Pressure Drop

Pipe Diameter	Minimum Time Lapse (min:sec)							
Inch	*100 ft*	*150 ft*	*200 ft*	*250 ft*	*300 ft*	*350 ft*	*400 ft*	*450 ft*
4	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24
10	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48
12	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38
15	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04
18	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41
21	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31
24	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33

b. **For Pipes Larger than 30" in Diameter (Individual Joint Testing):**

1. Individually test each sewer pipe joint with an approved joint air testing apparatus to an air pressure of 4.0 psig. If the groundwater table is above the sewer being tested, the air pressure shall be increased 0.43 psi for each foot that the water table is above the invert of the sewer, up to a maximum of 9.0 psig unless otherwise restricted by pipe manufacturer's recommendation.

2. The testing apparatus shall be positioned within the pipe in such a manner as to straddle the joint to be tested.

3. The apparatus packer ends shall be expanded so as to isolate the joint from the remainder of the pipe and create a void area between the packer and the pipe joint. The ends of the testing device shall be expanded against the pipe in accordance with the manufacturer's recommendations.

4. After void pressure is observed to be equal to or greater than the required test pressure, the air flow shall be stopped. If the void pressure drops by more than 1.0 psi within 15 seconds, the joint will have failed the test.

5. Upon completing the testing of each individual joint, the packer shall be deflated with the void pressure meter continuing to display void pressure. Contractor shall note and record the pressure display reading before each joint test. Should the void pressure meter fail to drop to 0.0 (±0.5) psig, Contractor shall make necessary equipment repairs to provide for an accurate void pressure reading.

802-8.1.2 Infiltration Test: Where the natural groundwater is 24 inches or more above the top of a section of pipe, the Contractor shall measure the flow of water in the pipe and the rates of seepage and infiltration. Contractor shall measure the flow rate by using a calibrated weir. The Contractor shall leave the weir in the line until the flow rate has stabilized. The Contractor is responsible for verifying the groundwater level by providing sight gauges in manholes or digging test holes at suitable locations.

a. The total seepage and infiltration of groundwater as determined by the test shall in no case exceed 50 gallons per 24 hours per inch-mile of pipe.

b. Make infiltration tests on all sewer construction before placing the lines in service and before making any connections to other sewers.

c. If the amount of infiltration into the sewer(s) is in excess of the maximum quantity specified above, then repair the joints, relay the sewer (if necessary), or perform other remedial construction, at the Contractor's expense, in order to reduce groundwater infiltration to within the specified limits.

802-8.1.3 Exfiltration Test: Where the groundwater is not 24 inches or more above the top of the pipe section being tested, the Contractor shall perform an exfiltration test.

a. The Contractor shall bulkhead the pipe below the lower manhole of the section being tested with a pneumatic plug or other device. Insert a vent pipe 48 inches long in the stopper of the upper end of that section. Then fill the lower manhole with water, or add water until there is a minimum of 4 feet over the upper end; make certain that all air is forced out through the vent tube.

b. Contractor will measure the drop in the level of the water in the manhole due to exfiltration over a specific time, and calculate the water loss due to exfiltration. The total exfiltration shall not exceed that specified above for infiltration.

802-8.2 Mandrel Test (Plastic & Fiberglass Pipe): Pipe shall not exceed a deflection of more than 5%. Unless otherwise directed by the Engineer, after pipe has been backfilled for at least 30 days, a mandrel sized at 95% of the inside pipe diameter shall be pulled through pipe per pipe manufacturer's recommendation.

802-8.3 Smoke Test:

a. All new sewer lines including service laterals with diameters up to & including 15 inches shall be smoke tested prior to backfilling in accordance with Section 814.

b. At the discretion of the Owner, a final smoke test shall be performed a minimum of nine (9) months after final acceptance up to the end of the twelve (12) month warranty period.

c. Leaks detected during smoke testing must be repaired as part of the Work and shall be considered incidental to and included in the cost of Work.

802-9 SANITARY SEWER PIPE REPAIRS:

802-9.1 Point Repair: A Point Repair is the task of excavating to a pipe and performing a corrective measure to repair a defect on a length of sewer pipe less than or equal to twenty (20) feet long. Point repairs shall address, but not be limited to, cracked pipe, broken pipe, faulty tap, protruding tap, sheared joint, dropped joint, or other similar conditions.

802-9.2 Remove and Replace: Remove and Replace is the task of excavating to a pipe and performing a corrective measure to repair a defect on a length of sewer pipe as designated on the Contract Documents. Remove and Replace operations shall address, but not be limited to, cracked pipe, broken pipe, faulty tap, protruding tap, sheared joint, dropped joint, or other similar conditions.

802-9.3 Trenchless Point Repair: A Trenchless Point Repair is the task of providing a localized trenchless sealing and structural repair to a defect on a length of sewer pipe less than or equal to three (3) feet long with an internally installed stainless steel repair sleeve. Trenchless Point repairs shall address, but not be limited to, leaking joints, cracked pipe, broken pipe, deformed pipe, or other similar conditions where excavation is not practical due to surface conflicts.

802-9.3.1 Design: The design of the stainless steel repair sleeves shall be in accordance with AWWA Manual 11 standards for design of Flexible Tunnel Liners. The repair sleeve shall be structurally designed to carry 5psi uniformly distributed hydraulic working load having a minimum factor of safety of 2.5 after 100-year chemical erosion of stainless steel material has been subtracted. Corrosion tables based on Stainless Steel Industry reports shall be used for calculating general surface erosion of the stainless steel plate thickness over the required 100-year service life due to corrosion. Calculations prepared by a Professional Engineer licensed in the State of Louisiana shall be submitted containing structural design, calculated effect of ovality and calculated structural effect of a 100-year chemical erosion of the structural element.

Where repair sleeve is fully enclosed in the damaged host pipe, the structural element of the sleeve shall be designed for 5psi hydraulic load with a minimum 2.5 factor of safety.

Where repair sleeve is expected to come in direct contact with the surrounding soil in excess of one third of the sleeve length, the structural element of the sleeve shall be designed for a hydraulic load of 10psi using a minimum 2.5 factor of safety. In lieu of a single sleeve, it is permissible to use a double sleeve assembly consisting of two single sleeves with 5psi capacity each joined together by a manufacturer approved resin matrix as a load transfer medium.

In case the host pipe has become oval, not exceeding 10 percent out of round, the repair sleeve with wall thickness of next thicker gauge from the one specified for standard repair sleeves shall be used.

802-9.3.2 Materials:

a. Sleeve: The structural component of the repair device shall be 316 stainless steel in the form of sleeves of the required length to cover the repair. The inner diameter reduction of the host pipe shall not exceed one (1) inch.

b. Sealant: Only manufacturer specified resin with physical properties set out by the requirements of the structural design shall be used. The sealant must be appropriate for transmitting all external loads to the stainless steel structural core, providing adequate support for the structural core against buckling and bonding the device in place.

    1. Sealing Grout: The sealant used shall be as specified by the manufacturer for

sealing infiltration.

2. Structural Grout: The sealant used shall be as specified by the manufacturer and shall be capable of transmitting all external loads to the structural core of the repair sleeve. If any infiltrating water is present, infiltration shall be sealed prior to installation of sleeve using structural grout.

802-9.3.3 Preparation:

a. Contractor shall notify the Engineer prior to beginning cleaning activities and pre-construction CCTV inspection. Contractor shall plan cleaning and pre-construction CCTV inspection activities far enough in advance of Trenchless Point Repair activities to allow Engineer time to review any Critical Damage Reports that may develop from the CCTV inspection results.

b. Experienced personnel trained in locating breaks, obstacles, and service connections by CCTV will perform CCTV of pipe in accordance with Section 815. The interior of the pipe should be carefully inspected to determine the location of any conditions that may prevent proper installation of the repair sleeve, such as protruding service taps, collapsed or crushed pipe, and reductions in the cross-sectional pipe area of more than 10%. The Contractor will notify the Engineer immediately if the inspection reveals an obstruction that cannot be removed by conventional sewer cleaning equipment or that will interfere with the proper installation an acceptable repair. This should be submitted to the Engineer as a Critical Damage Report (CDR). The CDR shall include all adverse conditions for each pipe segment from manhole to manhole. The CDR shall include:

1. Two letters of transmittal.
2. A CDR standard form including screen capture of adverse condition and location footage.
3. A hardcopy printout of the video cut sheet (video report).
4. A DVD containing:
    i. Electronic pdf files of the video cut sheets
    ii. Digital copy of the pipe video
5. Recommendation from the Contractor for each adverse condition.

c. It shall be the responsibility of the Contractor to remove all loose debris that is located within the sewer pipe in accordance with Section 812. This cleaning will be incidental to the cost of the Trenchless Point Repair. If an obstruction is encountered that cannot be cleared with conventional sewer cleaning equipment, the Engineer should be notified immediately.

d. Any roots, protruding gaskets, or protruding laterals in the existing sewer pipe shall be cut and removed from the sewer pipe prior to the sewer liner installation. With the approval of the Engineer, this removal work associated with Trenchless Point Repairs will be paid for under the relative pay items in Section 808.

802-9.3.4 Installation:

a. The entire process of transporting and installing the sleeve shall be recorded on digital media and a copy provided to the Engineer at the completion of each sewer

section.

b. The sewer must remain in full operation during the repair process allowing for a maximum of 5 minutes of flow interruption.

c. In case of offset joints, bells, and deformed or irregular pipe with disarranged pipe pieces, the pipe bore shall be opened by application of a hydraulic expander.

d. Pipe deformation shall reversed back to the round configuration and repair sleeves installed capable of restoring the full structural capacity of the host pipe.

e. In case the host pipe has completely collapsed and re-rounding is not possible without complete removal of the damaged pipe parts, an opening at least equal to the inside diameter of the host pipe must be cleared through the debris and the repair devices capable of sustaining the full soil load extended throughout the collapsed area at least 12 inches into the undamaged pipe.

f. When a cracked host pipe has formed randomly directed elements the host pipe must be re-rounded with the repair sleeve, or the re-rounding must be completed before installing a sleeve, in the backfill is compacted too tight around the pipe. In this case re-rounding should be accomplished by using a hydraulic jack before the sleeve is inserted.

g. The repair must extend at least 8" into undamaged pipe or joint adjacent to both extremities of the damage. If access to the line is limited such that shorter than specified sleeves must be used, or the length exceeds the manufacturer standard sleeve lengths, two or more sleeves shall be used with an overlap where two adjacent sleeves meet following manufacturer specified standards for overlapped repair sleeves.

h. Upon completion of the repair, the entire sewer section shall be inspected and the inspection recorded on digital media at no additional cost to the Owner. This video inspection shall be submitted to the Engineer for verification of work quality and completion of repair.

802-9.3.5 Acceptance:

a. All stainless steel sleeve locks have been engaged.

b. All the pre-measured grout supplied by the manufacturer has been applied to each stainless steel sleeve as specified by the manufacturer.

c. All host pipe leaking joints, cracks and holes are fully covered by the repair sleeve.

d. The entire pipe damage has been repaired per these specifications.

802-9.4 Smoke Testing: Smoke Testing shall be performed on each mainline or service lateral repair once all repairs are complete on a segment and prior to backfill according to Section 814 of the Specifications.

802-10 MEASUREMENT:

a. **Sewer Pipe**: Measurement of new pipe shall be made from center of manhole to

center of manhole as identified on the Contract Documents. Quantities of pipe for payment will be the contract quantities, adjusted as required due to plan errors or plan changes. Excavation, bedding, backfill, compaction, testing, and bypass flow are included in the measurement of new pipe.

b. **Rehab Sewer Pipe:** Measurement for the removal of existing sewer pipe and its replacement with sewer rehab pipe shall be made on a linear foot basis of pipe installed. Measurement will be made to the nearest whole foot for the various diameters listed in the Bid Form. When tying into a manhole or manholes, measurement will be to the inside face of the manhole structure. It is recognized that the Contractor must purchase pipe material at the minimum manufactured length based on the pipe material used; therefore, the unit bid price shall be based on a minimum main line length of six (6) feet at each point repair and will be recorded accordingly by the Engineer's field representative. Excavation, bedding, backfill, and compaction are NOT included in the measurement of sewer rehab pipe.

c. **Connections to Existing Manholes:** Connections to existing manholes (sanitary sewer manhole or storm water conflict/junction/inlet box) will be measured each for the connections required.

d. **Adjusted Sanitary Sewer Service Lateral Connections:** Adjusting existing services will be measured each for the service adjustments required and includes up to twenty (20) feet of adjusted sewer service lateral to avoid conflict with new utility. Excavation, bedding, backfill, compaction, testing, and bypass flow are included in the measurement of new pipe.

e. **Sewer Service Lateral:** Measurement of new service lateral shall be made from the nearest outside edge of the mainline or lateral connection stack to the limits of the sanitary sewer clean-out as identified on the Contract Documents. Quantities of service lateral for payment will be the contract quantities, adjusted as required due to plan errors or plan changes. Measurement for sewer service laterals shall be made to the nearest linear foot of pipe installed.

f. **Sewer Service Lateral Connection Stack:** Measurement of new service lateral connection stack shall be made from top outside edge of the mainline to the top of the stack as identified on the Contract Documents. Quantities of service lateral connection stack for payment will be the contract quantities, adjusted as required due to plan errors or plan changes. Measurement for sewer service lateral connection stacks shall be made to the nearest vertical foot of pipe installed.

g. **Sewer Service Lateral Termination:** Measurement for the sewer service lateral termination shall be the actual count of termination assemblies installed and accepted.

h. **Non-Shear Couplings:** Non-shear couplings will be counted each for the diameter required.

i. **Electrofusion Couplings:** Electrofusion couplings for jointing existing HDPE pipe to new HDPE pipe will be counted each for the diameter required.

j. **Sanitary Sewer Clean-out:** Measurement for the sanitary sewer clean-out shall be the actual count of clean-outs installed and accepted.

k. **Service Lateral Mainline Connection Associated with CIPP:** Measurement for the

service lateral mainline connection associated with mainline that has been previously rehabilitated with a CIPP liner shall be the actual count of each service lateral connection installed and accepted.

Excavation, bedding, backfill, and compaction associated with this item shall be paid for under the Sewer Point Repair Excavation, Backfill, and Compaction item by the appropriate depth range in accordance with Section 801. The pay limit length for this excavation, bedding, backfill, and compaction shall be limited to 6 feet at the depth range of the mainline beginning at the backside mainline excavation width pay limit. The pay limit width of excavation shall be the trench pay limit as shown on the Contract Documents.

l. **Service Lateral Mainline Connection Associated with Slip Lining:** Measurement for the service lateral mainline connection associated with slip lining shall be the actual count of each service lateral connection installed and accepted.

Excavation, bedding, backfill, and compaction associated with this item shall be paid for under the Sewer Point Repair Excavation, Backfill, and Compaction item by the appropriate depth range in accordance with Section 801. The pay limit length for this excavation, bedding, backfill, and compaction shall be limited to 6 feet at the depth range of the mainline beginning at the backside mainline excavation width pay limit. The pay limit width of excavation shall be the trench pay limit shown on the Contract Documents.

m. **Service Lateral Mainline Connection Associated with HDPE:** Measurement for the service lateral mainline connection associated with HDPE pipe or lining material shall be the actual count of each service lateral connection installed and accepted.

Excavation, bedding, backfill, and compaction associated with this item shall be paid for under the Sewer Point Repair Excavation, Backfill, and Compaction item by the appropriate depth range in accordance with Section 801. The pay limit length for this excavation, bedding, backfill, and compaction shall be limited to 6 feet at the depth range of the mainline beginning at the backside mainline excavation width pay limit. The pay limit width of excavation shall be the trench pay limit as shown on the Contract Documents.

n. **Abandon Sewer Pipe:** Abandonment of gravity sewer pipe will be measured on a lump sum basis or by the cubic yard of flowable fill required to complete all work indicated on the Contract Documents and as provided in the bid form. Abandonment shall include any equipment, cleaning, flowable fill throughout the full length of pipe, and disposal in accordance with the plans and specifications.

o. **Plug and Abandon Sewer Pipe:** Plug and abandonment of gravity sewer pipe will be measured on a lump sum basis upon completion of all work indicated on the Contract Documents. Plug and abandonment shall include any equipment, cleaning, disposal and flowable fill required to cap the pipe ends in accordance with the plans and specifications.

p. **Remove Sewer Pipe**: Removal of gravity sewer pipe will be measured on a lump sum basis upon completion of all removal work indicated on the Contract Documents including appurtenances. Removal work shall include any equipment, cleaning, disposal, trenching, and backfilling required to remove the existing gravity sewer pipe in accordance with the plans and specifications.

q. **Remove or Abandon Sewer Pipe**: Removal or abandonment of gravity sewer pipe will be measured on a lump sum basis upon completion of all removal work indicated on the Contract Documents. Removal work shall include any equipment, cleaning, disposal, trenching, and backfilling required to remove the existing gravity sewer pipe in accordance with the plans and specifications. Abandonment in-place with this item shall include insertion of flowable fill throughout the full length of pipe.

r. **Trenchless Point Repair:** Measurement for trenchless point repair shall be made on a linear foot basis of sleeve installed. Measurement will be made to the nearest whole foot for the various diameters listed in the Bid Form.

802-11 PAYMENT:

a. **Sewer Pipe:** Payment for this Item will be full compensation for equipment, excavation, bedding, backfill, compaction, pipe, fittings, removal and disposal of existing sewer pipe and/or manholes if necessary, plugging, sewer flow control, traffic control, connections to new manholes, connections to service lateral, laying, jointing, cleaning new pipe, and testing, in accordance with the Contract Document. Sand-aggregate for bedding and initial backfill material and useable excavated soil for secondary backfill, as shown on City-Parish Standard Detail 801-01 shall be included in this pay item. When required, special bedding and backfill material such as #57 Stone Backfill, #610 Stone Backfill, CLSM Backfill, Sand-Aggregate for Secondary Backfill, and Select Material for Backfill required for Work associated with Sewer Pipe will be paid for under the relative pay item in Section 801.

b. **Rehab Sewer Pipe:** Payment for this Item will be full compensation for pipe, fittings (excluding non-shear couplings), plugging, removal and disposal of existing sewer pipe, sewer flow control, connections to existing pipe and service lines, laying, jointing, and cleaning new pipe, smoke testing of the repair, in accordance with the Contract Documents. Payment will be made for new pipe only when it is installed in the ground. No payment shall be made for pipe stored on the site but not yet installed. This item shall be used in conjunction with point repairs or remove and replace rehabilitation only. Excavation, bedding, backfill, and compaction required for Work associated with Rehab Sewer Pipe will be paid for under the relative pay item in Section 801.

c. **Connections to Existing Manholes:** Payment for this Item will be full compensation for all equipment, labor, materials required to connect the pipe to an existing manhole (sanitary sewer manhole or storm water conflict/junction/inlet box).

d. **Adjusted Sanitary Sewer Service Lateral Connections:** Payment for this item shall be full compensation for all equipment, labor, excavation, bedding, backfill, compaction, pipe, fittings, removal and disposal of existing sewer pipe if necessary, plugging, sewer flow control, traffic control, materials, and testing required to adjust up to twenty (20) feet of sanitary sewer service connections in accordance with the Contract Documents.

e. **Sewer Service Lateral:** Payment for this Item will be full compensation for equipment, excavation, bedding, backfill, compaction, pipe, fittings, removal and disposal of existing sewer pipe if necessary, plugging, bypass pumping, traffic control, laying, jointing, cleaning new pipe, and testing, in accordance with the Contract Document. Sand-aggregate for bedding and initial backfill material and useable excavated soil for secondary backfill, as shown on City-Parish Standard

Detail 801-01 shall be included in this pay item. When required, special bedding and backfill material such as #57 Stone Backfill, #610 Stone Backfill, CLSM Backfill, Sand-Aggregate for Secondary Backfill, and Select Material for Backfill required for Work associated with Sewer Pipe will be paid for under the relative pay item in Section 801.

f. **Sewer Service Lateral Connection Stack:** Payment for this item shall include all material, labor, pipe, fittings, bedding material.

g. **Sewer Service Lateral Termination:** Payment for this Item will be full compensation for SDR 35 PVC pipe, PVC fittings, and PVC cap.

h. **Non-Shear Couplings:** Payment for this Item will be full compensation for all equipment, labor, and materials required to install non-shear couplings.

i. **Electrofusion Couplings:** Payment for this Item will be full compensation for all electrofusion couplings, equipment, labor, and materials required to install electrofusion couplings.

j. **Sanitary Sewer Clean-out:** Payment for this Item will be full compensation for SDR 35 PVC pipe, PVC fittings, PVC clean-out fittings, cast iron frame and cover, and 24" square concrete pad surrounding the top of the clean-out.

k. **Service Lateral Mainline Connection Associated with CIPP:** Payment for this item will be full compensation for removal of host pipe (as required), saddle wyes, all fittings, grout, smoke testing, all equipment, labor, and materials.

l. **Service Lateral Mainline Connection Associated with Slip Lining:** Payment for this item will be full compensation for removal of host pipe (as required), compressive-fit service connection, patching of host pipe, grout, all fittings, smoke testing, all equipment, labor, and materials.

m. **Service Lateral Mainline Connection Associated with HDPE:** Payment for this item will be full compensation for electrofusion branch saddles, all fittings, smoke testing, all equipment, labor, and materials.

n. **Abandon Sewer Pipe:** Payment for this Item will be full compensation for equipment, bypass pumping, connections, cleaning, disposal and flowable fill, in accordance with the Contract Document.

o. **Plug and Abandon Sewer Pipe:** Payment for this Item will be full compensation for equipment, bypass pumping, connections, cleaning, disposal and flowable fill at the pipe ends (18 inches min.), in accordance with the Contract Document.

p. **Remove Sewer Pipe**: Payment for this Item will be a lump sum full compensation for equipment, bypass pumping, connections, cleaning, excavation, backfill and delivery/disposal, in accordance with the Contract Document. Payment will be made for removed pipe.

q. **Removal or Abandon Sewer Pipe**: Payment for this Item will be a lump sum full compensation for equipment, bypass pumping, connections, cleaning, excavation, backfill, delivery/disposal, and flowable fill throughout full length of pipe, in accordance with the Contract Document. Payment will be made for removed pipe and/or completely filled abandoned pipe.

r. **Trenchless Point Repair:** Payment for this item will be full compensation for sewer flow control, public notification, traffic control, sewer pipe cleaning, repair device, installation of the repair device, pre- and post-construction CCTV inspection, and clean-up in accordance with the Contract Documents.

802-12 PAY ITEMS:

Pipe Inner Diameter (I.D.) Schedule
(as Shown on Drawings)

A	=	4" Pipe	N	=	27" Pipe
B	=	6" Pipe	O	=	30" Pipe
C	=	8" Pipe	P	=	32" Pipe
D	=	10" Pipe	Q	=	36" Pipe
E	=	12" Pipe	R	=	42" Pipe
F	=	14" Pipe	S	=	48" Pipe
G	=	15" Pipe	T	=	54" Pipe
H	=	16" Pipe	U	=	60" Pipe
I	=	18" Pipe	V	=	64" Pipe
J	=	20" Pipe	W	=	66” Pipe
K	=	21" Pipe	X	=	72” Pipe
L	=	24" Pipe	Y	=	76” Pipe
M	=	26" Pipe	Z	=	80” Pipe

Pipe Depth Schedule

0	=	0	-	6	Feet
1	=	6.1	-	8	Feet
2	=	8.1	-	10	Feet
3	=	10.1	-	12	Feet
4	=	12.1	-	16	Feet
5	=	16.1	-	20	Feet
6	=	20.1	-	24	Feet
7	=	24.1	-	28	Feet
8	=	28.1	-	32	Feet
9	=	32.1	-	36	Feet

Item No.	Item	Unit
80200_ _	Sewer Pipe (depth) (diameter)	Linear Feet
80210_ _	PVC Sewer Pipe (depth) (diameter)	Linear Feet
80211_ _	HDPE Sewer Pipe (depth) (diameter)	Linear Feet
80212_ _	Ductile Iron Sewer Pipe (depth) (diameter)	Linear Feet
80213_ _	Steel Sewer Pipe (depth) (diameter)	Linear Feet
80214_ _	Fiberglass Sewer Pipe (depth) (diameter)	Linear Feet
802200_	PVC Rehab Sewer Pipe (diameter)	Linear Feet
802210_	HDPE Rehab Sewer Pipe (diameter)	Linear Feet
802220_	Ductile Iron Rehab Sewer Pipe (diameter)	Linear Feet

802230_	Steel Rehab Sewer Pipe (diameter)	Linear Feet
802240_	Fiberglass Rehab Sewer Pipe (diameter)	Linear Feet
8023000	Connections to Existing Manholes	Each
8024000	Adjusted Sanitary Sewer Service Lateral Connections	Each
8024100	Sewer Service Lateral	Linear Feet
8024200	Sewer Service Lateral Connection Stack	Vertical Feet
8024300	Sewer Service Lateral Termination	Each
802500_	Non-Shear Couplings (diameter)	Each
802501_	Electrofusion Couplings (diameter)	Each
8026000	Sanitary Sewer Clean-out	Each
8027000	Service Lateral Mainline Connection Associated with CIPP	Each
8027001	Service Lateral Mainline Connection Associated with Slip Lining	Each
8027002	Service Lateral Mainline Connection Associated with HDPE	Each
8028000	Abandon Sewer Pipe (w/flowable fill in-place)	Lump Sum
8028001	Abandon Sewer Pipe (w/flowable fill in-place)	Cubic Yard
8028100	Plug and Abandon Sewer Pipe (cap each end)	Lump Sum
8028200	Remove Sewer Pipe	Lump Sum
8028300	Remove or Abandon Sewer Pipe	Lump Sum
802900_	Trenchless Point Repair (diameter)	Linear Feet

SECTION 803
SEWER MANHOLES

803-1 DESCRIPTION: This Work consists of removal and disposal of existing manholes, if necessary, and furnishing and constructing new precast concrete sanitary sewer manholes, drop lines, and adjusting existing manholes. Manholes shall be constructed of specified material to the sizes, shapes and dimensions and at the locations and elevations shown on the Drawings. The expectation is that all new manholes will be completely sealed, thereby, eliminating infiltration and exfiltration from the manhole.

803-2 MATERIALS:

a. Materials shall conform to the following Sections and Subsections:

Precast Concrete Riser Rings	806-3.1a
Cast Iron Riser Rings	806-3.1b
Stainless Steel Insert	806-3.4
Portland Cement Concrete	1005
Reinforcing Steel	1006-1
Frames and Covers	1011-5
Precast Concrete Manhole Units	1017-2

b. Manhole walls, transitions, conical sections, and base shall conform to the requirements of ASTM C 478 for the depths indicated on the Contract Documents. Conical sections shall be designed to support cast iron frames and covers under an AASHTO HS-20 loading. Axial length of sections shall be selected to provide the correct total height required with the fewest joints.

c. Riser rings shall be precast concrete or cast iron.

   1. Concrete riser rings shall be free from cracks, voids and other defects and shall conform to ASTM C 478. Concrete riser rings shall be of a nominal thickness of not less than four (4) inches and not more than six (6) inches for reconstruction and/or adjustment of the manhole frame and cover. Joints shall also be externally wrapped with an external seal wrap as specified in Section 803-4.7.

   2. Cast iron riser rings shall conform to the latest edition of AASHTO M306. Cast iron riser rings shall be used for adjustment of the manhole frame and cover of less than four (4) inches. Joints shall also be externally wrapped with an external seal wrap as specified in Section 803-4.7.

d. Manhole joint types may be either tongue and groove, confined groove, or single offset joint, and shall be sealed accordingly with either a flexible soil-tight butyl mastic gasket or flexible watertight rubber gaskets conforming to ASTM C 990 or C 443 respectively.

e. Prior to backfilling, rubber external seal wraps shall be applied to each manhole section joint, riser rings and frame in accordance with Subsection 803-4.7.

f. Conical sections shall be concentric, unless otherwise specified. Where the manhole barrel diameter is greater than 48 inches, a flat slab transition, concentric unless otherwise specified, may be used to transition to 48 inch diameter riser sections. Underside of the transition shall be at least 7 feet above the top of the bench.

g. Sewer pipe to manhole barrel section connections shall be sealed with resilient connectors complying with ASTM C 923. Mechanical devices shall be stainless steel.

h. Concrete manholes shall include the following protective admixtures:

1. Crystalline Waterproofing Additive:

i. Concrete waterproofing system shall be of the crystalline type that chemically controls and permanently fixes a non-soluble crystalline structure throughout the capillary voids of the concrete. The system shall cause the concrete to become sealed against the penetration of liquids from any direction, and shall protect the concrete from deterioration due to harsh environmental conditions.

ii. Crystalline waterproofing additive shall include an approved coloring that will tint the finished concrete as proof of additive. Coloring must be provided by the additive manufacturer.

iii. Installer of crystalline waterproofing additive shall be approved by the manufacturer or manufacturer's representative in writing.

iv. Crystalline waterproofing additive shall be added to concrete mix at time of batching, and dosage rates and installation shall be in accordance with manufacturer's recommendations.

v. Crystalline waterproofing additive shall be as manufactured by Xypex Chemical Corporation or approved equal and shall meet the following requirements:

A. Testing Requirements: Crystalline waterproofing system shall be tested in accordance with the following standards and conditions, and the testing results shall meet or exceed the performance requirements as specified herein. Independent tests verifying these results shall be submitted prior to approval.
B. Independent Laboratory: Testing shall be performed by an independent laboratory meeting the requirements of the recognized specifying body of the country in which the testing is performed. Testing laboratory shall obtain all concrete samples and waterproofing product samples.
C. Crystalline Formation: Crystallizing capability of waterproofing system shall be evidenced by independent SEM (Scanning Electron Microscope) photographs showing crystalline formations within the concrete matrix at a magnification no greater than 2000 times.
D. Permeability: Independent testing shall be performed according to U.S. Army Corps of Engineers CRD-C48 - Mod " Permeability of Concrete". Under CRD-C48 treated concrete samples that are no greater than 2 inches thick shall be pressure tested to 150 psi (350 foot head of water). The treated samples shall exhibit no measurable leakage against control samples which shall exhibit full saturation and

measurable leakage. In all case cases treated and untreated samples shall have the same mix design.

E. DIN1048/EN12390 "Water Impermeability of Concrete": Treated and untreated samples that are 120mm thick shall be subjected to hydrostatic pressure for 3 days (Minimum of 3 samples of each). Control samples shall have a minimum of 100mm of penetration (average of samples). Treated samples shall show a minimum of 90% reduction in depth of water penetration when compared to the control sample (average of samples). In all cases treated and untreated samples shall have the same mix design.

F. Compressive Strength: Independent testing shall be performed according to ASTM C39 "Compressive Strength of Cylindrical Concrete Specimens". Concrete samples containing the crystalline waterproofing additive shall be tested against untreated control sample. At 28 days, the treated samples shall exhibit an increase in compressive strength over the control sample.

G. Crack Bridging Capability: Requirement: Minimum of 0.4mm. Crack heal effect shall be supported by reports from recognized independent agency documenting crack healing effects of crystalline modified versus a control concrete in the same application.

2. Anti-microbial Additive:

i. Antimicrobial additive shall provide long term prevention of bacterial corrosion if concrete in Microbial Induced Corrosive (MIC) sanitary sewer environments. It shall render the concrete uninhabitable for bacteria growth.

ii. The liquid antibacterial additive shall be an EPA registered material. Product must include an approved coloring that will tint the finished concrete as proof of additive. Coloring must be provided by the additive manufacturer.

iii. Installer of anti-microbial additive shall be certified by the manufacturer or manufacturer's representative in writing.

iv. The additive shall be added into the concrete mix water to insure even distribution throughout the concrete mixture. The amount to be used shall be as recommended by the manufacturer of the antibacterial additive. This amount shall be included in the total water content of the concrete mix design.

v. The anti-microbial additive shall have successfully demonstrated prevention of MIC in sanitary sewers for ten or more years. Anti-microbial additive shall be as manufactured by Conshield Technologies or approved equal.

Any patching or grout materials used on the interior of the manhole after casting must also include the both admixtures.

i. All interior surfaces (including benches) of new sanitary sewer manholes at force

main entry locations, one manhole upstream and downstream of force main entry locations, and other locations shown in the Drawings, shall be given an interior protective coating in accordance with Section 822.

j. Cast-iron frames, covers, and riser rings shall be completely coated with an environmentally safe, water-based asphaltic coating which is non-toxic, non-flammable, colorless, and dries to a hard black finish. This coating shall be applied to the casting prior to the installation of the external seal wrap.

803-3 SUBMITTALS:

a. Complete product data on all standard manhole bottoms, riser sections (concrete and steel), cone sections, frames and covers, concrete and steel riser rings, rubber boots and external seal wrap shall be submitted.

b. The precast concrete producer shall submit a mix design for each strength and type of concrete that will be used, regardless of whether listed on the QPL or not. Submitted mix designs shall include the quantity, type, brand and applicable data sheets for all mix design constituents as well as documentation indicating conformance with this specification.

c. If required by the Contract Documents, the manhole epoxy liner system manufacturer's literature (cut sheets) describing the system, material/chemical properties, material handling and storage requirements, mixing and proportioning requirements, maximum pot life, MSDS sheets, environmental requirements for application and worker safety requirements shall be submitted.

d. Written certification by the protective admixture manufacturers stating the precast manufacturer is approved to install the admixtures specified shall be submitted.

e. Written certification by the manhole liner system manufacturer stating the installation Contractor is approved to install the liner system specified shall be submitted.

f. Written certification from the liner product manufacturer that each of the proposed liner and patching products are compatible with each other shall be submitted.

g. Detailed instructions and methodology for finishing all pipe and manhole connections to prevent infiltration and exfiltration shall be submitted.

h. Detailed methodology and materials for repairing surface imperfections or minor chipping of manhole structures shall be submitted

i. Wastewater Flow Control/Bypassing Plan shall be submitted.

j. Traffic Control Plan with site Contractor's telephone numbers for emergencies and copies of any necessary permits for lane closures shall be submitted.

k. Epoxy liner and vacuum test results shall be submitted to Engineer.

803-4 CONSTRUCTION:

803-4.1 Excavation, Bedding, and Backfill: Excavation, bedding, backfill, and compaction required for the installation of manholes shall be in accordance with Section 801 and as shown in the Contract Documents.

803-4.2 Precast Concrete Manholes:

a. Base for precast manholes may be either precast or cast-in-place. Cast-in-place bases shall be used for manholes built over existing sewer lines only. If base is cast-in-place, lowermost precast unit shall be set in place at the time base is poured; additional precast units shall not be placed until 24 hours after base is poured. Cast-in-place reinforced concrete manhole bases shall be constructed in accordance with Section 601 Concrete Structures. Concrete for base and channel formation shall be 6A4000 concrete conforming to Section 1005 and shall include admixtures described in subsection 803-2h. If required for the manhole, interior of cast-in-place base must field coated in accordance with Section 822.

b. Precast manhole structures shall have a normal plant-run finish produced in forms that impart a smooth finish to concrete. Surface holes smaller than 1 inch caused by air bubbles, form joint marks, and minor chips are acceptable. Fill air holes greater than 1 inch in width or 1/4 inch in width that occur in high concentration (more than one per 2 sq. inch). Major or unsightly imperfections, honeycombs, exposed reinforcing steel, exposed aggregate, or structural defects are not permitted.

c. Protective admixture tint shall be uniform in color and appearance throughout wall thickness of precast concrete structure. If cross-sectional views of precast concrete structure, such as pipe cutouts or across joints, are not available for visual inspection or do not provide satisfactory evidence of color uniformity, at the request of the Engineer, the Contractor shall have the structure cored to provide evidence. Coring and repair shall be at no cost to the Owner. Any unapproved coatings or paints applied to the manhole structure may be cause for rejection of the manhole by the Engineer.

d. For manholes requiring an epoxy protective coating on the interior surface: surface preparation and protective coating shall be in accordance with Section 822. Manholes may be coated “in the shop” prior to delivery to project site. Any damage to the protective coating during shipping or installation shall be repaired by the Contractor in accordance with the manufacturer’s recommendations at no additional cost to the Owner. Upon completion of manhole and pipe installation the protective coating shall be free of bugholes, pinholes, and continuous across the section joints. Coating shall extend over the top rim of the cone opening by one inch.

e. Manholes shall be constructed such that their walls are plumb. The spigot end of the precast sections shall be set at the top of each section.

f. Gaskets and gasket seats shall be cleaned of dirt and debris just prior to placing precast units.

g. If holes must be cut in precast units, they shall be cored or drilled for proposed mains 18 inches in diameter or smaller. Manholes requiring larger pipe connections may be enlarged using a jack hammer, but must be neatly grouted to provide an airtight seal.

h. There shall be at least 12" horizontal clearance between adjacent pipes.

All inverts shall be of 4000 psi concrete meeting the requirements of Section 1005 of these specifications and include the anti-microbial additive. The invert shall be carefully formed to the required size and grade by gradual and even changes in sections. Changes in directions of flow through the inlet shall be made to a true curve with as large a radius as the size of the inlet will

permit.

803-4.3 Manhole Drop Connections: If inlet pipe enters the manhole 2 feet above the manhole invert or higher, an external drop line is required and shall comply with details in the Contract Documents. The drop line shall be of the same material as that of the inlet pipe and one nominal pipe size smaller (minimum 8 inch diameter). Backfill drop assembly with #610 Stone Backfill material. Extend the bedding material a minimum of 4 inches outside bells.

803-4.4 Adjusting Sewer Manholes: If grade adjustments of existing manholes are required, frames and covers shall be removed and manhole shall be adjusted to new grade as specified for new Work. Adjustment shall be made using precast concrete riser rings or cast iron riser rings in accordance with Section 806-6.1. Frames and covers shall be handled in accordance with Section 806-6.3.

After removal of existing manhole cover, a suitable temporary cover shall be placed over manhole to prevent debris from entering manhole and to provide for safety of workmen and the public until new manhole cover is in place. If rubble or debris falls into a "live" manhole during adjustment operations, the Contractor shall remove and dispose of debris at no cost to the Owner. Upon completion of the manhole adjustment an external seal wrap shall be install in accordance with Section 803-4.7.

803-4.5 Riser Rings, Frames and Covers:

a. The top of the manhole frame will be at the finished grade of the pavement or 3-inches above the ground surface in accordance with the details of the Contract Documents.

b. In paved areas the frame and cover should match the slope and crown of the finished pavement.

c. Concrete riser rings shall be set in a full bed of mortar. Mortar shall be struck smooth on the inside of the manhole using a hard trowel followed by a sponge float. An epoxy system designed for metal-to-metal adhesion shall be used to connect individual cast iron riser rings and the cast iron riser rings to the frame.

803-4.6 Stainless Steel Insert: A stainless steel insert shall be installed in manholes located in areas below the base flood elevation as shown on the Contract Documents.

803-4.7 External Seal Wrap:

a. Riser Rings and Frame: The sewer manhole riser rings and frame shall be externally sealed with rubber seal wraps or mechanically locked corrugated rubber seals.

    1. Rubber seal wraps:

        i. Rubber seal wraps and required band widths shall conform to ASTM C 877 (Type I – Rubber and Mastic Bands).
        ii. The number of bands required will depend on the number of adjusting rings needed. A minimum 3 inch overlap below the cone-riser ring joint shall be required. A 2 inch overlap shall be required to fold over the frame base to seal the frame-riser ring joint. If there are more adjusting rings per installation there will be a requirement for an additional band. Each additional band will overlap the upper band by two inches.

2. Mechanically locked corrugated rubber seals:

    i. The frame seal shall remain flexible throughout a 25 year design life. The sleeve portion of the seal shall be corrugated with a minimum unexpanded vertical height of 10 inches and be capable of being mechanically locked to the base flange of the manhole frame casting.
    ii. The sleeve and any extension shall be made from high quality EPDM rubber suitable for both above and below grade applications. Minimum thickness of rubber sleeve and extension shall be 0.085 inches. Rubber material shall conform to the applicable material requirements of ASTM C 923 and have a hardness (durometer) of 45±5.
    iii. The sealing area that compresses against the base flange of the manhole frame casting and the chimney or cone shall have a series of sealing fins to facilitate a watertight seal. The top compression band shall be "C" shaped to uniformly compress and mechanically lock the sleeve into the base flange of the manhole frame casting. Both the top and bottom compression bands shall have a take-up mechanism capable of developing a minimum of 400 lbs. of torque.

3. The external seal shall be installed after the adjusting rings are set and all castings are coated.

b. Riser Section Joints:

1. Each manhole section joint shall be sealed with an external rubber seal wrap conforming to ASTM C 877 (Type I – Rubber and Mastic Bands, Type II – Plastic Film and Mesh Reinforced Mastic Bands, or Type III – Chemically-Bonded Adhesive Butyl Bands).

2. The seal shall be designed to prevent leakage of water through the joint sections of a manhole.

3. Any excess joint sealant material or gaskets that protrudes on the outside of the manhole section joint shall be removed prior to the installation of the external rubber seal wrap.

c. The external seal wrap shall be installed in accordance with the details of the Contract Documents and the manufacturer's recommendations.

803-4.8 Abandoning Manholes: The Contractor shall clean the manhole to be abandoned in accordance with Section 812 to remove and dispose of all sewage and debris. Contractor shall permanently plug both upstream and downstream pipes at the manhole, and thoroughly crack or drill holes in the manhole bottom to allow any water to drain out. Plug shall consist concrete or flowable fill extending a minimum of 18" into the pipe end. Finally the Contractor shall completely remove the manhole structure down to a minimum three (3) feet below natural ground and fill and compact with an approved backfill sand. Removed material shall become property of the Contractor and shall be disposed of at no additional cost to the Owner.

803-5 ACCEPTANCE TESTING:

803-5.1 Air Vacuum Test: After completion of manhole construction, wall sealing, and backfilling, the Contractor shall conduct a vacuum test as follows:

a. All manholes are to be vacuum tested following backfill and compaction. The ring and lid casting assembly shall be installed prior to testing. The testing equipment shall consist of a gasoline-powered vacuum pump with sufficient vacuum hose length and a test head of proper size to fit the inside opening of the manhole. The test head shall be equipped with an inflatable rubber bladder to affect the seal to the manhole, an air pressure gauge, and a safety valve for filling the bladder, a 30-inch Hg liquid-filled vacuum gauge, a double air exhaust manifold with quarter turn ball valves, three bolt-on feet, and a bridge assembly with height adjustment rod.

b. Contractor shall plug all pipe openings, taking care to securely brace the plugs and the pipe. The plugs shall be placed a minimum of 6 inches beyond the manhole wall.

c. With the vacuum tester in place, inflate the compression to affect a seal between the vacuum base and the structure. Connect the vacuum pump to the outlet port with the valve open and evacuate the manhole to 10 inches Hg (0.3 bar) for 48-inch diameter manholes and 5 inches Hg (0.15 bar) for 60-inch and greater diameter manholes.

d. Close vacuum inlet/outlet ball valve, disconnect the vacuum pump, and monitor the vacuum for the specified time period. If the vacuum does not drop in excess of 1-inch Hg over the specified time period, the manhole if considered acceptable passes the test. If the manhole fails the test, identify the leaking areas by removing the head assembly, coating the interior surfaces of the manhole with a soap and water solution, and repeating the vacuum test for approximately thirty seconds. Once the leaks have been identified, complete all necessary repairs by sealing the leaks of the manhole to the satisfaction of the Engineer, and repeat test procedures until satisfactory results are obtained.

TABLE 8-2
Manhole Vacuum Testing

Vacuum Test Timetable			
Depth (Feet)	Manhole Diameter (Inches)		
	48”	60”	72”
4’	10 sec.	13 sec.	16 sec.
8’	20 sec.	26 sec.	32 sec.
12’	30 sec.	39 sec.	48 sec.
16’	40 sec.	52 sec.	64 sec.
20’	50 sec.	65 sec.	80 sec.
24’	60 sec.	78 sec.	96 sec.
*T	5.0 sec.	6.5 sec.	8.0 sec.
*Add extra testing time “T”, for each additional 2-foot depth. (The values listed above have been extrapolated for ASTM designation C924-85.)			

e. The Owner reserves the right to reject any and all manholes that do not pass vacuum testing requirements, and replacement shall be at the Contractor’s expense. A significant number of leaks on a single manhole or significant number of manholes leaking shall be considered as a basis for rejection and replacement of manholes.

803-5.2 Epoxy Liner Test:

a. Wet Film Thickness Gage: During application a wet film thickness gage, meeting ASTM D4414 – Standard Practice for Measurement of Wet Film Thickness of Organic Coatings by Notched Gages, shall be used to check coating thickness.

b. Holiday Detection: After a minimum of 24 hours following completion, the lining system shall be spark tested to assure a pinhole-free lining. Defects shall be marked and repaired per the manufacturer's instructions. The holiday detector shall be a Tinker Razor Model AP/W or an approved equal. Reference NACE RPO 188-99 for performing holiday detection. Manhole repair shall not be measured for payment when required as surface preparation for a manhole lining rehabilitation operation.

c. Adhesion Test: A minimum of 10% of the manholes coated shall be tested for adhesion/bond of the coating to the substrate. Testing shall be conducted in accordance with ASTM D7342-05.

803-6 MEASUREMENT:

a. **Sanitary Sewer Manholes:** Manholes constructed will be measured as a unit by manhole diameter and depth.

b. **Adjusting Sewer Manholes:** This item will be measured as a unit.

c. **Manhole Drop Lines:** Drop lines will be measured by line diameter per vertical foot of drop from the invert of the main line entering the manhole.

d. **Abandon Sewer Manholes:** Manholes to be abandoned shall be measured as a unit.

e. **New Manhole Protective Coating:** Measurement for payment of this Item shall be based on the actual number of vertical feet of manhole wall rehabilitated for a standard four-foot diameter manhole. Where manhole diameter is significantly different from the standard (i.e., 5' or 6') then the vertical footage shall be adjusted for pay purposes accordingly, to account for the additional square footage of area requiring rehabilitation (i.e., 5' diameter = 1.25 x vertical footage of standard; 6' diameter = 1.50 x vertical footage of standard, etc.). In like manner, structures that are discovered to have geometric shapes other than circular shall be adjusted as above to provide a consistent method of accounting for the actual square footage of area requiring rehabilitation of walls. All other aspects of measurement shall remain as indicated. All measurements shall be as specified or made by conventional means with accuracies consistent with field conditions and common practice. Should a discrepancy in measurement exist which is greater than ten percent (10%), the Item in question shall be re-measured by both the Contractor and the Engineer for verification.

803-7 PAYMENT:

a. **Sanitary Sewer Manholes:** Payment for new manholes include materials, labor, excavation, bedding, backfill, compaction, removal and disposal of existing manhole (if required), new manhole, geotextile fabric, rings, frames, covers (frame and cover type as shown on drawings), external seals, venting pipes (as required by the drawings), concrete admixtures, connections with pipe, and testing.

b. **Adjusting Sewer Manholes:** Payment for adjusted sewer manholes shall include materials, labor, excavation, bedding, backfill, compaction, riser rings, removal and

replacement of existing frame and cover, external seals, and testing.

c. **Manhole Drop Lines:** Payment for drop lines shall include all material, labor, pipe, fittings, hardware, removal and disposal of existing manhole drop line (if required), and bedding material.

d. **Abandon Sewer Manholes:** Payment for abandoned manholes include materials, labor, excavation, backfill, compaction, pipe plug(s), drilling of manhole base, removal and disposal of existing manhole, manhole frame and cover 3 foot minimum below grade.

e. **New Manhole Protective Coating:** Payment of the unit price amount bid for this Item shall be full compensation for all labor, materials, equipment, surface cleaning and preparation, patching and/or grouting, cementitious underlayment, sewer flow control, traffic control, and testing.

803-8 PAY ITEMS:

Drop Line Inner (I.D.) Diameter Schedule			Pipe Depth Schedule					
A	=	4" Pipe	0	=	0	- 6	Feet
B	=	6" Pipe	1	=	6.1	- 8	Feet
C	=	8" Pipe	2	=	8.1	- 10	Feet
D	=	10" Pipe	3	=	10.1	- 12	Feet
E	=	12" Pipe	4	=	12.1	- 16	Feet
F	=	14” Pipe	5	=	16.1	- 20	Feet
G	=	15” Pipe	6	=	20.1	- 24	Feet
H	=	16” Pipe	7	=	24.1	- 28	Feet
I	=	18” Pipe	8	=	28.1	- 32	Feet
			9	=	32.1	- 36	Feet

Item No.	Item	Unit
803148_	48” Sanitary Sewer Manhole (depth)	Each
803160_	60” Sanitary Sewer Manhole (depth)	Each
803172_	72” Sanitary Sewer Manhole (depth)	Each
803200_	Sanitary Sewer Drop Line (diameter)	Vertical Foot
8033000	Adjusting Sewer Manhole	Each
8034000	Abandon Sewer Manhole	Each
8035000	New Manhole Protective Coating	Vertical Foot

SECTION 806
MANHOLE REHABILITATION

806-1 DESCRIPTION: This specification consists of all work, materials, labor and equipment required for manhole rehabilitation for the purpose of eliminating infiltration and exfiltration, providing corrosion protection, adjusting final grade of manhole top, repair of voids and restoration of the structural integrity of the manhole.

806-1.1 General:

a. Do not use or retain contaminated, outdated, or diluted materials for resurfacing. Do not use materials from previously opened containers.

b. Use only products of the approved Manufacturer. Use products of one manufacturer in any one resurfacing system with compatible materials. Provide same material product for touch-up as for original material.

c. If any requirements of this specification conflict with a referenced standard, the more stringent requirement shall apply.

d. Make available all locations and phases of the work for access by the Engineer or other personnel designated by the Engineer. The Contractor shall provide ventilation and egress to safely access the coating work areas for inspection.

e. Conduct work so that the resurfacing system is installed as specified herein and according to manufacturer's recommendation. Inspect work continually to ensure that the resurfacing system is installed as specified herein. The Contractor shall inspect the work to determine conformance with the specifications and referenced documents. The Contractor shall inform the Engineer of the progress and the quality of the work through daily reports, which should at a minimum include EBROSCO manhole number, closest physical address, site and weather conditions, manhole existing conditions, rehabilitation work required, surface preparation, environmental conditions, lining application, quality control, and testing. Any nonconforming coating system work shall be corrected as specified herein or as recommended by the Manufacturer.

f. The methods of construction shall be in accordance with all requirements of this specification.

g. Job site environmental conditions such as air and surface temperatures, relative humidity, precipitation, wind, etc. shall be controlled and maintained by the Contractor in accordance with the Manufacturer's instructions.

806-2 SUBMITTALS:

a. Manhole rehabilitation system manufacturer's literature (cut sheets) describing the rehabilitation system and equipment components, material/chemical properties, MSDS sheets and environmental requirements for application and worker safety requirements. Provide samples of testing, certification and warranty statements.

b. References of projects successfully completed, incorporating not less than 250 manholes in total which were successfully performed within the last 10 years. Each reference shall include the name of the agency, the name of the project, the date of

the project, and an agency contact.

c. Written certification by the manhole rehabilitation system manufacturer stating the installation Contractor is approved to install the rehabilitation system specified.

d. Written certification from the product manufacturer that each of the proposed rehabilitation products is compatible with each other.

e. Warranty affidavit for MCP lining system in accordance with subsection 806-3.9c of this specification.

f. Manufacturer's written recommendations for product handling and storage requirements including temperature, humidity, and ventilation for resurfacing system materials.

g. Traffic Control shall be the responsibility of the Contractor. Any necessary lane closures shall require a permit from the Traffic Division of the DPW or the La DOTD. Copies of the permits shall be submitted to the Engineer prior to commencing Work.

h. Submit with Each Project:

1. Description, layout, and application sequencing plan.

2. Rehabilitation system application requirements including material handling and storage requirements, mixing and proportioning requirements (as applicable), maximum pot life, film/coating thickness, curing, testing and certification requirements of all rehabilitation materials. Product Material Safety Data Sheets.

3. Detailed instructions and methodology for finishing all pipe and manhole connections to rehabilitated manholes to prevent infiltration and exfiltration.

4. Wastewater Flow Control/Bypassing Plan.

5. Confined Space Entry Plan/Permit.

6. Plan for capturing extraneous debris during rehabilitation processes and debris disposal.

7. Liner and vacuum test results.

806-3 MATERIALS: The materials used shall be designed, manufactured and solely intended for sewer manhole rehabilitation. The materials shall have a proven history of performance in sewer manhole rehabilitation for a minimum of 10 years nationally, of similar age, groundwater levels and circumstance. Contractor shall comply with all manufacturers' recommendations for the approved products.

Products will not be considered by Engineer as an "or-equal" or substitute unless a written request for approval has been submitted by Contractor. Requests for approval shall include all of the following information:

a. A cover sheet stating the name of the proposed product and the name of the currently specified product (with applicable specification section number) which the proposed product is requesting to be approved as an "or-equal."

b. A letter from the Installer stating that the proposed product is in compliance with all aspects of the specifications including all physical properties, thicknesses, dimensions, cure-times, and warranty requirements; and the Installer shall also include with the letter complete references (with current contact information) showing exactly how many successful installations of the proposed product that the Installer has completed to date.

c. A letter from the Manufacturer stating that the proposed product is in compliance with all aspects of the specifications including all physical properties, thicknesses, dimensions, cure-times, and warranty requirements; and the Manufacturer shall also include with the letter complete references (with current contact information) showing that the exact proposed product has been successfully installed in at least 5,000 wastewater structures within the last 5 years.

d. Affidavits signed by both an Officer of the Manufacturer and the Installer declaring that all of the information submitted is true and that the proposed product is not currently involved in any unsettled disputes over patent infringement.

e. Product(s) seeking an "or-equal" approval that have not previously performed work with the Owner shall perform a demonstration of their product within the Owner's collection system at no cost to the Owner. Following a successful field installation of the product and the Owner's assessment and approval of said product for a period of six (6) months, the Owner, at their discretion, may elect to approve the product for the project.

The burden of proof of the merit of the proposed item is upon Contractor. Engineer's decision of approval or disapproval of a proposed item will be final. Contractor shall not rely upon approvals made in any other manner.

806-3.1 Riser Rings:

a. **Precast Concrete:** New precast concrete riser rings free from cracks, voids and other defects and shall conform to ASTM C478. Contractor shall use precast concrete riser rings of a nominal thickness of not less than four (4) inches and not more than six (6) inches for reconstruction and/or adjustment of the manhole frame and cover. Concrete riser rings shall include the protective admixtures in accordance with Section 803. Joints shall also be externally wrapped with an external seal wrap as specified in Section 803.

b. **Cast Iron:** New cast iron riser rings shall be of domestic origin, conform to the latest edition of AASHTO M306. Contractor shall use cast iron riser rings for reconstruction and/or adjustment of the manhole frame and cover of less than 4 inches.

806-3.2 Cone Replacement: The new precast concrete cone shall be concentric, unless otherwise specified, conforming to ASTM C478 and Section 1017-2. Concrete manhole cones shall include the protective admixtures in accordance with Section 803. Joints shall be sealed with gaskets conforming to ASTM C990 or C443. Joints shall also be externally wrapped with an external seal wrap as specified in Section 803.

806-3.3 Manhole Frame and Cover: New manhole and Air Release Valve vault frames and/or covers shall conform to Section 1011-5 and the Contract Documents. Frames and covers shall be completely coated with an environmentally safe, water-base asphaltic coating which is nontoxic,

nonflammable, colorless, and dries to a hard black finish. Manhole frames shall also be externally wrapped with an external seal wrap as specified in Section 803. Air Release Valve vault frames are not required to be wrapped with an external seal wrap

806-3.4 Stainless Steel Inserts: The insert body shall be manufactured of 304 stainless steel with a thickness of not less than 18 gauge. The dish shall have a handle of 3/16" plastic coated stainless steel cable installed on the body of the dish. The handle shall be attached with a #6 high grade stainless steel rivet. The gasket shall be made of close cell neoprene, and shall have a pressure sensitive adhesive on one side. The gas relief valve shall be designed to release at a pressure of .5 to 1.5 psi. The valve shall be made of Nitrile for prevention of corrosion from contact with hydrogen sulfide, diluted sulfuric acid and other gases associated with waste-water collection systems. Each dish shall have a factory installed five foot long, 3/16" stainless steel cable retaining tether that shall pass through a water tight grommet in the bottom of the dish with a high grade stainless steel adjustable locking device located between the bottom of the dish and lift loop at the top end of tether. The cable terminal and eye end shall be made of stainless steel.

806-3.5 Cementitious Mortar: Mortar shall be made of one part Portland cement and two parts clean sharp sand. Cement shall be Type 1 and shall conform to ASTM C 150. Sand shall meet the requirements of ASTM C 144.

806-3.6 Patching Material: A quick setting fiber reinforced cementitious material shall be used as a patching material and is to be mixed and applied according to manufacturer's recommendations.

806-3.7 Hydraulic Cement: A rapid setting, high-early-strength, cementitious product specifically formulated for leak control shall be used to stop water infiltration. The material shall be mixed and applied according to the manufacturer's recommendations.

806-3.8 Chemical Grout: A chemical grout shall be used for stopping very active infiltration and filling voids. Chemical grout shall be an acrylic, acrylate, or urethane base grout for non-structural infiltration control with the following properties:

a. Acrylic or Acrylate Base Grout:
    1. Minimum 25% acrylic or acrylate base material by volume.
    2. Controllable reaction time: 30 seconds to 1 hour.
    3. Viscosity: 1 to 3 centipoises water.
    4. Tolerates dilution and reacts in moving water.
    5. Final reaction:
        i. Produces chemically, continuous irreversible, non-biodegradable, flexible gel, impermeable to water at pressures up to 15psi in pure form.
        ii. Produces stabilized soil in ground that will not become brittle or rigid.
    6. Gel does not bleed water under stress.
    7. Dehydrated gel returns to 90% of its original volume and form after prolonged period of low ground water.
    8. Do not use catalyst containing dimethyl amino propionitrile (DMAPM).
    9. Tinted to allow detection of grout in drill holes or at leakage locations.

b. Urethane Base Grout:
    1. Ratio: One part urethane prepolymer to 10 parts water by volume (10 to 50% prepolymer).
    2. Liquid Prepolymer:
        i. Solids content: 77 to 83%
        ii. Specific gravity: 1.04

iii. Flash Point: 20 degrees F
iv. Viscosity: 200 to 1200 centipoises water at 70 degrees F

3. Water for reaching prepolymer: pH of 5 to 9.
4. Use manufacturer recommended gel control agent to control cure time as required.
5. Final reaction:

   i. Produces chemically, continuous irreversible, non-biodegradable, flexible gel, impermeable to water at pressures up to 15psi in pure form.
   ii. Produces stabilized soil in ground that will not become brittle or rigid.

6. Dehydrated gel returns to 90% of its original volume and form after prolonged period of low ground water.
7. Do not use catalyst containing dimethyl amino propionitrile (DMAPM).
8. Tinted to allow detection of grout in drill holes or at leakage locations.

Chemical grouts shall be as manufactured by Avanti International, De Neef, Inc., or approved equal.

806-3.9 Liner Materials:

a. **Cementitious Liner Material:** Cementitious liner products shall be used to form a structural monolithic liner covering all interior manhole surfaces and shall have the following minimum requirements:

   1. Compressive Strength (ASTM C109): 6,000 psi, 28days
   2. Tensile Strength (ASTM C496): 600 psi, 28 days
   3. Flexural Strength (ASTM C293): 1,000 psi, 28 days
   4. Shrinkage (ASTM C596): 0.02% at 28 days
   5. Minimum Bond (ASTM C952): 200 psi, 28 days

   When used as the final rehabilitation liner material (no epoxy liner), product shall be made with calcium aluminate cement. Calcium aluminate is not required when the cementitious liner is used as the underlayment for the epoxy liner application.

   Cementitious liner products shall be as listed in the Sanitary Sewer QPL, or approved equal.

b. **Epoxy Liner Material:** 100% solids epoxy liner is to be applied where structural enhancement is needed and severe corrosion is anticipated. The epoxy liner material shall be applied over the completed cementitious liner material (without the calcium aluminate). The liner shall be spray applied or spin cast. The manufacturer of the selected epoxy liner material shall approve in writing that their epoxy liner is compatible with cementitious repair and liner material. The epoxy liner material shall have the following minimum requirements:

   1. Hardness, Shore D (ASTM D2240): 85 (±2)
   2. Adhesion (ASTM D4541), Concrete: Substrate Failure
   3. Abrasion (ASTM D4060): No more than 180 mg loss after 1,000 cycles (CS 17 Wheel 1kg)
   4. Corrosion Resistance: Suitable for environments PH of .5 or higher. Highly resistant to hydrogen sulfide, sulfuric acid, MIC and treatment chemicals.

   Epoxy liner products shall be as listed in the Sanitary Sewer QPL, or approved

equal.

c. **Multi-Component Polyurea (MCP) System Liner Material:** A multi-component, non-volatile, silicone modified polyurea stress panel liner is to be applied where an infiltration barrier is needed, severe corrosion is anticipated, and where service turnaround time is extremely limited.

1. The liner components shall be as follows:

Component	**Material**
Moisture Barrier	Silicone Modified Polymer (polyurea)
Surfacer	Polyurethane/Polymeric blend
Final Corrosion Barrier	Silicone Modified Polymer (polyurea)

2. The Barrier coat material is a two component 100% solids Silicone Modified Polyurea with the following minimum requirements and properties:

1. Tensile Strength (ASTM D412): 2,600 psi
2. Elongation (ASTM D412): 420%
3. Tear Strength (ASTM D624): 280 pli
4. Hardness, Shore D (ASTM D2240): 42 (±2)
5. Flexibility (ASTM D522): Pass (1/ 8 “Mandrel)
6. Taber Abrasion (ASTM D4060): No more than 25 mg loss after 1,000 cycles (CS 17 Wheel 1kg)
7. Corrosion Resistance: Suitable for environments PH of .5 or higher. Highly resistant to hydrogen sulfide, sulfuric acid, MIC and treatment chemicals.
8. Processing Properties:
    A. Gel Time: 1-2 seconds
    B. Tack Free Time: 15 seconds
    C. Cure Time: 30 seconds

3. The Surfacer coat material is a two component premium, closed cell, specially formulated polyurethane foam with the following minimum requirements and properties:

1. Density (ASTM D1622): 4 pcf
2. Compressive Strength (ASTM D1621): 90 psi
3. Closed Cell Content (ASTM D1940): >95%
4. Water Absorption (ASTM D2842): 0.020 gm/cc
5. Water Vapor Transmission (ASTM E96): 0.61 perms
6. Processing Properties:
    A. Cream Time: 1-4 seconds
    B. Tack Free Time: 5-8 seconds
    C. Rise Time: 6-10 seconds

4. Modified polymer shall be sprayable, solvent free, two component polymeric, moisture/chemical barrier specifically developed for the corrosive wastewater environment.

5. A mechanical anchoring system shall be imbedded and sprayed into the liner at all leaks and at the wall/floor termination.

6. MCP System Warranty: The supplied lining system shall include a 10-year limited warranty covering both materials and installation beginning on the date of

final acceptance. Both the Manufacturer and the Applicator shall stand behind this warranty for 10 years. Contractor shall submit the following:

1. An affidavit executed under seal by an officer of the Manufacturer and the Installer stating that if their proposed MCP lining system is used on this project; the Manufacturer will warrant the finished, in-place, lining system against infiltration and corrosion for a minimum of 10 years from the installation date.

MCP liner products shall be SpectraShield with AnchorShield as manufactured by CCI Spectrum, Inc., or approved equal.

d. **Water:** Water shall be clean and potable.

806-3.10 Internal Manhole Chimney Seal Material: An aromatic urethane rubber material or flexible epoxy mastic used to prevent leakage of water into the manhole through the frame joint area and the area above the manhole cone and shall have the following minimum requirements:

a. Elongation (ASTM D412): 600%
b. Tensile Strength (ASTM D412): 1,150 psi
c. Adhesive Strength (ASTM D903): 175 lb. l/in.
d. Tear Resistance (ASTM D1004): 155 lb. l/in.

The seal shall extend from the inside of the manhole frame down to the cone or corbel of the manhole.

806-3.11 External Manhole Seal Wrap: When work consists of adjusting manholes or cone replacements, an external seal wrap shall be installed to the outside of concrete risers, steel risers and joints of the precast manhole in order to eliminate infiltration. The external seal wrap shall conform with Section 803 and be installed in accordance with the details of the Contract Documents and the manufacturer's recommendations.

806-4 EQUIPMENT: Contractor shall utilize equipment approved by the material supplier for the specific application. Hard to reach areas, primer application and touch-up may be performed using hand tools as approved by the manufacturer. Contractor shall be trained by, or have their training approved and certified by the coating product manufacturer for the handling, mixing, application and inspection of the coating product(s) to be used as specified herein.

806-5 PREPARATION:

a. Perform traffic control in accordance with the approved traffic control submittal.

b. Store materials in accordance with manufacturer's recommendations.

c. Schedule and perform the work in a manner that does not cause or contribute to overflows or spills of sewage from the sewer system.

d. Install devices to prevent extraneous material from entering the sewer system and to prevent upstream line from flooding the manhole. If extraneous material or debris falls into a "live" manhole during adjustment operations, the Contractor shall remove debris at no cost to the Owner.

e. Dispose of wastes in accordance with applicable regulations.

f. Schedule and perform any bypass pumping that will be necessary to properly rehabilitate the manhole. Refer to section 813 for sewer flow requirements.

g. If present in the manhole, Contractor shall remove all access steps. Removal shall consist of neatly cutting steps flush with the wall prior to any lining installation. Contractor shall be responsible for proper disposal of steps.

h. For manholes that are located within pavement areas and require resetting or replacement of concrete riser rings, cones, and /or frames, the Contractor shall sawcut, remove, and replace a 6 ft. x 6 ft. square section of pavement and base for rehabilitation operations. Costs for removal and replacement of pavement and base beyond these limits shall be borne by the Contractor.

806-6 INSTALLATION: Prior to any lining all other miscellaneous work must be complete.

806-6.1 Cone Replacement: The Contractor shall replace existing deteriorated manhole cone section with new precast concrete cone section. A preformed gasket material shall be placed in all keyways between existing manhole riser section and cone joints. Prior to backfilling, rubber external seal wraps shall be applied to the cone and manhole section joint, riser rings and frame in accordance with Subsection 803-4.7. If the existing manhole is of brick construction, the cone shall be set in a full bed of mortar on the top course of bricks.

806-6.2 Riser Rings: The Contractor shall replace existing, deteriorated riser rings with new precast concrete riser rings and/or cast iron riser rings. All manholes designated to receive casting adjustment and/or alignment shall be adjusted to meet existing finished grade unless an alternative elevation is specified. A cementitious mortar shall be placed in between individual precast concrete riser rings, and precast concrete riser ring and cone joints. The mortar shall be struck smooth with the interior surface of the manhole and floated with a sponge float to a surface profile of 8-10 mils. An epoxy system designed for metal-to-metal adhesion shall be used to connect individual cast iron riser rings and the cast iron riser rings to the frame. Prior to backfilling, rubber external seal wraps shall be applied to the cone and manhole section joint, riser rings and frame in accordance with Subsection 803-4.7.

806-6.3 Frame and Cover: Existing frames and covers which must be removed to facilitate manhole and/or Air Release Valve vault rehabilitation, riser reconstruction, and/or casting alignment or grade adjustments shall be salvaged, cleaned and given two coats of an approved bituminous coating by the Contractor for replacement unless determined to be defective by Engineer. If frame and/or cover are determined to be defective, Contractor shall replace with new frame and/or cover. Replacement frames and/or covers shall be furnished and installed in accordance with the Contract Documents. Frames shall be set in full mortar bed. The mortar shall be struck smooth with the interior surface of the manhole and floated with a sponge float to a surface profile of 8-10 mils. Prior to backfilling, rubber external seal wraps shall be applied to the cone and manhole section joint, riser rings and frame in accordance with Subsection 803-4.7.

806-6.4 Cementitious Liner:

a. All manholes to be lined shall be cleaned and scarified with a minimum of 5,000 psi water jet at a minimum water temperature of 180 degrees F. The water jet shall hit the manhole wall surface at as near perpendicular angle as possible. Cleaning the manhole walls from the ground surface without the appropriate angled nozzles will not be accepted. Manhole surface build-up of debris and loose manhole construction materials shall be removed during the cleaning process.

b. The intent of the surface preparation and cleaning work is to remove debris, films or

unsound, deteriorated concrete and to provide a structurally sound, clean surface that will enable lining materials to bond to the original substrate at adhesion strengths of that specified herein, a substrate pH of 8.3 is the minimum pH that will be considered acceptable to demonstrate that the surface preparation and cleaning have been properly performed.

c. Additional aggressive surface preparation and cleaning methods may be necessary to remove carbonated cementitious lining concrete or contaminants that remain after the cleaning performed as described above. The Contractor shall test the pH of the cleaned manhole interior surface at various locations of the manhole and when the results indicate a pH less than 8.3 then additional surface preparations and cleaning will be required. As a minimum level of effort the Contractor shall either dry sand blasting or pneumatic jackhammering with a bushing bit followed by a minimum 5,000 psi water blast.

d. Active leaks shall be stopped using hydraulic cement and/or chemical grout as necessary. Installation of chemical grout shall follow ASTM F2414 and as specified herein:

1. Brick Manholes:
    i. Drill only the amount of holes necessary to stop leakage following industry standards and chemical grout manufacturer's recommendations.
        A. Do not use curtain of grout sealing method.

    ii. Proceed with manhole repairs and/or reconstruction.

2. Precast manholes:
    i. Seal pipe connections as specified by drilling between pipe and manhole opening and injecting grout.
    ii. When specified, seal precast manhole base by drilling holes at leakage points along bench to wall, and in channel.
    iii. At precast joints inject grout through holes drilled at leaking joint.

3. Equipment: The basic equipment shall consist of chemical pumps, chemical containers, injection packers, hoses, valves, and necessary equipment and tools required to seal manholes. The injection pumps shall be equipped with pressure gages that will provide for monitoring pressure during the injection process.

Chemical grout shall be pumped through grout injection ports until material refusal is recorded on the pumping unit pressure gage or a predetermined quantity of sealant has been injected. Care shall be taken during the pumping operation to insure that excessive pressures do not develop and cause damage to the manhole structure. Upon completion of the injection, the ports shall be removed and the remaining holes filled with mortar or patching material and troweled flush with the surface of the manhole walls or other surfaces.

e. Any bench, invert or service line repairs shall be made at this time using quick setting grout or repair mortar per the manufacturer's recommendations.

f. Invert repair shall be performed on all inverts with visible damage or where infiltration is present. After blocking flow through the manhole and thoroughly cleaning the invert, quick setting patch material shall be applied to the invert in an expeditious manner. The finished invert surfaces shall have a smooth surface and form a continuous monolithic conduit with the sewer pipe entering and leaving the manhole.

The bench and invert shall form a watertight seal with the manhole walls, base and pipe seal.

g. Wastewater flow shall be controlled by methods which prevent contact with the new bench and invert for 6-8 hours after mortar placement. If 6-8 hours set time is not possible, a fast setting, high early strength mortar shall be used with provisions for flow control until concrete has set.

h. Fill all cracks, holes and joints what have voids using non-shrink grouts in accordance with the manufacturer's recommendations. Repair exposed rebar, defective pipe penetrations or inverts, etc. with non-shrink grouts or other approved alternative method.

i. Apply Cementitious Liner Material per the Manufacturer's recommendations. Apply Cementitious Liner material so that the final thickness is 0.5-inch minimum or per the thickness required by the manufacturer's minimum specification, whichever is greater. The material shall start at the bottom of the manhole frame and extend to the water level of the invert.

j. Finish repair material to a hard trowel finish and then finish with a sponge float. The sponge float finish shall have a surface profile of 8-10 mils.

k. If the cementitious lining material is not immediately coated with epoxy, apply a seal coat compatible with the repair material to aid in curing and minimize recontamination of the substrate prior to application of the epoxy liner material.

806-6.5 Epoxy Liner:

a. Prior to any Epoxy lining perform all work shown in Section 806-6.4 above.

b. Remove any curing compounds, sealers or contaminates prior to epoxy lining.

c. Apply epoxy lining material in accordance with the manufacturer's recommendations over the waterproofing/structural repair material shown in Section 806-6.4.

d. Epoxy liner shall be 125 mils, minimum, dry film thickness.

806-6.6 Multi-Component Polyurea (MCP) System Liner:

a. Prior to any MCP System lining perform all work shown in Sections 806-6.4 a. through h. above.

b. Mechanical anchoring system shall be imbedded and sprayed into the liner at all wall seams and at the wall/floor termination.

c. Application of multi-component system shall be in strict accordance with manufacturer's recommendation and must be performed by a contractor licensed and trained by the Manufacturer. A permanent identification number and date of work performed shall be affixed to the structure in a readily visible location.

1. Apply Moisture Barrier. This layer of polyurea shall be spray applied to all surfaces.

2. Apply Surfacer. This layer of polyurethane rigid structure foam shall be spray applied to all surfaces previously lined with the moisture barrier. Layer thickness may vary depending on the condition of the substrate and the level of deterioration. Mechanical anchoring system shall be embedded in this layer.

3. Apply Final Corrosion Barrier to all surfaces lined with the Surfacing layer.

d. Total MCP System lining thickness shall be 500 mils, minimum, dry film thickness.

806-6.7 Internal Manhole Chimney Sealant:

a. Perform all work described in Sections 806-6.4 and 6.5 (if 6.5 is required) prior to any Internal Manhole Chimney Sealant.

b. Clean all contaminates from manhole frame by sandblasting or mechanical methods as recommended by the chimney sealant manufacturer.

c. Install Internal Manhole Chimney Sealant in accordance with the manufacturer's recommendations. The Contractor shall contact the manufacture for thickness recommendations however; the final liner material shall be made no less than 170 mils.

806-6.8 External Manhole Seal Wrap: When Work consists of adjusting sewer manholes or cone replacement, an external seal wrap shall be installed to the outside of concrete risers, steel risers and joints of the precast manhole in order to eliminate infiltration. Frame and cover shall be completely coated prior to installation of the external seal wrap. The external seal wrap shall be installed in accordance with the details of the Contract Documents and the manufacturer's recommendations.

806-6.9 Stainless Steel Insert: If existing manhole is equipped with a non-stainless steel insert, Contractor shall remove and dispose of existing insert and furnish and install a new stainless steel insert in accordance with manufacturer's recommendations. Rivet used for attaching insert to manhole shall be installed into the casting. If existing manhole is equipped with a stainless steel insert pan to prevent intrusion of storm water, pan shall be cleaned and reinstalled by the Contractor unless determined to be defective by the Engineer. If insert is determined to be defective, Contractor shall furnish a new stainless steel insert and install in accordance with manufacturer's recommendations at the completion of manhole rehabilitation operations.

806-7 TESTING: After completion of any rehabilitation operation and backfilling (if required), the Contractor shall conduct the following tests on the manholes:

a. Vacuum Test: Manhole shall be vacuum tested in accordance with Subsection 803-5.1.

b. Visual Inspection: Upon completion of the lining system installation, the lined area shall be cleaned and prepared by the Contractor, to permit close visual inspection by

the Engineer and Applicator. Any and all deficiencies or defective work (not in compliance with this section or related sections) shall be marked and repair or removed/replaced by the Contractor at no additional cost to the Owner.

If an epoxy or MCP liner is applied, the following additional tests will be required:

a. Wet Film Thickness Gage: During application a wet film thickness gage, meeting ASTM D4414 – Standard Practice for Measurement of Wet Film Thickness of Organic Coatings by Notched Gages, shall be used to ensure a monolithic coating and uniform thickness during application.

b. Holiday Test: Upon full cure, the installed lining system shall be checked by high voltage spark detection in accordance with NACE RP0188-90 to verify a pinhole-free surface. Voltage shall be set at 11,000 volts. Areas which do not pass the spark detection test shall be corrected and rechecked at no additional cost to the Owner.

806-8 MEASUREMENT:

a. **Manhole Riser Ring (Concrete):** Measurement for precast concrete manhole riser rings shall be made on a vertical inch basis.

b. **Manhole Riser Ring (Cast Iron):** Measurement for cast iron manhole riser rings shall be made on a vertical inch basis.

c. **Manhole Cone Replacement**: Measurement of Work for payment of this Item shall be made at the unit price bid per vertical foot based on manhole diameter. Measurement shall be made from the bottom of cone to top of cone. Excavation, backfill, disposal of deteriorated cones and surplus excavated material is considered incidental to and, if required, shall be included in this Bid Item. Sawcutting, removal and restoration of pavement and base material, curbs and gutters, shall be paid for as required under the Bid Item for that particular portion of the Work.

d. **Reset Existing Manhole Frames and Covers:** Measurement for removing, cleaning, and resetting existing manhole and/or Air Release Valve vault frames and covers shall be the actual count (each).

e. **Manhole Frame:** Measurement for new manhole frame shall be the actual count (each).

f. **Manhole Frame (Oversized):** Measurement for new oversized manhole frame that is larger than the standard 25” diameter manhole frame shall be the actual count (each).

g. **Manhole Frame (Bolt Down Watertight):** Measurement for new bolt down watertight manhole frame shall be the actual count (each).

h. **Manhole Frame and Cover (Hinged):** Measurement for new hinged manhole frame and cover assembly shall be the actual count (each).

i. **Air Release Valve Vault Frame:** Measurement for new Air Release Valve vault frame shall be the actual count (each).

j. **Manhole Cover:** Measurement for new manhole cover shall be the actual count (each).

k. **Manhole Cover (Oversized):** Measurement for new oversized manhole cover that is larger than the standard 23 ¼" diameter manhole cover shall be the actual count (each).

l. **Manhole Cover (Bolt Down Watertight):** Measurement for new bolt down watertight manhole cover shall be the actual count (each).

m. **Air Release Valve Vault Cover:** Measurement for new Air Release Valve vault cover shall be the actual count (each).

n. **S.S. Manhole Insert:** Measurement for new stainless steel manhole insert shall be the actual count (each).

o. **Manhole Repair (Patching):** Measurement for manhole repair shall be made on a cubic foot basis as determined by the actual volume of water seal, solid filler, or waterproof grout mix used to make repairs to wall sections, bench, and invert to manhole connections. All application shall be in accordance with manufacturer's recommendations. All work under this Item is considered to be performed from the interior of the manhole. Manhole repair shall not be measured for payment when required as surface preparation for a manhole lining rehabilitation operation.

p. **Chemical Grouting for Leakage Control:** Measurement for chemical grouting for leakage control shall be made on a per gallon basis as determined by the actual volume of chemical sealing material used to seal manhole from active leaks. All application shall be in accordance with ASTM F 2414 and manufacturer's recommendations. All work under this Item is considered to be performed from the interior of the manhole.

q. **Manhole Rehabilitation (Cementitious Lining):** Measurement for payment of these Items shall be based on the actual number of vertical feet of manhole wall rehabilitated for a standard four-foot diameter manhole. Where manhole diameter is significantly different from the standard (i.e., 5' or 6') then the vertical footage shall be adjusted for pay purposes accordingly, to account for the additional square footage of area requiring rehabilitation (i.e., 5' diameter = 1.25 x vertical footage of standard; 6' diameter = 1.50 x vertical footage of standard, etc.). In like manner, structures that are discovered to have geometric shapes other than circular shall be adjusted as above to provide a consistent method of accounting for the actual square footage of area requiring rehabilitation of walls. All other aspects of measurement shall remain as indicated. All measurements shall be as specified or made by conventional means with accuracies consistent with field conditions and common practice. Should a discrepancy in measurement exist which is greater than ten percent (10%), the Item in question shall be re-measured by both the Contractor and the Engineer for verification. Manhole rehabilitation (cementitious lining) shall not be measured for payment when required as underlayment for a manhole rehabilitation (epoxy lining) operation.

r. **Manhole Rehabilitation (Epoxy Lining):** Measurement for payment of these Items shall be based on the actual number of vertical feet of manhole wall rehabilitated for a standard four-foot diameter manhole. Where manhole diameter is significantly different from the standard (i.e., 5' or 6') then the vertical footage shall be adjusted for pay purposes accordingly, to account for the additional square footage of area requiring rehabilitation (i.e., 5' diameter = 1.25 x vertical footage of standard; 6' diameter = 1.50 x vertical footage of standard, etc.). In like manner, structures that

are discovered to have geometric shapes other than circular shall be adjusted as above to provide a consistent method of accounting for the actual square footage of area requiring rehabilitation of walls. All other aspects of measurement shall remain as indicated. All measurements shall be as specified or made by conventional means with accuracies consistent with field conditions and common practice. Should a discrepancy in measurement exist which is greater than ten percent (10%), the Item in question shall be re-measured by both the Contractor and the Engineer for verification.

s. **Manhole Rehabilitation (MCP Lining):** Measurement for payment of these Items shall be based on the actual number of vertical feet of manhole wall rehabilitated for a standard four-foot diameter manhole. Where manhole diameter is significantly different from the standard (i.e., 5' or 6') then the vertical footage shall be adjusted for pay purposes accordingly, to account for the additional square footage of area requiring rehabilitation (i.e., 5' diameter = 1.25 x vertical footage of standard; 6' diameter = 1.50 x vertical footage of standard, etc.). In like manner, structures that are discovered to have geometric shapes other than circular shall be adjusted as above to provide a consistent method of accounting for the actual square footage of area requiring rehabilitation of walls. All other aspects of measurement shall remain as indicated. All measurements shall be as specified or made by conventional means with accuracies consistent with field conditions and common practice. Should a discrepancy in measurement exist which is greater than ten percent (10%), the Item in question shall be re-measured by both the Contractor and the Engineer for verification.

t. **Internal Manhole Chimney Sealant**: Measurement for payment of this Item shall be based on the actual number of vertical inches depending on the depth of each seal applied. The depth of each seal will be measured as the distance from the manhole frame joint to the top joint of the manhole cone for which final liner material is to be applied. Fractional measurement will be rounded down to the nearest whole number as reported in inches.

u. **Removal of Interior Manhole Steps:** Measurement of Work for payment of this Item shall be made at the unit price bid per manhole containing steps, regardless of the number of steps in each.

806-9 PAYMENT:

a. **Manhole Riser Ring (Concrete):** Payment for precast concrete manhole riser rings will be full compensation for all labor, materials, and equipment necessary to remove and dispose of existing deteriorated concrete manhole riser rings and replace with new precast concrete manhole riser rings; including traffic control, external seal wraps, excavation, backfill, and disposal of surplus excavated material, if required. Sawcutting, removal and restoration of pavement and base material, curbs and gutters, shall be paid for as required under the Bid Item for that particular portion of the Work.

b. **Manhole Riser Ring (Cast Iron):** Payment for cast iron manhole riser rings will be full compensation for all labor, materials, and equipment necessary to remove and dispose of existing deteriorated cast iron manhole riser rings and replace with new cast iron manhole riser rings; including traffic control, external seal wraps, excavation, backfill, and disposal of surplus excavated material, if required. Sawcutting, removal and restoration of pavement and base material, curbs and gutters, shall be paid for as required under the Bid Item for that particular portion of

the Work.

c. **Manhole Cone Replacement:** Payment of the unit price amount bid for this Item shall be full compensation for furnishing all materials, labor, and equipment; including traffic control, excavation, backfill, external seal wraps, and disposal of deteriorated cones and surplus excavated material, if required. Sawcutting, removal and restoration of pavement and base material, curbs and gutters, shall be paid for as required under the Bid Item for that particular portion of the Work.

d. **Reset Existing Manhole Frames and Covers:** Payment for resetting existing manhole and/or Air Release Valve vault frames and covers will be full compensation for all materials, labor, equipment; including traffic control, external seal wraps, excavation, backfill, and disposal of deteriorated cones and surplus excavated material, if required. Sawcutting, removal and restoration of pavement and base material, curbs and gutters, shall be paid for as required under the Bid Item for that particular portion of the Work.

e. **Manhole Frame:** Payment for this item includes full compensation for furnishing and installing a new manhole frame, disposal of damaged manhole frame, external seal wraps, and traffic control.

f. **Manhole Frame (Oversized):** Payment for this item includes full compensation for furnishing and installing a new oversized manhole frame, disposal of damaged oversized manhole frame, external seal wraps, and traffic control.

g. **Manhole Frame (Bolt Down Watertight):** Payment for this item includes full compensation for furnishing and installing a new bolt down watertight manhole frame, disposal of damaged manhole frame, external seal wraps, and traffic control.

h. **Manhole Frame and Cover (Hinged):** Payment for this item includes full compensation for furnishing and installing a new hinged manhole frame and cover, disposal of damaged manhole frame and cover, external seal wraps, and traffic control.

i. **Air Release Valve Vault Frame:** Payment for this item includes full compensation for furnishing and installing a new Air Release Valve vault frame, disposal of damaged Air Release Valve vault frame, and traffic control.

j. **Manhole Cover:** Payment for this item includes full compensation for furnishing and installing a new manhole cover, disposal of damaged manhole cover, and traffic control.

k. **Manhole Cover (Oversized):** Payment for this item includes full compensation for furnishing and installing a new oversized manhole cover, disposal of damaged oversized manhole cover, and traffic control.

l. **Manhole Cover (Bolt Down Watertight):** Payment for this item includes full compensation for furnishing and installing a new bolt down watertight manhole cover, disposal of damaged manhole cover, and traffic control.

m. **Air Release Valve Vault Cover:** Payment for this item includes full compensation for furnishing and installing a new Air Release Valve vault cover, disposal of damaged Air Release Valve vault cover, and traffic control.

n. **S.S. Manhole Insert:** Payment for this item includes full compensation for furnishing and installing a new stainless steel manhole insert, and traffic control.

o. **Manhole Repair:** Payment for manhole repair will be full compensation for cleaning and preparing surfaces; drilling for access or infiltration relief purposes; and for labor, materials and equipment necessary to purchase, store, transport, mix and apply all patching and preparatory items required to complete the Work; sewer flow control, traffic control and testing.

p. **Chemical Grouting for Leakage Control:** Payment for chemical grouting for leakage control will be full compensation for cleaning and preparing surfaces; drilling for sealant injection ports; and for labor, materials and equipment necessary to seal manhole from active leaks through chemical grouting and preparatory items required to complete the Work; sewer flow control, traffic control and testing.

q. **Manhole Rehabilitation (Cementitious Lining):** Payment of the unit price amount bid for this Item shall be full compensation for all labor, materials, equipment, surface cleaning and preparation, patching and/or grouting, cementitious lining, sewer flow control, traffic control, and testing.

r. **Manhole Rehabilitation (Epoxy Lining):** Payment of the unit price amount bid for this Item shall be full compensation for all labor, materials, equipment, surface cleaning and preparation, patching and/or grouting, cementitious underlayment, epoxy lining, sewer flow control, traffic control, and testing.

s. **Manhole Rehabilitation (MCP Lining):** Payment of the unit price amount bid for this Item shall be full compensation for all labor, materials, equipment, surface cleaning and preparation, multiple-component polyurea liner system, sewer flow control, traffic control, and testing.

t. **Internal Manhole Chimney Sealant**: Payment of the unit price amount bid for this Item shall be full compensation for all labor, materials, sealant system accessories, equipment, surface cleaning and preparation, patching and/or grouting, sewer flow control, traffic control, and testing.

u. **Removal of Interior Manhole Steps**: Payment for this item will be full compensation for labor, materials and equipment necessary to remove steps from the interior of the manhole, patch any voids created by the removal, sewer flow control, and traffic control.

806-10 PAY ITEMS:

Item No.	Item	Unit
8061100	Manhole Riser Ring (Concrete)	Vertical Inch
8061200	Manhole Riser Ring (Cast Iron)	Vertical Inch
80620_ _	_ _" Manhole Cone Replacement	Vertical Foot
8063000	Reset Existing Manhole Frames and Covers	Each
8063100	Manhole Frame	Each
8063101	Manhole Frame (Oversized)	Each

8063102	Manhole Frame (Bolt Down Watertight)	Each
8063103	Manhole Frame and Cover (Hinged)	Each
8063104	Air Release Valve Vault Frame	Each
8063200	Manhole Cover	Each
8063201	Manhole Cover (Oversized)	Each
8063202	Manhole Cover (Bolt Down Watertight)	Each
8063203	Air Release Valve Vault Cover	Each
8064000	S.S. Manhole Insert	Each
8065000	Manhole Repair (Patching)	Cubic Foot
8065500	Chemical Grouting for Leakage Control	Gallon
8066100	Manhole Rehabilitation (Cementitious Lining)	Vertical Foot
8066200	Manhole Rehabilitation (Epoxy Lining)	Vertical Foot
8066250	Manhole Rehabilitation (MCP Lining)	Vertical Foot
8066300	Internal Manhole Chimney Sealant	Vertical Inch
8067000	Removal of Interior Manhole Steps (Per M.H.)	Each

SECTION 808
CURED-IN-PLACE-PIPE (CIPP)

808-1 DESCRIPTION: This Work consists of providing labor, materials, equipment, and supervision necessary to accomplish the CIPP lining of all sewer mains designated in the Contract Documents.

808-2 SCOPE OF WORK:

a. Contractor shall provide materials, labor, equipment, and services necessary for: sewer flow control, pre-installation cleaning, rehabilitation of existing sanitary sewer mains by lining, initial and final Closed Circuit Television inspection (CCTV), and final testing of the CIPP system.

b. It is the intent of this Section to provide for the rehabilitation of existing sewer host pipe. A resin-impregnated flexible felt tube will be inserted utilizing an inversion process to fit against the original host pipe. The liner is then heated to cure the resin to a hard smooth liner.

808-2.1 Qualifications:

a. CIPP Contractors shall have a minimum of five (5) years of active continuous experience installing the exact named CIPP product proposed. In addition, Contractor shall have successfully installed at least 300,000 feet of the exact named proposed CIPP liner product including at least 20,000 feet in 36-inch diameter (or larger) host pipe and at least 5,000 feet in 54-inch (or larger) host pipe in wastewater collection system applications.

b. The Qualifying Field Superintendent employed by the CIPP Contractor will have at least five (5) years experience with CIPP products. In addition, the Qualifying Superintendent must have supervised jobs in which at least 300,000 feet of pipe has been rehabilitated using the exact named product proposed including a minimum of 20,000 feet in 36-inch diameter (or larger) host pipe and at least 5,000 feet of 54-inch in 54-inch diameter (or larger) host pipe. The Qualifying Superintendent shall be on-site during all phases of the work involving any pre and post-installation video inspection, sewer cleaning or insertion and processing of the CIPP..

c. The CIPP system manufacturer shall have 1,000,000 linear feet installed of the exact name-brand product bid in the United States, with a minimum of 20,000 linear feet in diameters 36-inch or larger and a minimum of 5,000 feet of 54-inch diameter or larger.

808-3 MATERIALS:

a. The Contractor shall use a thermosetting resin impregnated inversion liner conforming to the requirements of the latest version of ASTM F1216 (Rehabilitate Pipelines by Inversion and Curing a Resin Impregnated Tube), ASTM D5813 (Cured-in-Place, Thermosetting Resin Sewer Pipe), and ASTM F1743 (Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP)). All products shall be as shown on the Quality Products List (QPL) or approved equal.

b. The tube shall consist of one or more layers of absorbent non-woven fabric capable of carrying resin, and capable of withstanding installation pressures and curing temperatures. The tube material shall be able to stretch to fit irregular pipe sections and negotiate bends. The outside layer of the tube shall be plastic coated with a material that is compatible with the resin system used. The tube should be fabricated to a size that will fit the internal circumference and the length of the existing pipe when installed. Allowance should be made for circumferential stretch during installation. The inside of the installed tube shall be marked along its full length at regular intervals not to exceed ten (10) feet. Markings shall also include the manufacturer of the liner that must appear in at least one location per setup.

c. Unless otherwise specified, the Contractor shall furnish a general purpose, unsaturated, polyester or thermosetting vinyl ester resin and catalyst system compatible with the reconstruction inversion process that provides the cured physical strengths and properties specified herein. The approved thermosetting resin and catalyst systems are found in the QPL. The resin shall be cured in the presence of steam or water as specified in the curing section in this specification.

d. Resins shall be shipped directly to the wet-out facility from the resin manufacturer.

e. Old resins and reworked resins are prohibited, regardless of whether or not they are mixed with new resin.

f. Catalysts: Primary catalyst shall not exceed 1 percent of resin by volume; secondary catalyst shall not exceed ½ percent of resin by volume.

g. The wall color of the interior pipe surface of the CIPP after installation shall not be of a dark or non-reflective nature that could inhibit proper closed circuit television (CCTV) inspection.

h. The bond between all CIPP layers shall be strong and uniform. All layers, after cure, shall be completely saturated with resin.

i. Material Warranty: Provide manufacturer's written 1 year warranty, with Owner named as beneficiary, for correction of any breakdown of material effectiveness of structural repair elements, including all Work required to remove and replace defective material.

808-4 SUBMITTALS:

a. Prior to receiving the Notice to Proceed at the pre-construction meeting, the Contractor or manufacturer shall submit all data sheets for CIPP materials to be used on the project. These include at a minimum the tube, resin, and catalyst materials.

b. **Qualifications:** Submit documentation showing that the Contractor and personnel meet the minimum required qualifications stated in Section 808-2.1. Include a list of projects showing Contractor's experience with the use of the same pipe material, length and diameter (or larger). Information must include, but not be limited to date and duration of work, location, pipe information (i.e. length, diameter, depth of installation, pipe material, etc.), project owner information (i.e. name, address, telephone number, contact person), and the contents handled by the pipeline (water, wastewater, etc.). **The apparent low bidder shall complete and submit the required qualifications to the Engineer within ten (10) days after the bid opening.**

c. The Standard Dimension Ratio (SDR) is the ratio of the outside diameter (OD) of the pipe to its minimum wall thickness. All CIPP wall thicknesses, SDR's by diameters, and depth ranges corresponding to the requirements of the Contract Documents, must be submitted to the Engineer for approval prior to installation.

d. Critical Damage Reports, if applicable.

e. The Contractor shall submit to the Engineer, at least 24 hours prior to installation, a
"wet-out" schedule detailing time and location.

f. The manufacturer, prior to installation, shall provide the inversion pressures necessary for proper installation. Tube installation forces or pressures shall be limited so the tube is not stretched longitudinally by more than 5% of the original length.

g. Before the installation begins, the tube manufacturer shall provide the minimum pressure required to hold the tube tight against the existing host pipe, and the maximum allowable pressure that will not damage the tube.

h. Acceptance testing samples as described in Section 808-21.

i. Traffic Control shall be the responsibility of the Contractor. Any necessary lane closures shall require a permit from the Traffic Division of the DPW or the LaDOTD. Copies of the permits shall be submitted to the Engineer prior to commencing Work.

j. Post-construction CCTV inspection videos.

808-5 DESIGN PARAMETERS:

a. The CIPP system felt and resin composite shall have the minimum physical properties given below and in accordance with the guidelines in the appendix of the latest version of ASTM F1216.

1.	Design Life:	50 years
2.	Pipe Diameters:	Per Contract Documents
3.	Ovality:	Per Contract Documents
4.	Pipe Condition:	Fully deteriorated
5.	External Water:	ground surface
6.	Flexural Strength:	4,500 psi
7.	Short Term Flexural Modules:	400,000 psi
8.	Reduction Factor:	50%
9.	Long Term Flexural Modules:	200,000 psi
10.	k Enhancement Factor:	7
11.	Soil Modules:	1,000 psi
12.	Soil Density:	120 pcf
13.	Highway Live Load:	AASHTO HS20-44
14.	Safety Factor:	2 minimum
15.	Min. Thickness(=<10"):	6 mm
16.	Min. Thickness (>10") :	7.5 mm

17. If calculations require thicker wall round to the next higher multiple of 0.5 mm.

b. Any layers of the tube that are not saturated with resin prior to insertion into the existing pipe shall not be included in the required design structural CIPP wall thickness.

808-6 EQUIPMENT: The basic equipment shall consist of a CCTV system as described in Section 815, necessary liner materials, stand pipes, pumps, regulators, valves, hoses, boilers, blowers, winches, etc. The equipment shall be capable of performing the specified operations required to install the sewer liner material.

808-7 CLEANING, ROOT REMOVAL, PROTRUDING GASKET REMOVAL, AND INSPECTION:

a. Contractor shall notify the Engineer prior to beginning cleaning activities and pre-construction CCTV inspection. Contractor shall plan cleaning and pre-construction CCTV inspection activities far enough in advance of CIPP lining activities to allow Engineer time to review any Critical Damage Reports that may develop from the CCTV inspection results.

b. Experienced personnel trained in locating breaks, obstacles, and service connections by CCTV will perform CCTV of pipe in accordance with Section 815. The interior of the pipe should be carefully inspected to determine the location of any conditions that may prevent proper installation of the impregnated tube, such as protruding service taps, collapsed or crushed pipe, and reductions in the cross-sectional pipe area of more than 10%. The Contractor will notify the Engineer immediately if the inspection reveals an obstruction that cannot be removed by conventional sewer cleaning equipment or that will interfere with the proper installation an acceptable liner. This should be submitted to the Engineer as a Critical Damage Report (CDR). The CDR shall include all adverse conditions for each pipe segment from manhole to manhole. The CDR shall include:

1. Two letters of transmittal.

2. A CDR standard form including screen capture of adverse condition and location footage.

3. A hardcopy printout of the video cut sheet (video report).

4. A DVD containing:

    i. Electronic pdf files of the video cut sheets
    ii. Digital copy of the pipe video

5. Recommendation from CIPP Contractor for each adverse condition.

c. It shall be the responsibility of the Contractor to remove all loose debris that is located within the sewer pipe in accordance with Section 812. This cleaning will be incidental to the cost of sewer pipe lining. If an obstruction is encountered that cannot be cleared with conventional sewer cleaning equipment, the Engineer should be notified immediately.

d. Any roots and/or protruding gaskets in the existing sewer pipe shall be cut and removed from the sewer pipe prior to the sewer liner installation. This root and/or protruding gasket cutting and removal shall be incidental to the cost of the sewer pipe lining, and there shall be no direct payment to the Contractor.

808-8 PROTRUDING SERVICE CONNECTIONS: When service connections protrude into the existing pipe more than ½" as measured from the inside pipe wall, then the Contractor shall remove the protruding portion of the service connection to within ½" of the inside pipe wall. Removal of the protruding portion of the service connection shall be accomplished using a television camera and internal cutting device, which shall not damage the collection line or the portion of the service line to remain in place. This work shall be accomplished prior to the installation of the liner pipe.

808-9 RESIN IMPREGNATION:

a. The tube shall be vacuum-impregnated with resin (wet out) under controlled conditions. The volume of resin used should be sufficient to fill all voids in the tube material at nominal thickness and diameter. The volume should be adjusted by adding excess resin for the change in resin volume because of polymerization and to allow for any migration of resin into the cracks and joints in the original pipe. A roller system shall be used to uniformly distribute the resin throughout the tube.

b. The Contractor shall designate a location where the CIPP will be vacuum impregnated prior to installation. The Contractor shall allow the Engineer to inspect the materials and procedures used to vacuum impregnate the tube if desired.

c. Delivery, storage and handling of approved products are the responsibility of the Contractor. The Contractor shall keep them safe from damage and stored with the proper environmental containment as outlined by the manufacturer. No products should be used that have exceeded the designated shelf life as outlined by the manufacturer. Remove damaged products from Site. Promptly replace damaged products with new products at no additional cost to the Owner.

d. Maintain resin-impregnated tubes in refrigerated truck trailers at a temperature below 45-degrees F to prevent premature curing. Prior to beginning inversion, no portion of the resin-impregnated tubes liner shall be subjected to sunlight or ultraviolet radiation. Resin-impregnated tubes with signs of premature curing shall not be installed and shall be removed from the Project Site.

808-10 FLOW CONTROL PRECAUTIONS:

a. The Contractor shall be completely responsible for preventing service line backups during the liner installation and curing period.

b. The Contractor shall follow the additional flow control precautions in accordance with Section 813. Notification to homeowners will be made in accordance with Section 813-2(e).

808-11 INSTALLATION OF CIPP:

a. The wet out tube shall be inserted through an existing manhole or approved access point by means of an inversion process and the application of a hydrostatic head sufficient to extend it to the next designated manhole or termination point.

b. Alternately, the tube can be pulled into place and expanded with an inflation bladder.

c. Once the installation has begun, the pressure shall be maintained between the minimum and maximum pressures until the installation has been completed.

d. The existing host pipe shall be dewatered for any CIPP installation that does not use

an inversion method to expand the tube against the pipe wall.

808-12 USE OF LUBRICANT: Lubricant shall be used to reduce friction between the host pipe and the liner during the inversion or pulled-in process. This lubricant should be poured into the water in the downtube or applied directly to the tube or inflation bladder. The lubricant used should be a nontoxic, oil-based product that has no detrimental effects on the tube, heating source and pump system, will not support the growth of bacteria, and will not adversely affect the fluid to be transported. Lubricant shall be used in processes with permeable coatings.

808-13 CURING WITH WATER:

a. After installation is completed, suitable heat source is required to circulate heated water throughout the pipe. The equipment should be capable of delivering hot water throughout the section to uniformly raise the water temperature above the temperature required to affect a cure of the resin. Temperature gauges shall be installed in the following areas: incoming water supply; outgoing water supply and between the impregnated tube and the pipe invert at the lining termination point.

b. Curing Time: 3 hours minimum

c. Minimum interface temperature between liner and tube shall be 120 degrees F.

d. Water Temperature: 180 degrees F minimum.

e. For CIPP in host pipes larger than 24", Continuous Temperature Monitoring and data collection shall be required during the CIPP process. To monitor the temperatures inside the tube wall and to verify proper curing, temperature sensors shall be placed between the host pipe and the liner in the bottom of the host pipe (invert) throughout the reach to record the heating and cooling that takes place on the outside of the liner during processing. Discrete temperature readings shall be taken at intervals no greater than 10 feet, along the entire length of any CIPP segment installed under this Contract. Additionally, sensors shall be strategically placed at points where a significant heat sink is likely to be anticipated. Prior to installing the liner in the host pipe, the temperature monitoring system's proper functioning shall be confirmed by connecting the system to a laptop computer and show that the sensors are reporting the ambient temperatures. No more than two sensors per manhole-to-manhole segment can be found faulty during this test. If three or more sensors in sequence are discovered faulty, a new sensor array shall be pulled into the host pipe replacing the previously installed array and the new array shall be again tested for its proper functioning at the Contractor's expense. The Temperature Monitoring System shall be connected to a laptop computer and collect temperature readings and log data for continuous monitoring during cure, as well as, future analysis and documentation of the temperature gradients during all aspects of the curing process, including heating, exotherm, curing, and cool-down of the CIPP installation. The data collection shall be stored in a database that shall have an output report that identifies each sensor by its station in the reach and shows the maximum temperature achieved during the processing of the CIPP and the time sustained at or above the manufacturer's required curing temperature at each sensor. Curing of the resin system shall be as per the directions of the CIPP manufacturer. The temperatures achieved and the duration of holding of the liner at those temperatures shall be per the CIPP manufacturer's established procedures. If any of the sensors or sensors along the reach indicates that there is a localized issue with respect to achieving proper curing per the written installation procedure, the Contractor shall address the issue

immediately using previously established protocols for such an event.

808-14 CURING WITH STEAM:

a. After installation is completed, suitable heat source is required to circulate steam throughout the pipe. The equipment should be capable of delivering steam throughout the section to uniformly raise the steam temperature above the temperature required to affect a cure of the resin. Temperature gauges shall be installed in the following areas: incoming steam supply; outgoing steam supply and between the impregnated tube and the pipe invert at the lining termination point.

b. Curing Time: 2 hours minimum

c. Minimum interface temperature between liner and tube shall be 120 degrees F.

d. Steam Temperature: 230 degrees F minimum.

e. Pressure required to keep tube inflated while curing 5 psi.

f. For CIPP in host pipes larger than 24", Continuous Temperature Monitoring and data collection shall be required during the CIPP process. To monitor the temperatures inside the tube wall and to verify proper curing, temperature sensors shall be placed between the host pipe and the liner in the bottom of the host pipe (invert) throughout the reach to record the heating and cooling that takes place on the outside of the liner during processing. Discrete temperature readings shall be taken at intervals no greater than 10 feet, along the entire length of any CIPP segment installed under this Contract. Additionally, sensors shall be strategically placed at points where a significant heat sink is likely to be anticipated. Prior to installing the liner in the host pipe, the temperature monitoring system's proper functioning shall be confirmed by connecting the system to a laptop computer and show that the sensors are reporting the ambient temperatures. No more than two sensors per manhole-to-manhole segment can be found faulty during this test. If three or more sensors in sequence are discovered faulty, a new sensor array shall be pulled into the host pipe replacing the previously installed array and the new array shall be again tested for its proper functioning at the Contractor's expense. The Temperature Monitoring System shall be connected to a laptop computer and collect temperature readings and log data for continuous monitoring during cure, as well as, future analysis and documentation of the temperature gradients during all aspects of the curing process, including heating, exotherm, curing, and cool-down of the CIPP installation. The data collection shall be stored in a database that shall have an output report that identifies each sensor by its station in the reach and shows the maximum temperature achieved during the processing of the CIPP and the time sustained at or above the manufacturer's required curing temperature at each sensor. Curing of the resin system shall be as per the directions of the CIPP manufacturer. The temperatures achieved and the duration of holding of the liner at those temperatures shall be per the CIPP manufacturer's established procedures. If any of the sensors or sensors along the reach indicates that there is a localized issue with respect to achieving proper curing per the written installation procedure, the Contractor shall address the issue immediately using previously established protocols for such an event.

808-15 COOL-DOWN:

a. Water cured CIPP should be cooled to a temperature below 90 F before relieving the hydrostatic head. Cool-down may be accomplished by the introduction of cool water

into the CIPP to replace water being drained from the small hole made in the downstream end. Care should be taken in the release of the static head to prevent a vacuum that could damage the newly installed CIPP.

b. Steam cured CIPP. Send air through the liner until it cools down to 120 F interface temperature. Once 120 F has been reached water may be introduced to finish cooling the line down to 90 F. Care should be taken in the release of the water to prevent a vacuum that could damage the newly installed CIPP.

808-16 INFLATION BLADDER REMOVAL: For pulled-in place installation techniques where the inflation bladder is designed not to bond to the CIPP, all portions of the bladder material must be removed from the CIPP.

808-17 CURING WITH ULTRA VIOLET LIGHT (UV):

a. If this method of curing is selected the material must be a polyester needle felt or fiberglass based CIPP liner impregnated with ISO NPG. The liner is cured with the standard UV curing method. A control panel operating a UV curing unit Light chain inside an end fitting with a light chain implemented installation drum, can be pulled on a trailer attached to the UV unit.

b. The Liner gets inverted into the pipe to be lined with the standard pressure drum. After completion of the inversion process the method does not distinguish at all from the standard method applied for the installation of the known glass liner systems. The light chain is introduced in the liner and the ends closed with the couplings.

c. The UV liner may be stored for as much as 3 months before installation.

808-18 FINISHED CIPP:

a. Be continuous over entire length from manhole to manhole and be free from visual defects such as foreign inclusions, dry spots, keel, boat hull, fins, pinholes, wrinkles, and other deformities. Such defects and deformities may (at the discretion of the Owner) be cause for rejection of the entire liner, in which case the lined pipe will be removed and replaced at no additional cost to the Owner.

b. When passing through or terminating in a manhole shall be carefully cut out in a shape and manner approved by Engineer.

c. Each pipe opening into manhole, a hydrophilic rubber joint seal shall be bonded with adhesive to the manhole and CIPP.

d. Meet leakage requirements as specified in Section 802.

808-19 SERVICE LINE CONNECTION RESTORATION: The service laterals to be excavated and restored shall be done prior to the CIPP lining of the mainline in accordance with Section 802 and all re-established services shall be smoke tested prior to backfilling. After the liner has properly cured, the service line connections shall be cut without excavation using an internal cutting device and a television camera. **All coupon materials from this action shall be collected by the Contractor at the next downstream manhole and submitted to the Engineer.** Contractor shall be responsible for repairs to downstream pumps that are damaged as a result of Contractor's failure to collect coupon materials. Service line connections shall be fully reopened and trimmed to a neat,

clean, circular opening concentric with the service line pipe, free of jagged edges, “sawteeth”, resin plugs or resin shelves.

If internal cuts to existing lined pipes are required by the Contract Documents in order to re-establish service line connections, the work shall be done similarly as described above. This work is in association with rehabilitation of pipes that have been previously lined and payment for this work will be included under the removal of protruding service connection pay item.

808-20 PARTIAL (SPOT REPAIR) CIPP LINERS:

a. The partial CIPP liner shall be installed in accordance with ASTM F 2599 and same requirements as for a full length liner.

b. The dimensions of the liner shall be fabricated to a size that when installed, will neatly fit the circumference of the existing conduit. The materials and physical properties of the partial liner shall conform to the same requirements as for a full length liner.

c. The tube, in good condition, shall be vacuum impregnated with the thermo-set resin. All air in the tube shall be removed by vacuum allowing resin to thoroughly impregnate the tube. A resin-impregnated sample shall be retained by the installer for each installation to provide verification of the curing process taking place in the host pipe. This sample shall be hung in the entry manhole to simulate ambient conditions of the host pipe.

d. The saturated tube along with the inversion bladder will be inserted into the carrying device and pulled into the host pipe. The pull is complete when the end of the launching device is aligned with the beginning of the section to be repaired. The resin and tube shall be completely protected during the pull such that no resin is lost by contact with manhole walls or pipe. The resin that provides a structural seal shall not contact the pipe until positioned at the point of repair.

e. The installer shall be capable of viewing the beginning of the liner contacting the host pipe verifying the exact placement of the liner. No measuring from a CCTV counter or estimating will be allowed.

f. The tube will be extracted out of the carrying device by controlled air or water pressure. The tube is held tightly in place against the wall of the host pipe by the pressure until the cure is complete.

g. Once the sample piece in the manhole has cured, the inflation bladder is deflated, and bladder and launching device are removed from the host pipe. Any materials used in the installation other than the CIPP liner is to be removed from the host pipe by the installer. Contractor shall recover the sample piece and label with upstream and downstream manhole numbers and footage from upstream manhole to service connection. Sample shall be submitted for testing in accordance with Section 808-21.

h. Any service lateral connections covered by the sectional repair are to be restored in accordance with Section 808-19.

808-21 INSPECTION AND TESTING:

a. PROPERTIES TEST: The following test requirements apply to all CIPP installations,

regardless of installation method, for each setup:

1. The Contractor shall prepare a sample for each installation of CIPP. The samples shall be restrained samples for diameters of CIPP less than 18"; and flat plate samples for diameters of CIPP 18" and larger. The flat plate samples shall be taken directly from the wet out tube, clamped between flat plates, and cured in the downtube. The restrained samples shall be tested for thickness and initial physical properties; flat plate samples shall be tested for initial physical properties only.
2. In diameters of CIPP less than 18", one minimum 12 inch long restrained pipe section shall be cut from the cured liner. In diameters greater than 18" flat plate samples shall be taken directly from the wet out tube, clamped between flat plates and cured in the downtube. All samples shall be labeled with upstream and downstream manholes numbers for that setup. The restrained samples shall be tested for thickness and initial physical properties; flat plate samples shall be tested for initial physical properties only. Each sample shall be large enough to provide three specimens for tensile testing and five specimens for flexural properties testing. Prior to laboratory tests, Wall thickness measurements shall be taken in accordance with ASTM D2122. Measurements of sample thickness will be taken by the Owner from four locations on each section. The average thickness of the measurements shall be equal to or greater than the required minimum or design thickness (whichever is greater). For laboratory testing, send one sample to an independent laboratory and test for modulus of elasticity and flexural strength. Preparation and testing standards shall be performed in accordance with approved submittals. In addition, Contractor shall collect the coupons from the service line connection restoration for each setup, label with upstream and downstream manhole numbers, and submit to the Owner. These coupons may also be used for testing. Failure of the thickness test, modulus of elasticity, or flexural strength shall be grounds for rejection of the CIPP liner.

3. "Wet-out" facility resin mixing equipment shall have a valve downstream of the mixing functions and immediately upstream of the application of the mixed resin to the tube where the Owner can draw resin samples. Contractor's batch mix facilities, if any, shall provide for sampling of the mixed batch. Submitted "wet-out" schedule cannot be modified without 24-hour notice to Owner. Resin samples shall be drawn at times determined by Owner. The Owner representative drawing the samples will arrive unannounced and shall be afforded immediate access to the equipment.

b. CCTV VISUAL TEST: The Contractor and the Engineer shall inspect each installation visually by CCTV. Variations from true line and grade may be inherent because of the conditions of the original piping. No infiltration of groundwater should be observed. All service entrances should be accounted for and be fully functional unless otherwise directed by the Engineer in writing. No visible leak around liner at manhole connection will be allowed. The pre- and post-installation documentation in DVD format will become the property of the Owner.

c. Contractor shall correct failed liner or liner deemed unacceptable by the Owner as a result of the post-video inspection and/or thickness test. Remedy for failed thickness test shall be defined as shown in the following table. Where pipe removal and replacement is required, it shall be for the entire segment length from manhole to manhole and payment shall be made in full for the cured-in-place pipe. No payment will be made to construct a new sewer segment (i.e. pipe replacement). The test shall be repeated at no additional cost to the Owner until the results are satisfactory to the

Engineer.

d. Warranty Inspection: Contractor shall provide a 1 year written guarantee, with Owner named as beneficiary, for correction of any installation defects. Owner will conduct a warranty CCTV inspection in the 11th month following the Final Acceptance of the Work. Contractor and a representative of liner product manufacturer shall participate in this inspection. Repair all material and installation defects to Owner's satisfaction under warranties provided.

TABLE 8-6
CIPP Liner Thickness Correction

PIPE CORRECTION			
Test	**Required Value**	**Test Result**	**Remedy**
Thickness	Minimum or Design, whichever is greater	≥ 90% to 100%	No Unit Price Reduction
		≥ 80%, but less than 90%	15% Unit Price Reduction
		< 80%	Pipe Replacement
Flexural Strength	4,500 psi	4,300 to 4,490 psi	10% unit price reduction
		4,100 to 4,290 psi	30% unit price reduction
		Less than 4,100 psi	Pipe replacement
Flexural Modulus	400,000 psi	380,000 to 399,000 psi	10% unit price reduction
		360,000 to 379,900 psi	30% unit price reduction
		Less than 360,000 psi	Pipe replacement

808-22 POST INSTALLATION CLEANING: At the conclusion of the work, the Contractor shall thoroughly clean the entire new pipe by flushing with water or other means to remove all dirt, stones, and pieces of wood or other material that may have entered during the construction period. Debris cleaned from the lines shall be removed from the job site. If, after this cleaning, any obstructions remain, they shall be removed.

808-23 PATENTS: The Contractor shall warrant and hold harmless the Owner against all claims of patent infringement and any loss thereof for any type of sewer pipe lining process used in the work.

808-24 MEASUREMENT:

a. **Sewer CIPP Lining:** Measurement for installed cured-in-place pipe lining shall be on a lump sum basis, for the host pipe sizes listed under this item in the Contract Documents.

b. **Sewer CIPP Partial Lining:** No measurement will be made for Sewer CIPP Partial Lining.

c. **Remove Protruding Service Connections:** No measurement will be made to remove protruding service connections.

808-25 PAYMENT:

a. **Sewer CIPP Lining:** Payment for this item will be full compensation for sewer flow control, public notification, traffic control, any required excavation and restoration, locating manholes, uncovering buried manhole covers, sewer pipe cleaning, root removal, Removal and Re-Installation of Manhole structures, installation of the liner, inspection, pre- and post-construction CCTV inspection, equipment retrieval, service line connection restoration, coupon retrieval, testing, and clean-up in accordance with the Contract Documents. Payment for point repairs necessary prior to lining will be paid for separately under the appropriate Bid Items.

b. **Sewer CIPP Partial Lining:** No direct payment will be made for Sewer CIPP Partial Lining

c. **Remove Protruding Service Connections:** No direct payment will be made for removing protruding service connections

808-26 PAY ITEMS:

Item No.	Item	Unit
808100T	54” Diameter Sewer CIPP Lining	Lump Sum
808100U	60” Diameter Sewer CIPP Lining	Lump Sum

SECTION 809
CURED-IN-PLACE PIPE (CIPP) LATERALS

809-1 DESCRIPTION: This Work consists of installing a cured-in-place pipe (CIPP) liner to stabilize structural defects and construction inadequacies in sanitary sewer service laterals and service/mainline connections.

809-2 SCOPE OF WORK:

a. Contractor shall provide materials, labor, equipment, and services necessary for: sewer flow control, pre-installation cleaning, rehabilitation of existing sanitary sewer service laterals by lining, sealing connections to existing sewer main, pre- and post-construction Closed Circuit Television inspection (CCTV) in accordance with Section 815, and final testing of the CIPP system.

b. The rehabilitation of service lateral main line connections shall be done by the installation of a resin-impregnated, flexible, felt tube inverted into the existing service lateral, approximately 12 – 24 inches, utilizing a pressure apparatus positioned in the mainline pipe. Curing shall be accomplished by ambient cure or other approved method to cure the resin into a hard impermeable pipe-within-a-pipe. When cured, the service lateral connection repair shall extend over the length of inversion in a tight fitting, watertight pipe-within-a-pipe to effect a watertight seal with the rehabilitated service lateral pipe. In addition, the lateral connection repair shall seal to the mainline pipe by means of a resin-impregnated flexible felt flange integral with the service lateral felt tube portion or by means of a resin-impregnated one-piece main and lateral cured-in-place liner that will have a watertight seal with the mainline

c. The Work required by the Contract Documents may include just the installation of a service lateral connection sealing and repair product or the installation of this and a service lateral liner. If the work requires both products, the completed product may either be a one piece liner from the main line seal to the cleanout or a two piece liner consisting of service lateral main line connection overlapped by the service lateral liner. The completed product will be a watertight pipe-within-a-pipe, mechanically bonded to the host pipe from the cleanout to the main line with a watertight seal with the main line pipe. The liner shall be smooth, hard, strong, and chemically inert.

809-2.1 Qualifications:

a. CIPP Contractors shall have a minimum of two (2) years of active continuous experience installing CIPP lateral liners in pipe of similar size, length and configuration as proposed in the project. In addition, Contractor shall have successfully installed CIPP liner product in at least 2,000 laterals in wastewater collection system applications.

b. Field supervisory personnel employed by the CIPP Contractor will have at least two (2) years of experience in the performance of the work and tasks as stated in the Contract Documents.

809-3 MATERIALS:

a. All components used in this process will be selected from the QPL or an approved equal. The required principal components are based on materials developed by the

impregnation of an absorbent carrier material shaped into a tube of the correct size to fit the host pipe. This sleeve is expanded to the inner wall of the host pipe and cured in place to obtain a hard plastic sleeve mechanically bonded to the host pipe.

b. The flexible polyester felt top hat is a tube insert that shall be fabricated to the proper size for the lateral and host pipe. The proper fit will allow the top hat to key into the internal surface irregularities of the lateral joint and neatly fit tight to the internal circumference of the lateral. The top hat tube shall be a laminate made of non-woven fiber materials that allows for circumferential stretching and angular alignment with the lateral pipe connection geometry during insertion.

c. The carrier material for the tubes shall be of fibrous absorbent composition tailored to achieve the following:

1. Allow the migration of resin from its internal structure by compressing to a thickness of less than 90% of its uncompressed thickness under a pressure of 1psi.

2. The carrier material must consist of non-degradable fibers such as polyester or polypropylene or corrosion resistant fiberglass. The carrier may use stitched or glued joints of material with sufficient strength to comply with the minimum requirement of this specification (Table 8-7).

TABLE 8-7
CIPP Initial Structural Properties

Property	ASTM Method	Minimum Value
Tensile Strength	D638	3,000 psi
Flexural Strength	D790	4,500 psi
Modulus of Elasticity	D790	250,000 psi

3. The material must have an abrasion resistant, chemically resistant, fully bonded coated surface in the lateral portion to ensure that on curing a smooth surface free from blemishes, pinholes or loose non wetted fibers.

4. Where fiberglass is used, a surface veil or a layer of felt must be used to prevent osmosis or wicking of the strands.

5. The resin used to impregnate the liner must be a resin cured by light, heat or chemicals via the use of accelerators. As an alternative, any other safe energy source, which does not involve the use of electrical current within the main sewer, may be used when evidence can be supplied of the intrinsic safety of the method. PET resins, resin filters, resin additives, and resin enhancement agents are prohibited. Only neat resins are acceptable. Old resins and reworked resins are prohibited, regardless of whether or not they are mixed with new resin.

6. Proven resistance to the municipal wastewater environment that may comprise, as a minimum, all of the following factors:

i. Immersion in septic sewage at temperatures up to 75 degrees F.

ii. Exposure in hydrogen sulfide gas from septic sewage at temperatures up to 75 degrees F.

iii. Proven resistance to ultra-violet light (sunlight) at any stage prior to installation.

iv. Solvent free epoxy, polyester, silicate, and vinyl ester resins are acceptable.

v. Shall not contain silicones, stereates, or natural waxes that would adversely affect the adhesives properties or any other chemical or physical properties of the CIPP liner.

809-4 SUBMITTALS:

a. Prior to receiving the Notice to Proceed at the pre-construction meeting, the Contractor or manufacturer shall submit all data sheets for CIPP materials to be used on the project. These include at a minimum the tube, resin, and catalyst materials.

b. **Qualifications:** Submit documentation showing that the Contractor and personnel meet the minimum required qualifications stated in Section 809-2.1. Include a list of projects showing Contractor's experience with the use of the same pipe material, length and diameter (or larger). Information must include, but not be limited to date and duration of work, location, pipe information (i.e. length, diameter, depth of installation, pipe material, etc.), project owner information (i.e. name, address, telephone number, contact person), and the contents handled by the pipeline (water, wastewater, etc.). **The apparent low bidder shall complete and submit the required qualifications to the Engineer within ten (10) days after the bid opening.**

c. The Standard Dimension Ratio (SDR) is the ratio of the outside diameter (OD) of the pipe to its minimum wall thickness. All CIPP wall thicknesses, SDR's by diameters, and depth ranges corresponding to the requirements of the Contract Documents, must be submitted to the Engineer for approval prior to installation.

d. Prior to installation, the manufacturer shall provide the inversion pressures necessary for proper insertion and tube installation. The tube manufacturer shall provide the minimum pressure required to hold the tube tight against the existing host pipe, and the maximum allowable pressure that will not damage the tube. Forces or pressures shall be limited so the tube is not stretched longitudinally by more than 5% of the original length.

e. The proposed bypassing system shall be approved in advance by the Engineer. The acceptance of the bypassing system in advance by the Engineer shall, in no way, relieve the Contractor of responsibility or public liability.

f. Traffic Control shall be the responsibility of the Contractor. Any necessary lane closures shall require a permit from the Traffic Division of the DPW or the La DOTD. Copies of the permits shall be submitted to the Engineer prior to commencing Work.

g. Post-construction CCTV inspection videos.

809-5 DESIGN PARAMETERS:

a. The CIPP system felt or fiberglass and resin composite shall have the minimum physical properties given below and in accordance with the guidelines in the appendix of ASTM F1216.

1.	Design Life:	50 years
2.	Pipe Diameters:	Per Contract Documents
3.	Ovality:	2%
4.	Pipe Condition:	Fully deteriorated
5.	External Water:	ground surface
6.	Flexural Strength:	4,500 psi
7.	Short Term Flexural Modulus:	250,000 psi
8.	Reduction Factor:	50%
9.	Long Term Flexural Modulus:	125,000 psi
10.	k (enhancement Factor):	7
11.	Soil Modules:	1,000 psi
12.	Soil Density:	120 pcf
13.	Highway Live Load:	AASHTO HS20-44
14.	Safety Factor:	2 minimum
15.	Min. Thickness	3 mm

16. If calculations require thicker wall, round to the next higher multiple of 0.5 mm.

b. Any layers of the tube that are not saturated with resin prior to insertion into the existing host pipe shall not be included in the required design structural CIPP wall thickness.

809-6 PREPARATIONS:

a. Temporary flow control shall be carried out in accordance with Section 813. Prior to shutdown of private service laterals, provide notification and comply with the requirements as specified in Section 808. Contractor shall provide for the transfer of flow, through or around the section or sections of host pipe that are to be repaired.

b. Delivery, storage and handling of approved products are the responsibility of the Contractor. The Contractor shall keep them safe from damage and stored with the proper environmental containment as outlined by the manufacturer. No products should be used that have exceeded the designated shelf life as outlined by the manufacturer. Remove damaged products from site. Promptly replace damaged products with new products at no additional cost to the Owner.

c. Contractor shall video inspect the service lateral immediately prior to the repairs of the lateral and connection. The Contractor shall use a self-leveling camera to determine the structural condition of the service lateral in accordance with Section 815. The Contractor will notify the Engineer immediately if the inspection reveals an obstruction or other condition exists that will interfere with the proper installation an acceptable lateral liner or lateral connection sealing and repair product.

d. The section of lateral pipe to be lined must be free of debris, obstructions, scale or any other material that reduces the effective diameter of the pipe.

e. All necessary work to repair the lateral-main joint shall be completed prior to commencing any service lateral pipe lining operation described herein.

f. If the service lateral lining process requires the installation of a cleanout, the Engineer must approve the Work before it is done.

809-7 LATERAL CONNECTION SEALING AND REPAIR PRODUCT INSTALLATION: All service lateral connections along a mainline to be CIPP lined shall receive a lateral connection sealing and repair product after installation of the mainline liner, unless the lateral has been recently replaced by a point repair or remove and replacement resulting in a new connection. After suitable cleaning and video inspection, introduce the fiberglass lateral connection sealing and repair product (top hat) from the mainline into the lateral as follows:

a. A flexible resin impregnated top hat tube that is sized to the service laterals will be inserted into the service lateral by means of a robotic manipulator device. The robotic device, together with a television camera, will be used to align the repair product with the service lateral connection opening. Air pressure, supplied to the applicator through an air hose, shall be used to insert the top hat into the service lateral pipe. The insertion pressure will be adjusted to fully deploy the top hat into the service lateral connection and hold it tight to the main and lateral pipe walls.

b. A resin-impregnated sample shall be retained by the installer for each installation to provide verification of the curing process taking place in the host pipe. This sample shall be hung in the entry manhole to simulate ambient conditions of the host pipe.

c. The inserted product will be inspected using a CCTV camera to confirm the product is correctly positioned and/or centered in the lateral opening prior to curing.

d. The pressure apparatus shall include a bladder of sufficient length in both the main and service lateral lines to extend beyond the ends of both the lateral tube and main line brim segments. A smooth transition from top hat to the pipe diameters without a step, ridge or gap between the product and the inner diameters of the service lateral and mainline host pipes must be achieved.

e. After insertion is completed, the manufacturer's recommended pressure must be maintained on the impregnated product for the duration of the curing process. The liner is chemically cured at ambient temperatures or by a suitable heat source. The heating equipment shall be capable of delivering a mixture of steam and air throughout the liner bladder assembly to uniformly raise the temperature above the temperature required to cure the resin. The curing of the CIPP must take into account the existing pipe material, the resin system, and ground conditions (temperature, moisture level, and thermal conductivity of the soil). The heat source temperatures shall be monitored and logged during the cure and cool down cycles. Once the sample piece in the manhole has cured, the bladder is deflated, removed from connection and returned to the manhole to repeat the cycle. Contractor shall recover the sample piece and label with upstream and downstream manhole numbers and footage from upstream manhole to service connection. Sample shall be submitted for testing.

f. The top hat insert shall seal to the inside wall of the mainline at least 2.5 - 3 inches around the host lateral opening and to the lateral wall 12-24 inches into the lateral pipe from the main host pipe. This bond seal shall be created by the resin cure and aided with the use of hydrophilic gaskets or hydrophilic caulk. The cured top hat must attain the cured physical strength of the lateral liner.

g. The Contractor shall install the top hat into the service lateral connection within five (5) days of the main line CIPP liner installation.

809-8 LATERAL CIPP INSTALLATION:

a. After the top hat connection has properly cured, the CIPP service lateral pipe is installed. See Section 808-11 of these specifications for the proper installation method.

b. The internal wall color of the cured liner must be a light reflective color so that clear detailed CCTV inspection can be accomplished.

c. The lateral CIPP must overlap the top hat installation a minimum of six (6) inches in the lateral host pipe and be properly cured and sealed according to manufacturer's recommendations.

d. Install CIPP as outlined in the latest version of ASTM F1216 for direct inversion installations.

809-9 INSPECTION AND TESTING:

a. Finished liner shall be free from visual defects such as foreign inclusions, dry spots, keel, boat hull, fins, pinholes, wrinkles, and other deformities.

b. All re-established services shall be smoke tested prior to backfill. Failures shall be completely removed and replaced until a successful test is achieved at no additional cost to the Owner.

c. Testing requirements of Section 808-21(a) and (c) shall also apply to service lateral lining and lateral connection sealing and repair products. The resin-impregnated sample for each installation shall be retained, labeled in accordance with Section 809-7 (e), and submitted to an independent laboratory, approved by the Owner.

d. The Engineer and the Contractor shall inspect each installation visually by CCTV. No infiltration of groundwater should be observed. The repair sleeve should be monitored for excessive wrinkling, exposed unwetted fibers, pinhole leaks, and infiltration around the terminations. The pre- and post-construction CCTV inspection documentation in DVD format will become the property of the Owner. The test shall be repeated at no additional cost to the Owner until the results are satisfactory to the Engineer.

809-10 POST INSTALLATION CLEANING: At the conclusion of the Work, the Contractor shall thoroughly clean the entire new lined pipe by flushing with water or other means to remove all debris or other material that may have entered during the construction period.

809-11 PATENTS: The Contractor shall warrant and hold harmless the Owner against all claims of patent infringement and any loss thereof for any type of sewer pipe lining process used in the Work.

809-12 MEASUREMENT:

a. **Sewer CIPP Service Lateral Lining:** Measurement for service lateral rehabilitation by a cured-in-place process shall be on a linear foot basis, to the nearest whole foot, measured from the lateral cleanout to the mainline connection point minus 12 inches.

b. **Lateral Connection Sealing and Repair Product:** The lateral connection sealing and repair product or top hat (12" – 24" in length) shall be paid for each.

809-13 PAYMENT:

a. **Sewer CIPP Service Lateral Lining:** Payment for this item will be full compensation for sewer flow control, public notification, traffic control, locating manholes and cleanouts, any required excavation and restoration to uncover buried manholes and cleanouts, sewer pipe cleaning, root removal, installation of the lateral liner, inspection, pre- and post-construction CCTV inspection, equipment retrieval, testing, and clean-up in accordance with the Specifications.

b. **Lateral Connection Sealing and Repair Product:** Payment for this item will be full compensation for sewer flow control, public notification, traffic control, locating manholes and cleanouts, any required excavation and restoration to uncover buried manholes and cleanouts, sewer pipe cleaning, root removal, cutting & brushing service line connection (if necessary); installation of the top hat, inspection, pre- and post-construction CCTV inspection, equipment retrieval, testing, and clean-up in accordance with the Specifications.

809-14 PAY ITEMS:

Item No.	Item	Unit
8091000	Sewer CIPP Service Lateral Lining	Linear Foot
8092000	Lateral Connection Sealing and Repair Product (12-24" top hat)	Each

SECTION 810
SLIP LINING

810-1 DESCRIPTION: This Work consists of the rehabilitation of existing sewer host pipe by the insertion of a liner pipe. The liner pipe will be inserted by a winch cable inserted through the host pipe and attached to the front of the liner pipe which is then pulled and pushed through the host pipe. The voids or annulus between the host pipe and liner pipe will be filled with grout.

810-1.1 QUALIFICATIONS:

a. Slip Lining Contractors shall have a minimum of five (5) years of active continuous experience installing Slip Lined Pipe using the exact name brand product proposed. In addition, Contractor shall have successfully installed the proposed product in at least 20,000 feet of 36-inch diameter (or larger) and at least 5,000 feet of 54-inch diameter (or larger) host pipe in wastewater collection system applications.

b. The Qualifying Field Superintendent employed by the Contractor will have at least five (5) years experience with installing Slip Lined Pipe using the exact name brand product proposed. In addition, the Qualifying Superintendent must have supervised jobs in which at least 20,000 feet of 36-inch diameter (or larger) host pipe and at least 5,000 feet of 54-inch (or larger) host pipe has been rehabilitated using the exact named product proposed. The Qualifying Superintendent shall be on-site during all phases of the work involving any pre and post-installation video inspection, sewer cleaning, or slip lining installation.

810-2 MATERIALS: All slip liner pipe shall meet the following requirements:

a. Pipe shall be constructed of corrosion resistant, thermoplastic or thermosetting resin. Pipe shall pass impact testing of 220 ft-lbs. All pipe shall have a smooth interior.

b. Closure pieces shall be constructed of the same material, thickness, dimensions, and jointing system as the pipe.

c. Slip Lining shall be performed using liner pipe with inside diameters as follows, unless directed by the Engineer:

Host Pipe (I.D.)	Slip liner Pipe (nominal I.D.)
18"	15"
21"	18"
24"	21"
27"/30”	24"
36"	30"
42"	36"
48”	42”
54”	48”
60”	54”

d. All products used shall be selected from the Qualified Products List (QPL) or approved equal.

e. All slip line pipe shall be light in color.

f. Closed Profile PVC Slip Liner will not be allowed for slip lining

g. Solid Wall PVC Slip Liner will not be allowed for slip lining

h. Closed Profile HDPE Slip Liner will not be allowed for slip lining

i. Solid Wall HDPE Slip Liner will not be allowed for slip lining

i. Fiberglass Reinforced Polymer (FRP) Pipe:

1. General: Pipe shall be manufactured to meet the requirements of ASTM D3262 and AWWA M45. Joints shall meet the requirements of ASTM D4161. Gaskets shall meet the requirements of ASTM F477.

2. Materials: Pipe shall be manufactured from fiberglass reinforcing materials, polyester resin and pure silica sand. The pipe shall conform to ASTM D3262 standards. Gaskets shall be of a rubber material conforming to ASTM F477.

3. Manufacturing: Pipe shall have a minimum long term pipe stiffness of 46 psi when tested in accordance with ASTM D2412. The joint shall be low-profile fiberglass bell and spigot type or flush fiberglass bell and spigot type, when the fit requires. Nominal lengths shall be 20 feet, however, shorter lengths will be allowed where needed.

4. Material Warranty: Provide manufacturer’s written 1 year warranty, with Owner named as beneficiary, for correction of any material defect in structural repair

elements, including all Work required to remove and replace defective material.

j. Grout Materials and Mixes:

1. Neat Cement Grout (Cementitious): Neat cement grouts shall contain only cement, water, and possibly a flowability performance-enhancing additive such as flyash, silica fume, chemical dispersants, or thixotropic agents. The grout mixture shall not contain thickening aggregates, or sand, and shall be handled by high speed colloidal mixers or an approved ready mixer.

2. Cellular Grout (Cellular Concrete): Cellular grout shall not be allowed

3. Mix Designs: Mixes shall be developed to completely fill the annular space between the host pipe and the slip liner pipe and shall meet the following requirements:

i. Compressive Strength: The grout shall have a minimum compressive strength of 100 psi in 24 hours when tested in accordance with ASTM C403 and a minimum of 200 psi in 28 days when tested in accordance with ASTM C495 or C109. Grouts with compressive strengths from 200 psi to 1,000 psi will be acceptable provided sand is not added to the mixture.

ii. Density: The Contractor shall design a grout mix with a density that will not float the slip liner pipe while maintaining an apparent viscosity that does not to exceed 18 seconds as tested in accordance with ASTM C939. Density shall be verified by ASTM C138 or by other methods as approved by the Engineer. The minimum density shall be 55 pcf and a maximum of 61 pcf.

iii. Performance Requirements: The Contractor shall establish proposed grout material and mixes, equipment, placement procedures, applicator, set-up, and criteria that the grouting operations shall meet. The grouting system shall have sufficient gauges, monitoring devices and tests to determine the effectiveness of the grouting operation. The Contractor must document compliance with the project and slip liner pipe specification design limits. The grouting operation shall be modified if the grouting does not perform as submitted. Such modifications and changes shall be done in a timely manner to avoid unnecessary delay to the completion of the work.

iv. Contractor shall seal the annular space between the new pipe and the existing host pipe with grout as specified. Contractor shall take appropriate precautions to avoid overpressurization, buckling and floating of the new pipe during the grouting process. Contractor shall comply with pipe manufacturer's recommendations for grouting procedures and with the grout manufacturer's procedures for placement of grout, grout pressures and grout quantity. Multiple grout lift installation may be required to avoid buckling of the new pipe. Contractor shall also take precautions to avoid movement of the new pipe during the grouting operation. No grout shall be placed until service connections have been identified and restored, if required.

v. The Contractor shall design a grout mix to accommodate the size of the

annular void, the void size of the surrounding soil and the absence or presence of groundwater

vi. The Contractor shall design a grout mix to provide the acceptable strength and durability as well as sufficient strength and movement to prevent movement of pipe of the slip liner pipe.

vii. Shrinkage shall not exceed 1% by volume as tested in accordance with ASTM C1090.

810-3
SUBMITTALS:

a. A Traffic Control Plan will be submitted to DPW. The plan shall include an outline of the permit acquisition procedure for lane closure, methods for proper signing and barricades which complies with state requirements, local requirements and the MUTCD.

b. The Contractor shall submit samples of sliplining pipe products to be used for certification. The Contractor shall submit the product data for slipliner pipe, and other specified material as well as a copy of the manufacturer's product installation recommendations if any.

c. The Contractor shall submit the following to the Engineer for review prior to the start of the grouting operation:

i. The proposed grouting mix and all performance data relative to this section such as, but not limited to: flow characteristics, viscosity, set time, bleed segregation, shrinkage and manufacturer.
ii. The proposed densities.
iii. The proposed grouting method.
iv. The maximum injection pressures.
v. Twenty-four hour and 28 day projected compressive strengths.
vi. Proposed grout stage volumes.
vii. Proposed bulkhead designs.
viii. Grout flow control.
ix. Buoyancy force calculations for the liner pipe.
x. Provisions for service connections and laterals.

These shall be submitted as a complete package for the grouting requirements and the Contractor shall notify the Engineer of any changes to be made at any time after approval is granted.

d. The Contractor shall submit an installation plan to the Engineer for review:

i. Proposed installation pit locations
ii. Site plan sketch showing:
    A. Dimensions of installation pits
    B. Pipe Storage areas
    C. Temporary work areas
    D. Equipment/material ingress and egress from installation pit or receiving location
iii. Calculations showing anticipated loading, jacking forces or pulling forces are within capabilities of proposed pipe and equipment prepared by a

Professional Engineer licensed in the State of Louisiana.

iv. Method of installing slip lined pipe and continuously monitoring of pulling or jacking forces.

v. Approximate installation rate in feet per day

vi. Access requirements for grout

vii. Buoyancy force calculations for slip liner pipe.

e. **Qualifications:** Submit documentation showing that the Contractor and personnel meet the minimum required qualifications stated in Section 808-2.1. Include a list of projects showing Contractor's experience with the use of the same pipe material, length and diameter (or larger). Information must include, but not be limited to date and duration of work, location, pipe information (i.e. length, diameter, depth of installation, pipe material, etc.), project owner information (i.e. name, address, telephone number, contact person), and the contents handled by the pipeline (water, wastewater, etc.). **The apparent low bidder shall complete and submit the required qualifications to the Engineer within ten (10) days after the bid opening.**

810-4
EQUIPMENT:

a. Grouting Equipment: The materials shall be mixed in equipment of sufficient size and capacity to provide the desired amount of grout material for each stage in a single operation. The equipment shall be capable of mixing the grout at densities required for the approved procedure and shall also be capable of changing densities as dictated by field conditions any time during the grouting operation. Gauges shall be attached immediately adjacent to an injection port at the bulkhead; the gauge shall conform to an accuracy of no more than 2% error over the full range of the gauge operation.

810-5
CONSTRUCTION:

810-5.1 Preparations: The following preparation/steps shall be completed, unless approved otherwise by the Engineer. The Owner and Engineer make no guarantee regarding the information, data, and physical condition of underground facilities or the existing sanitary sewers. Before commencing with any work, or ordering any materials, the Contractor will be responsible for physically measuring and CCTV inspecting the existing sanitary sewers to verify that the rehabilitation specified herein will be appropriate. No claims will be considered for any work performed, downtime, material ordered or restocking of material ordered prior to the Contractor verifying that the existing sewer lines are coincident with the conditions listed in the Contract Documents. This physical inspection will be considered incidental to the Contractor's price for slip lining.

a. Safety: The Contractor shall carry out his operations in strict accordance with all applicable OSHA Standards. Particular attention is directed to those safety requirements involving entry into a confined space. It shall be the Contractor's responsibility to familiarize himself with OSHA Standards and Regulations pertaining to all aspects of the work.

b. Pre-Lining Cleaning: It shall be the Contractor's responsibility to wash, clean and video the existing sewer pipe before lining as described in Sections 812 and 815, at a cost incidental to the insertion of liners. The Contractor will plan his work after

review of CCTV inspection video and CCTV reports. The Contractor shall submit a pipe cleaning and waste disposal plan to the Engineer prior to cleaning. After pipe cleaning, Contractor shall also submit proof of proper disposal of material cleaned from host pipe to the Engineer

c. Insertion and Pulling of Mandrel: It shall be the responsibility of the Contractor to pull a mandrel with a minimum length of one joint of pipe completely through each sewer line to be rehabilitated from manhole to manhole. The mandrel will be of the same outside diameter as the slip lining pipe. Any cost incurred in inserting and pulling the mandrel through the sewer line shall be incidental to the construction of the liner.

d. Line Obstructions: If a pre-Installation inspection with a mandrel reveals an obstruction (such as heavy solids, dropped joints, or collapsed pipe) in the existing pipe that cannot be removed by sewer cleaning equipment as specified in Section 812, a point repair must be performed prior to slip lining as approved by the Engineer. All point repairs must be satisfactorily completed; equipment and material mobilized, and the Engineer shall be informed of the impending work schedules for liner installations. Point repairs, approved by the Engineer, shall be performed and paid in accordance with Sections 801 and 802.

e. Bypass Pumping: If required, the Contractor shall provide for continuous bypass sewage flow around the section or sections of pipe designated for the liner process. The pump and bypass lines, shall have adequate capacity and size to handle the flow as per Section 813 (Sewer Flow Control). Any costs derived from this task shall be considered incidental and included in the cost of slip lining.

f. Locate and mark existing utilities in areas where excavation is to be performed prior to beginning excavation. Any relocated utilities will require as-builts to be submitted of the utility relocation to the Owner.

g. It shall be the Contractor's responsibility to locate and designate insertion pits taking into consideration conditions of existing pipe, directional changes, surface conditions, existing utilities, maintenance of traffic, pipe lay down areas, and pulling or pushing distances. The Contractor shall submit a plan to temporarily relocate conflicting utilities. The Contractor shall also submit a closure procedure for work areas during nonworking hours.

h. Locate and designate locations for drilling holes from the surface through host pipe as necessary for grouting annular space. Locate grout holes considering surface conditions, existing utilities, and maintenance of traffic.

i. Shipping and Storage: Do not cut, kink, or otherwise damage pipe during transportation or during loading and unloading. Store pipe lengths in location and manner as to eliminate possibility of scoring, gouging or otherwise damaging pipe.

810-6 INSTALLATION:

a. Install slip liner pipe in accordance with manufacturer's recommendations and handle pipe with textile slings. Chains or cable are not allowed.

b. Removal and replacement of fences, damage to yards, lawns, streets, sidewalks, driveways, etc., due to installation and movement of the mandrel, cleaning, boiler,

steam or other trucks and/or erection of equipment shall be incidental.

c. If a point repair is deemed necessary at any point on the existing sewer line by the Engineer, the Contractor will be required to locate his insertion pit at the point repair location. Any additional pits the Contractor deems necessary for construction shall be at his cost.

d. All sewer service connections shall be identified, located, excavated, and disconnected prior to the slip line pipe insertion. The complete list of service laterals, including relevant footage and diameter of lateral, shall be submitted to the Engineer, prior to slip lining, for informational purposes only. Upon completion of insertion of the slip line pipe and pipe relaxation period, the Contractor shall expedite the reconnection of services in accordance with Section 802-7, to minimize any inconvenience to the customers. All re-established services shall be smoke tested prior to backfilling.

e. All coupon materials cut from the slip line pipe shall be retrieved at the next downstream manhole and submitted to the Engineer. The Contractor shall be responsible for any sewer flow control and sewer backups during slip lining operations. These issues shall be addressed as directed in Section 813 Sewer Flow Control.

f. The Contractor shall not exceed forces recommended by manufacturer while pushing, pulling or joining pipe. Contractor shall monitor and record forces used to push, pull and join slip liner pipe during installation and submit the record of forces to the Engineer. If the contractor exceeds forces recommended by manufacturer, the contractor will stop installing pipe until a correction can be made so that the forces to install the pipe do not exceed manufacturer's recommendations. The contractor shall also provide scoring protection as liner is inserted to prevent damage of liner by existing pipe. This protection could include, but is not limited to using a shield, strapping timbers to the pipe, or installing a rail system to guide the slip liner pipe installation.

g. Where a Contractor performs a "pull-through" through a manhole for two or more consecutive lines, he will be responsible for restoring the invert in the manhole. The Contractor will cut the slip line pipe even with the benches and grout the annular space between the existing manhole invert and the new pipe. In any case the maximum pull-through shall be two segment lengths maximum unless longer pull-throughs are required and approved by the engineer.

h. Completed joints shall be watertight at rated pressure for pipe and have strength characteristics equal to or greater than the pipe itself. Improperly made or damaged joints shall be repaired or replaced as approved by Engineer.

i. Finishing inside the manhole shall be accomplished using a quick-set, non-shrink grout to raise the invert to the grade of the liner pipe.

j. Prior to the introduction of grout and backfilling of re-established service connections, a dye water test will be performed on the liner pipe to test the bulkheads at each end for leaks. Grout shall be placed within 48 hours of slip lining. If grout access conduits are located within a street, they shall not be allowed to protrude from the pavement. As soon as the grout is placed the Contractor shall permanently restore the pavement. If any access conduits located in the street are to be exposed to traffic between the insertion of the liner pipe and

placement of grout, the Contractor shall restore the street by placing temporary asphalt pavement over the conduit.

k. The slip liner pipe shall serve as the inside form for the grout placement. Bulkheads, where required, shall completely fill the annular space, and be of a material compatible with the type of grout and constructed to withstand the loads imposed by the grout during placement, curing and the pressure of groundwater without leakage. Bulkheads shall have appropriate venting to dewater the annular space, while sealing the space from sewer flow, thereby permitting the grout to set. The bulkheads shall be constructed to allow the air to escape as grout is introduced. Air vent pipe locations shall be determined by pipeline conditions. The vent pipes may also be used to monitor the grout level.

l. Placement of grout shall be by means of one or a combination of the following:

1. preset threaded grout access outlets in the slip liner pipe wall
2. a set of top-side grout access ports through the crown of the existing host pipe
3. injection through access ports in the bulkheads

Where placement of grout is via an access port in the slip liner pipe wall, adequate air circulation shall be maintained to ensure safe working conditions and heat dissipation due to cement hydration. The access port shall also provide for a water source to make emergency clean-ups. In constricted or small annular spaces, the installation of an air vent of 2 in. diameter PVC pipes shall be required to prevent air from creating large voids in the fill. The Contractor shall inject the theoretical volume of grout to fill the annular space and allow verification by the Engineer to determine if additional grout is needed. The Contractor shall inject additional grout as directed by the Engineer.

m. When the weight of the volume of grout displaced by the slip liner pipe is greater than the weight of the slip liner pipe, a net buoyancy force will exist and cause the liner pipe to float. The acceptable methods to negate the buoyancy potential are as follows:

i. Use a grout that weighs less than the weight of the pipe divided by the displaced volume of the pipe.
ii. Increase the weight of the pipe by filling with water or other material and reduce the weight of the grout.
iii. Use annular bridging such as casing spacers or blocking to hold the liner pipe in the required position.
iv. Place the grout in stages or "lifts" with detailed methodology to determine when a stage is completed.

Prior to grouting the Contractor shall submit to the Engineer a detailed plan that will anchor the liner in the invert for a period of time long enough to allow the grout to set where buoyancy factors exist.

l. The gauged pumping pressure shall not exceed 5 psi, which provides a 4:1 factor of safety against buckling the slip liner pipe. Pressure gauges shall indicate in 1-2 psi graduations, and be located in the grout transport line or very near the point of injection. Pumping equipment shall have sufficient capability to inject grout at velocities and pressure relative to the size of the annulus. Calculations must be made to determine if gravity flow will exert sufficient pressure to complete the

required grouting operation.

m. The Contractor shall, every half hour, check and record the grout density at or close to the discharge point. These records, combined with records of cement and other materials delivered to the job site, as well as the volume of water used shall be submitted to the Engineer to confirm the volume of grout placed.

810-7 TESTING:

a. The Contractor and the Engineer shall inspect each installation visually by CCTV. Variations from true line and grade may be inherent because of the conditions of the original piping. No infiltration of groundwater should be observed. All service entrances should be accounted for and be fully functional unless otherwise directed by the Engineer in writing. The pre- and post-installation documentation in DVD format will become the property of the Owner.

b. Warranty Inspection: Contractor shall provide a 1 year written guarantee, with Owner named as beneficiary, for correction of any installation defects. Owner will conduct a warranty CCTV inspection in the 11th month following the Final Acceptance of the Work. Contractor and a representative of liner product manufacturer shall participate in this inspection. Repair all material and installation defects to Owner's satisfaction under warranties provided.

810-8 MEASUREMENT:

a. **Sewer Pipe Slip Lining:** Measurement for installed pipe slip lining shall be on a lump sum basis, for the slip liner pipe sizes listed under this item in the Contract Documents.

b. **Grout:** Grout shall be estimated and placed by the cubic foot as required.

810-9 PAY ITEMS:

a. **Sewer Pipe Slip Lining:** Payment for this Item will be full compensation for slip line pipe, fittings, insertion pits, bulkheads, pipe cleaning, CCTV inspection, plugging, traffic control, replacing manhole structures, placing new manhole structures, sealing at manholes, locating, excavating, disconnecting, and backfilling service lateral connections, and testing, in accordance with the Contract Document; and all else incidental thereto for which separate payment is not provided under other Items in the Bid Form. No direct payment will be made for Re-establishment and grouting of service lateral connections required for slip lining.

b. **Grout:** No direct payment will be made for grout

810-10 PAY ITEMS:

Item No.	Item	Unit
810100S	48” Sewer Pipe Slip Lining	Lump Sum
810100T	54” Sewer Pipe Slip Lining	Lump Sum
8103000	Grout	No Measurement

SECTION 812
SEWER LINE, MANHOLE AND WET WELL CLEANING

812-1 SCOPE OF WORK:

a. The Contractor shall provide all labor, materials, equipment, and incidentals necessary to perform the cleaning of sewer lines, manholes and wet wells as specified in this specification. Sewer line cleaning shall include post-cleaning television inspection to assure satisfactory results.

b. The intent of sewer line, manhole and wet well cleaning is to remove all sludge, dirt, sand, rocks, grease, and other solids or semisolid material from the pipe, manhole or wet well so that defects are not obscured and to allow the water level to drop so that defects are visible. The pipe, manhole and/or wet well interior shall be clean enough to allow viewing of the entire pipe, manhole and/or wet well interior during inspection in accordance with Section 815. Since the success of the other phases of work depends a great deal on the cleanliness of the lines, manholes and wet wells, the importance of this phase of the operation is emphasized.

c. Preparatory cleaning shall be performed prior to closed circuit television inspection, point repair, sewer lining or robotic point repairs, etc. Upon request of the Contractor, the Owner may provide Inspection Reports performed prior to the current contract for reference.

d. Preparatory cleaning shall be performed prior to sewer manhole inspections. This preparatory cleaning shall include the use of hydraulic cleaning equipment and Vacuum Trucks to remove sludge, dirt, grease, etc. from the interior walls and benches of the manhole so that defects are visible. **Preparatory cleaning of sewer manholes shall be incidental to the manhole inspection.**

e. Heavy cleaning of sewers shall be conducted on lines at the direction of the Engineer. Heavy cleaning shall be conducted using bucket machines and mechanical cleaning equipment such as scrappers, scooters, heavy duty brushes, metal pigs and other approved debris removing equipment as specified herein. Heavy cleaning shall remove all foreign materials from the lines. The Contractor shall not be responsible for removing mortar or other similar material that is permanently attached to the pipe walls.

f. Heavy cleaning of sewer manholes shall be conducted on manholes at the direction of the Engineer. Heavy cleaning of manholes shall include entire manhole interior, including manhole benches and walls. It also includes removal of all foreign object or debris from the manholes which shall be removed either manually or mechanically.

g. Cleaning of sewer wet wells shall be conducted on wet wells at the direction of the Engineer. Cleaning shall include the use of hydraulic cleaning equipment and Vacuum Trucks to remove sludge, dirt, grease, etc. from the interior walls and bottoms of the wet well. Incorporate into line cleaning operation by scouring walls with high velocity nozzle after pipe segment cleaning operation is complete. It also includes removal of all foreign object or debris from the wet wells which shall be removed either manually or mechanically.

812-2 ACCEPTABLE METHODS: Sewer line cleaning shall be performed by electronically or manually operated, directly or remotely controlled, mechanically or hydraulically propelled cleaning equipment as described in this specification. Normal line cleaning shall be performed by high velocity water jetting or movable dam used to loosen and transmit material for extraction. Heavy line cleaning shall be performed by mechanical equipment when water jetting is unsuccessful. In NO case shall Heavy line cleaning be used on PVC pipe. Root Removal is a special operation to cut and remove roots from specific areas of a pipe segment. Selection of equipment for each type of operation shall be made by the Contractor with the concurrence of the Engineer and shall be based on the type of work to be performed, field conditions, such as wet well access, type of debris to be removed, depth of sewage flow, and pipe material.

812-3 LIMITATIONS:

a. Satisfactory precautions shall be taken to protect the sewer lines from damage that might be inflicted by improper use of the cleaning equipment. Whenever hydraulically propelled cleaning tools that depend upon water pressure to provide their cleaning force, or any tools that retard the flow of water in the sewer line, are used, precautions shall be taken to ensure that the water does not cause damage or flooding to public or private property.

b. No fire hydrant shall be obstructed or used when there is a fire in the area.

c. Contractor shall remove the water meter(s)/piping, etc. from all fire hydrants at the end of each working day.

812-4 SEWER CLEANING:

a. Sewer line sections shall be cleaned using mechanically powered, hydraulically propelled, or high velocity sewer cleaning equipment. Selection of the equipment used shall be based on the conditions of the lines at the time the work begins. The equipment and methods selected shall be satisfactory to the Engineer. The equipment selected for cleaning shall be capable of removing dirt, grease, rocks, sand, sticks, branches, leaves and other deleterious materials and obstructions from the sewer lines and wet wells. If cleaning of an entire section cannot be successfully performed from one manhole or wet well, the equipment shall be re-setup at the manhole or wet well on the opposite end of the pipe segment being cleaned and cleaning shall be re-attempted.

b. Water for sewer cleaning shall be purchased by the Contractor and obtained at locations in accordance with the utility owner, as directed. If the water is obtained from a potable supply, appropriate backflow prevention devices as identified in Part Xll Water Supplies by the La. Department of Health and Hospitals shall be provided to protect the potable system from cross connections and contamination. Contractor shall be solely responsible for preventing cross contamination of any public or private water systems used for this purpose.

c. During all sewer-cleaning operations, satisfactory precautions shall be taken to protect the sewer lines from damage that might be inflicted by the improper use of cleaning equipment. Whenever hydraulically propelled cleaning tools or tools which retard the flow in the sewer line are used, precautions shall be taken to ensure that the water pressure created does not cause any damage or flooding to public or private property. The flow of sewage in the sewer lines shall be utilized to provide necessary pressures for hydraulic cleaning devices whenever possible.

d. When additional water from fire hydrants is necessary to avoid delay in normal working procedures, the water shall be conserved and not used unnecessarily. No fire hydrant shall be obstructed in case of a fire in the area nor shall a hydrant be used for the purpose described unless an appropriate backflow preventer is provided.

e. Contractor will be solely responsible and held liable for any claims or damages arising from any action or lack of action arising from reckless, negligent, or careless behavior.

f. The retrieval of equipment lodged in pipes or a wet well is the Contractor's responsibility and will be performed at the Contractor's expense.

812-5 CLEANING EQUIPMENT:

812-5.1 Regular Sewer Line Cleaning:

a. Hydraulic Cleaning Equipment: The equipment used shall be of a movable dam type and be constructed in such a way that a portion of the dam may be collapsed at any time during the cleaning operation to allow the sewage flow past the cleaning head to protect against flooding of the sewer. The movable dam shall be equal in diameter to the pipe being cleaned and shall provide a flexible scraper around the outer periphery to ensure total removal of grease. If cleaning balls or other such equipment that cannot be collapsed instantly are used, special precautions against flooding of the sewers and causing damage to public or private property shall be taken.

b. High Velocity Jet (Hydro-Cleaning) Equipment: All high velocity sewer cleaning equipment shall be designed for ease and safety of operation. The equipment shall have a selection of two or more high velocity nozzles. The nozzles shall be capable of producing a scouring action from 15 degrees to 45 degrees in all sizes designated to be cleaned. Cleaning shall be accomplished by using a pump capable of delivering water from 800 to 1500 psi to the self-propelled nozzles. Equipment shall also include a high velocity gun for washing and scouring wet well walls and floor. The gun shall be capable of producing flows from a fine spray to a solid stream. The equipment shall carry its own water tank, auxiliary engines, pumps, and hydraulically driven hose reel. All controls shall be located so that the equipment can be operated above ground.

812-5.2 Heavy Sewer Line Cleaning:

a. Mechanical Cleaning (Heavy Cleaning Equipment): Bucket machines shall be in pairs with sufficient power to perform the work in an efficient manner. Machines shall be belt operated or have an overload device. Machines with direct drive that could cause damage to the pipe will not be allowed.

b. Power rodding machines shall be either sectional or continuous type capable of holding a minimum of 750 feet of rod. The rod shall be heat-treated steel. To ensure safe operation, the machine shall have a fully enclosed body and an automatic safety throw-out clutch or relief valve.

c. Chain knockers may be used in a back and forth motion to loosen heavy deposits of material. Chain knockers may be used in ductile iron pipe ONLY.

d. Contractor may recommend other heavy cleaning equipment for use with the

approval of the Engineer.

812-5.3 Root Removal:

a. Roots shall be removed in the designated sections where there is root intrusion. Root removal shall be sufficiently completed to satisfy the following objectives: to restore the hydraulic capacity of the sewer line to at least 95% capacity after cleaning, to allow for complete CCTV inspection of the sewer line in question to the satisfaction of the requirements of Section 815, and to decrease the probability of the damming of debris at the location of the root removal. Special attention shall be used during the cleaning operation to assure complete removal of roots from the joints.

b. Procedures may include the use of mechanical equipment such as rodding machines, winches using root cutters and porcupines. Also hydraulically driven root cutting blade or saw assemblies, hydraulic jetting equipment specifically design for root cutting, and hydraulically propelled chain or wire root cutters.

c. Sanitary sewer service lateral root cutting may be performed from the mainline or from a public sewer clean out if one exists. Sanitary sewer service lateral root cutting shall be approved by Engineer prior to Contractor performing root removal in the service lateral.

d. The Contractor shall perform an initial setup of his equipment so that sanitary sewer service lateral root cutting can be performed on all designated and/or approved service laterals along a mainline segment. Multiple additional setups on the same mainline segment will not be paid due to the preferred method of root removal in the service lateral chosen by the Contractor.

e. All lines that require root cutting will be both cleaned and inspected after root cutting is completed. The cost of this additional work will be considered incidental to the unit cost of root cutting. After root removal, re-televising the entire sewer line is not required, but the pipe in the locations where the roots have been removed, and any part of the line not yet videoed, must be re-televised after root removal so that any piping, connections, defects, etc., hidden before root removal may be identified. Televising may be stopped and the root cutting executed while the CCTV recording is paused.

812-5.4 Heavy Sewer Manhole Cleaning:

a. Cleaning equipment that uses a high velocity water jet for moving debris shall be capable of producing a minimum volume of 50 GPM with a pressure of 3500 PSI for the wet well structure at the pump. Any variations to this pumping rate must be approved, in advance, by the Engineer. A working pressure gauge shall be used on the discharge of all high pressure water pumps. The Contractor shall operate the equipment so that the pressurized nozzle continues to move at all times. The pressurized nozzle shall be turned off or reduced anytime the hose is held or delayed in order to prevent damage to the wet well.

b. Contractor shall remove foreign objects or debris from wet well by manual or mechanical means approved by the Engineer.

812-5.5 Pump Station Wet Well Cleaning: Cleaning of pump station wet wells shall be in accordance with Subsection 815-5.4.

812-6 MATERIAL REMOVAL:

a. All sewer lines to be cleaned shall be plugged at the discharge end prior to cleaning.

b. All sludge, dirt, sand, rocks, grease, and other solid or semi-solid material resulting from the cleaning operation shall be removed at the downstream manhole or wet well of the section being cleaned. Passing material from one sewer line section to another sewer line section, or from manhole section to manhole section shall not be permitted except when using high velocity jet equipment. The maximum limit before material is removed will be approximately 600 feet.

c. All roots shall be removed prior to sewer line inspection, robotics repair and sewer liner pipe installation. If roots are encountered during line inspection, remove inspection equipment, then perform root removal and re-inspect with no additional cost to the Owner.

812-7 DISPOSAL OF MATERIAL:

a. All debris, solids or semi-solids resulting from the cleaning operations shall be removed from the site and disposed of at a legally permitted site for that purpose. At a minimum all materials shall be removed from the site at the end of each workday. Under no circumstances will the Contractor be allowed to accumulate debris, etc., on the site of work beyond the stated time, except in totally enclosed containers and as approved by the Engineer.

b. Contractor shall be responsible for all fees and tipping charges for disposal.

c. The Contractor must follow all current applicable local, state and federal rules and laws regarding the appropriate disposal of waste materials from cleaning operations.

d. Under no circumstances shall sewage or solids removed in the cleaning process be dumped into streets, ditches, catch basins, storm drains, sewer manholes, wet wells, cleanouts, or dumps.

e. Sanitary sewer dewatering of the Vacuum Truck or tank may be discharged into the sanitary sewer system at a manhole downstream of the pipe segments that have been cleaned. Storm water dewatering may be discharged to a downstream location, as approved by the Engineer.

812-8 INSPECTION: Inspection of all cleaning operations will be made on a daily basis by the Engineer.

812-9 ACCEPTANCE: Television inspection shall be performed to ensure the satisfaction of the Engineer that proper cleaning of the line or wet well has been performed. If inspection shows the cleaning to be unsatisfactory to the Engineer, the Contractor will be required to re-clean and re-inspect the sewer line section or wet well until the cleaning is acceptable at no additional cost to the Owner.

812-10 MEASUREMENT:

a. **Sewer Line Cleaning:** Measurement for this item shall be on a linear foot basis, measured to the nearest whole foot, from center of upstream manhole to center of downstream manhole for the various sizes listed on the Bid Form.

b. **Wet Well Cleaning:** Measurement for this item shall be per each wet well based on the capacities listed. This shall include the first 40 feet of piping required for cleaning operations.

c. **Treatment Facility Cleaning:** Measurement for this item shall be per hour of cleaning operation. This may include, but not be limited to, the cleaning of Grit Chamber Drain Pits, Settling Basin's Scum Boxes, Clarifier Scum Boxes, Bar Screen Channels, or Influent Chambers at the three treatment facilities and/or the parish prison.

d. **Heavy Sewer Manhole Cleaning:** Measurement for this item shall be based on each manhole.

e. **Root Removal:** Measurement for this item shall be by the linear foot of mainline sewer pipe obstruction. The minimum length for Root Removal payment shall be twenty (20) feet per line segment from manhole to manhole. Measurement shall be for location of roots only. Travel length of root removal equipment to root location will not be measured as root removal.

f. **Sanitary Sewer Lateral Root Removal:** Measurement for this item shall be based on each sanitary sewer lateral requiring root or pipe obstruction removal up to twenty (20) feet of sewer service lateral.

g. **Sanitary Sewer Lateral Root Removal Set-up:** Measurement for this item shall be made per each initial equipment set-up per mainline segment requiring sanitary sewer lateral root removal.

h. **Additional Piping for Wet Well Cleaning:** Measurement for this item shall be based on the actual linear footage of pipe after the initial 40 feet paid under the Wet Well Cleaning item as approved by the Engineer. This item should only be used when the wet well is not accessible from the roadway or driveway.

i. **Emergency Call Out:** Measurement for this item shall be per each based on the actual number of call outs outside of normal business hours as authorized by the Engineer. Normal business hours are considered to be 6:30 a.m. to 3:00 p.m. Monday thru Friday, excluding City-Parish holidays. Personnel shall be available 24 hours a day, seven (7) days a week for call out and shall respond within three (3) hours of notification. Failure to respond within the specified time limit for three (3) call outs shall result in the Contractor being placed in default and the cancellation of the Contract.

812-11 PAYMENT:

a. **Sewer Line Cleaning:** Payment for this Item shall be full compensation for all labor, equipment, plugging, debris removal and disposal in accordance with the specifications under the specific pay items provided.

b. **Wet Well Cleaning:** Payment for this Item shall be full compensation for all labor, initial set-ups, equipment, first 40 feet of piping, plugging, debris removal, confined

space entry where required, and disposal in accordance with the specifications under the specific pay items provided.

c. **Treatment Facility Cleaning:** Payment for this Item shall be full compensation for all labor, equipment, plugging, debris removal and disposal in accordance with the specifications under the specific pay items provided.

d. **Heavy Sewer Manhole Cleaning:** Payment for this Item shall be full compensation for all labor, equipment, plugging, debris removal and disposal in accordance with the specifications under the specific pay items provided.

e. **Root Removal:** Payment for this Item shall be full compensation for all labor, equipment, plugging, debris removal and disposal in accordance with the specifications under the specific pay items provided.

f. **Sanitary Sewer Lateral Root Removal:** Payment for this Item shall be full compensation for all labor, equipment, plugging, debris removal and disposal in accordance with the specifications under the specific pay items provided.

g. **Sanitary Sewer Lateral Root Removal Set-up:** Payment for this Item shall be full compensation for the initial equipment set-up cost per mainline segment requiring sanitary sewer lateral root removal. This will be the total payment whether mainline or cleanout introduction of the root removal equipment is used.

h. **Additional Piping for Wet Well Cleaning:** Payment for this Item shall be full compensation for all additional labor, equipment, pipe after the initial 40 feet paid under the wet well cleaning item, and all other materials needed in accordance with the specifications under the specific pay items provided.

i. **Emergency Call Out:** Payment for this Item shall be full compensation for all expenses incurred for a crew to respond to call outs outside of normal business hours as authorized by the Engineer.

812-12 PAY ITEMS:

Item No.	Item	Unit
8125101	Regular Sewer Line Cleaning Less Than or equal to16”	Linear Foot
8125102	Regular Sewer Line Cleaning Greater than 16” up to 36”	Linear Foot
8125103	Regular Sewer Line Cleaning Greater than 36” up to 60”	Linear Foot
8125104	Regular Sewer Line Cleaning Greater than 60”	Linear Foot
8125201	Heavy Sewer Line Cleaning Less Than or equal to 16”	Linear Foot
8125202	Heavy Sewer Line Cleaning Greater than 16” up to 36”	Linear Foot
8125203	Heavy Sewer Line Cleaning Greater than 36” up to 60”	Linear Foot

8125204	Heavy Sewer Line Cleaning Greater than 60”	Linear Foot
8125211	Heavy Sewer Manhole Cleaning	Each
8125301	Root Removal	Linear Foot
8125302	Sanitary Sewer Lateral Root Removal	Each
8125303	Sanitary Sewer Lateral Root Removal Setup	Each
812640_	Wet Well Cleaning (__ - __ GPM Capacity)	Each
8126501	Additional Piping for Wet Well Cleaning	Linear Foot
8126601	Treatment Facility Cleaning	Hour
8126701	Emergency Call Out	Each

SECTION 813
SEWER FLOW CONTROL

813-1 DESCRIPTION: Sewer flow control is a set of methods to adjust the flow in the sewer system to allow for inspection, maintenance, repair or replacement. This is accomplished by either blocking or plugging the incoming lines to restrict flow or through the use of pumps to bypass the flow around the work area until the work is completed.

813-2 SCOPE OF WORK:

a. The Contractor shall be required to furnish all materials, labor, equipment, power, maintenance, etc. to implement the necessary flow control system and control the flow around and/or through the work area for the duration of the work.

b. The design and installation of the necessary systems as well as the operation of the temporary pumping systems (if necessary) shall be the Contractor's responsibility.

c. If bypass pumping and/or pump station shut down is required, the Contractor shall coordinate with the Wastewater Collection Pump Maintenance Superintendent.

d. Flow control will be required to conduct inspection or other maintenance/rehabilitation operations when the existing flow in the lines is above the following levels:

1. Maximum Depth of Flow for CCTV Inspection:

   The entire circumference of the pipe (360 degrees) shall be viewable to the satisfaction of the Engineer. Contractor shall dewater the pipe as necessary to allow the required visibility.

2. Maximum Depth of Flow for Joint Sealing:

6" - 12" Pipe	40% of pipe diameter
15" - 24" Pipe	45% of pipe diameter
>24" Pipe	50% of pipe diameter

e. Public notification and coordination with the homeowners shall be identified in the submittals and accomplished according to the following:

1. At least 7 days prior to any work, shutdown of service, or reduction in service to any line segment, the Contractor shall go door-to-door to distribute an Owner approved Homeowner Door Knocker describing the work to be performed.

2. On the day the service is to be shutdown or reduced, prior to commencing the work, the Contractor shall knock on the doors of all structures potentially impacted by the work and personally notify the occupants.

3. The Contractor shall notify by fax or email to the Owner's designated office the location of line segment in which service is to be shutdown or reduced prior to 7:00 a.m.

813-3 SUBMITTALS: At the request of the Engineer, the Contractor shall submit the following information:

a. Flow Control Plan: At the request of the Engineer, the Plan shall be submitted a minimum of 48 hours prior to controlling flows and shall include the following information:

1. Estimate of peak flow to be controlled
2. Detailed procedures for handling peak estimated flow
3. Schedule for controlling flow
4. Listing of equipment needed for flow control
5. Operation plan
6. Emergency procedures
7. Permits to close roads or lanes if necessary
8. Drawing of plug, bypass pump and pipeline locations (if bypass pumping is required)
9. Bypass pump sizes, capacities, number of each size to be onsite (including standby equipment) and power requirements (if bypass pumping is required)
10. Bypass pipeline sizes and material types (if bypass pumping is required)

813-4 FLOW CONTROL PRECAUTIONS: Whenever flows in a sewer line are blocked, plugged or bypassed, sufficient precautions shall be taken to protect the sewer lines from damage that might be inflicted by excessive sewer surcharging. Further precautions shall be taken to ensure that sewer flow control operations do not cause flooding or damage to public or private property being served by the sewers involved.

In situations where flow is running through an open trench during a sewer repair or replacement, Contractor shall take precautions to ensure that debris, bedding/backfill material, sediment, etc. do not enter into the sewer system possibly causing damage to downstream pump stations. In the event debris, bedding/backfill material, sediment, etc. does enter the downstream sewer system due to Contractor negligence, the Contractor shall be responsible for cleaning and videoing the downstream system and also any damage to the downstream pump station equipment at no additional cost to the Owner.

813-5 PLUGGING OR BLOCKING:

a. A sewer line plug permanently marked with a Contractor identification tag, shall be inserted into the line upstream of the pipe segment being inspected or repaired. Where necessary, plugs permanently marked with a Contractor identification tag, shall also be installed into the storm sewer pipe. Plugs shall be so designed that all or any portion of the flow can be released. All plugs shall have a tag line attached to them that extends outside of the manhole or wet well in addition to the air line in case of air line rupture. During CCTV inspection and sealing operations, flow shall be reduced to within the limits specified in Subsection 813-2.d.

b. After the Work has been completed and restricting the flow is no longer needed for the work, then the flow shall be restored to normal. Flow shall be restored by removing the plugs in an order that permits flow to slowly return to normal without surcharging or causing other major disturbances downstream.

c. Temporary plugs shall be removed and the flow restored to normal at the end of each working day. If downstream work is not or cannot be completed during the workday then the Contractor shall be required to provide, operate, and maintain bypass pumping system on a 24 hour basis.

d. The Contractor shall use bypass pumping if the work cannot be scheduled or cannot

be completed at a time when flow is within the flow levels specified by Subsection 813-2.d.

813-6 PERFORMANCE REQUIREMENTS:

a. It is essential that the sewer service have no interruption through the duration of the Work. If the storage capacity of the upstream line is not adequate to store the flow during the duration of the work or if the line is to be shut down for a period greater than 8 hours, then the Contractor shall provide adequate bypass pumping so that there is no interruption in the flow throughout the duration of the work. Therefore, Contractor shall provide, maintain and operate all temporary facilities such as dams, plugs, pumping equipment (both primary and back-up units) as necessary to intercept the flow before it impacts the work area, carry it past the work area and return it to the existing sewer system downstream of the work.

b. Discharge of sewage into the construction trench, private or public property, gutters, streets, sidewalks or storm sewers shall not be permitted.

813-7 FLOW ELIMINATION:

a. The flow shall be completely eliminated when required for sewer pipe replacement, structural concrete repairs in deteriorated manholes, or installation of cured-in-place pipe.

b. Flow elimination may be accomplished by temporary shutdown of pump stations where possible, or by plugging upstream sewers and pumping of flows, if required. Temporary shutdown of pump stations shall be done by Wastewater Maintenance personnel only.

c. All requests of the Contractor to eliminate or adjust the flow within the system shall be made in writing to the Owner. Owner and Contractor recognize and acknowledge that the elimination and/or adjustment of the flow are a cooperative effort and that the time and effort required achieving the desired flow varies. Owner and Contractor declare and agree that Contractor shall not be allowed, due, or paid any additional compensation, whatsoever, for Contractor's work, effort, time, material, labor, rentals, equipment, expenses, etc., during, as a result of, or arising from the elimination or adjustment of the flow.

813-8 PUMPING AND BYPASSING:

a. The Contractor shall obtain approval and secure all permits for placement of temporary bypass pumping system and pipeline within public right-of-way.

b. Bypass pumping may be required whenever pump stations are shut down or flow in gravity sewer lines are restricted or blocked. The Contractor shall supply the necessary pumps, conduits, and other equipment to divert the flow around the pump station, restriction, blockage, or other structure in which work is to be performed. Temporary shutdowns shall be performed by Wastewater Collection Pump Maintenance Personnel only. The bypass system shall be of sufficient capacity to handle existing flows plus additional flow that may occur during periods of a rainfall. Electric pumps or diesel silent pack pumps shall be used. No other type of pump will be acceptable without prior approval of the Owner.

c. The Contractor shall be responsible for furnishing the necessary equipment, power,

labor, and supervision to set up and operate the pumping and bypassing system. If pumping is required on a 24-hour basis, all equipment shall be operated in a manner to keep the pump noise at a minimum, and in accordance with City/Parish noise ordinance.

d. The Contractor shall be solely responsible for clean-up, repair, property damage costs and claims resulting from failure of the diversion system.

e. Bypass pumping shall not damage private or public property, or create a nuisance or public menace. Pumped sewage shall be in an enclosed pipe that is adequately protected from traffic, and shall be redirected into sanitary sewer system or alternatively into an enclosed tank for hauling to the wastewater treatment plant. Dumping or free flow of sewage on private or public property, gutters, streets, sidewalks, or into storm sewers is prohibited. Dumping of storm water may be discharged at a downstream location, as approved by the Engineer.

f. The Contractor shall make all arrangements for bypass pumping during the times when the main is shut down for any reason. The Contractor shall also perform the work during a low-flow period whenever possible.

g. The Contractor shall furnish, install, and maintain power, primary and standby pumps, equipment, and bypass piping required to maintain existing flows and services.

    1. All pumps used shall be fully automatic self-priming units that do not require the use of foot-valves or vacuum pumps in the priming system. All pumps used must be constructed to allow dry running for long periods of time to accommodate the cyclical nature of effluent flows.

    2. The Contractor shall provide the necessary stop/start controls for each pump.

    3. The Contractor shall included one stand-by pump of each size to be maintained on site. Back-up pumps shall be on-line and isolated from the primary system by a valve.

    4. In order to prevent the accidental spillage of flows, all discharge systems shall be temporarily constructed of a secure, tight, leak free discharge pipe. Under no circumstances will aluminum “irrigation” type piping or glued PVC pipe be allowed.

h. The Contractor shall be responsible for continuity of sewer service to each facility connected to the section of sewer main during the execution of the work, and shall also bypass the main sewer flow around the pipe to be replaced, or into adjacent sewers.

i. The pumps and the bypass lines shall be of adequate capacity and size to handle all flows without backup to private property.

j. Costs of bypass pumping, when needed, shall be included in the Contractors bid and shall be considered incidental to the work, unless a specific bid item is provided in the bid form.

813-9 SERVICE LATERAL DISCONNECTION:

a. Disconnected sewer service lateral connections shall be accommodated by bypass pumping or containment of the flow from time of disconnection to time of reconnection. This shall be accomplished by a mechanical pump and manifold system or by a storage system such as a bladder tank system. The storage system shall be capable of holding adequate sewage from each sewer service lateral connection for a period of 24 hours. Each storage system shall be emptied or pumped during each 24-hour period and properly disposed of.

b. When a service lateral must be disconnected from the main for more than 1 work day, the lateral shall be positively drained or pumped a minimum of once every 24 hours. The Contractor shall monitor status of flow and storage, and pump lateral more frequently if flows exceed the storage capacity of the lateral or the temporary storage.

c. Reconnect services in uncompleted sections during times of construction inactivity.

d. Notify building occupants when work is complete and full uninterrupted service restored.

e. No service is to remain shutdown for more than a period of 8 hours, unless Contractor provides substitute services for the residents. If the service is to be shutdown for more than 8 hours and Contractor cannot provide substitute services, then Contractor shall be required to provide temporary living quarters (i.e. hotel) for the resident at no additional cost to Owner or the resident. Temporary living quarters shall be approved by Engineer.

813-10 FIELD QUALITY CONTROL AND MAINTENANCE:

a. Testing: The Contractor shall perform leakage tests of the bypass pumping discharge piping using clean water prior to operation.

b. Inspection: The Contractor shall inspect the bypass-pumping system no less than once every 2 hours to ensure that the system is working correctly.

c. Maintenance of Service: The Contractor shall ensure that the temporary pumping system is properly maintained and a responsible operator shall be on hand at all times when pumps are operating.

813-11 CLEANING:

a. Before the bypass pumping system is dismantled, either to be moved to the next section or at the completion of the work, discharge sewage remaining in the bypass discharge pipeline and pumping equipment into the working sanitary sewer. Storm water is to be discharged at a downstream location, as approved by the Engineer.

b. Upon completion of the bypass pumping operation, disturbed areas shall be cleaned and restored to their original condition. This restoration should restore the site to a condition which is at least equal to or better than the condition which existed prior to the start of the work.

813-12 LIABILITY: The Contractor shall be responsible for damages to private or public property that may result from the sewer flow control operations. The Contractor shall be responsible for any violations of laws, regulations or permits and shall indemnify and hold the Owner harmless for any and all damages, including but not limited to, fines, penalties and law suits which arise from such

violations.

813-13 MEASUREMENT: If a pay item for bypass pumping is included in the Contract, measurement will be as follows:

a. **Bypass Pumping for rehabilitation of 54" pipe:** Measurement for this item shall be on a lump sum basis for all pipes requiring bypass pumping to rehabilitate the 54" pipes specified in the contract documents.

b. **Bypass Pumping for rehabilitation of 60" pipe:** Measurement for this item shall be on a lump sum basis for all pipes requiring bypass pumping to rehabilitate the 60" pipes specified in the contract documents.

813-14 PAYMENT: If no pay item for bypass pumping is included in the Contract, bypass pumping shall be at no direct cost and the Contractor shall include the cost in the price bid on other items. If a pay item for bypass pumping is included in the Contract, payment will be made as follows:

a. **Bypass Pumping for rehabilitation of 54" pipe** Payment for this Work will be full compensation for furnishing all labor, materials, equipment, and incidentals required to complete the Work. This work shall include all bypass pumping and temporary flow control when no separate specific Bid Item is included for these functions. Any other miscellaneous Work not specifically included for payment under any other Items in the Bid Form but obviously necessary to complete the Contract and fulfill all requirements of these Specifications and Contract Documents shall be included.

b. **Bypass Pumping for rehabilitation of 60" pipe** Payment for this Work will be full compensation for furnishing all labor, materials, equipment, and incidentals required to complete the Work. This work shall include all bypass pumping and temporary flow control when no separate specific Bid Item is included for these functions. Any other miscellaneous Work not specifically included for payment under any other Items in the Bid Form but obviously necessary to complete the Contract and fulfill all requirements of these Specifications and Contract Documents shall be included.

813-15 PAY ITEMS:

Item No.	Item	Unit
8130001	Bypass Pumping for rehabilitation of 54" Pipe	Lump Sum
8130002	Bypass Pumping for rehabilitation of 60" Pipe	Lump Sum

SECTION 814
SMOKE TESTING

814-1 SCOPE OF WORK: Sanitary sewer line sections, at locations designated by the Engineer or his authorized representative, shall be smoke tested to locate significant defects which are causing or could cause infiltration/inflow, soil erosion, and degradation to the existing sanitary sewer system or other underground utilities and surface structures.

All new or repaired main line or service lateral connections must be smoke tested and the Engineer will field determine which other new or repaired pipe segments are to be smoke tested prior to backfilling.

814-2 PRODUCTS:

a. Nontoxic, odorless, non-hazardous, and non-staining smoke generators (bombs or liquid smoke) shall be used to produce smoke for testing.

b. Smoke shall be blown by a "squirrel cage" or other approved blower located on top of a central manhole. Blower pressure should be adequate to force smoke throughout the isolated line section and to the ground surface through cracks, channels, improper jointing, etc. Minimum blower free fan delivery is 1,500 cfm.

c. Sand bags and/or plugs with permanently attached identification tags shall be placed at each end of the test section to prevent smoke from escaping through the manholes and adjacent sewer lines.

d. Color, digital photographs with a minimum resolution of four (4) mega pixels or greater shall be taken of all locations where smoke is observed at the ground surface. The camera shall record a date and time directly onto the photo. Each photographic file generated shall be saved in a _.JPEG file format using the manhole reference number, distance to the upstream manhole, and the physical address as the naming convention. These files will be recorded on a computer compact disk (CD) or digital video disk (DVD) and delivered to the Owner. A sample of a file name in the proper format is:

253-00012_299_12345_Maple.jpeg
Manhole No _ Dist_Hse No_Street _.file ext.

e. All data pertinent to the smoke testing will be recorded on the smoke testing log form using the proper inspection coding as provided by the Owner. This form shall be submitted to and remain in the possession of the Owner after a section of line has been tested.

814-3 PREPARATION:

a. Contractor’s testing schedule shall consider the unique conditions of the test site such as (but not limited to):
    1. Cross connected storm/sanitary sewers
    2. Heavy flow sections
    3. Traffic patterns

b. If work is to be performed in a roadway, the Contractor shall perform necessary traffic control, conform to DPW rules and regulations, and the latest edition of the Manual of Uniform Traffic Control Devices (MUTCD). Lane closures will require a

permit from the DPW Traffic Division.

814-4 METHODS:

a. Only sewer line segments on the upstream and downstream side of the blower shall be tested on a single set-up.

b. Smoke shall be introduced into a manhole and then blown into the connecting sewer lines.

c. All visible leaks, including those from collection lines, service laterals, drainage structures, and manholes within the road right-of-way or servitude, shall be recorded on the smoke testing log form. The information listed below shall be included on the log form:

    1. Upstream and downstream manhole numbers
    2. Manhole depths
    3. Direction of flows
    4. Location of sandbags and plugs
    5. Sketch showing leak location and distance and offset from the upstream manhole
    6. Street address nearest the detected leak
    7. Leak type that clearly describes the leak
    8. Smoke quantification
    9. Surface cover
    10. Properly identified color photograph of inflow source shall be attached to reporting form.

d. Visible smoke on private property shall be photographed and recorded by address.

e. Public notification and coordination with the City's Police and Fire Departments shall be accomplished according to the following:

    1. At least 7 days prior to the test of any line segment and prior to beginning the testing, the Contractor shall go door-to-door to distribute an Owner approved Homeowner Notification Door Knocker describing the smoke testing.

    2. On the day of test, prior to commencing operations, Contractor shall knock on the doors of all structures potentially impacted by the testing to personally notify occupants. Also Contractor shall notify the appropriate authorities prior to the beginning of any smoke testing and will be responsible for maintaining close coordination with the local Police and Fire Departments regarding the smoke tests.

    3. Contractor shall maintain multiple copies of the MSDS sheets of smoke products on site for to respond to all inquiries.

f. Smoke tests shall not be performed when the smoke coming out of the ground may be blown away so quickly as to escape visual detection.

g. Smoke testing shall not be performed during wet weather or saturated ground conditions.

h. For Physical Inspection Contracts, all smoke testing shall be performed after the

sewer lines and manholes have been cleaned and televised.

i. The Contractor will be solely responsible and held liable for any claims or damages arising from the lack of public notification, and coordination with the City Police and Fire Departments.

814-5 INSPECTION: The Engineer or his duly authorized representative shall witness all smoke testing, and review smoke testing log forms submitted to the Engineer. The log forms shall be available on the next work day following the performance of the test.

814-6 MEASUREMENT: Measurement for smoke testing to identify leak locations shall be made on a linear foot basis from the center of the upstream manhole to the center of the downstream manhole. Only line segments directly upstream and downstream of the blower are to be tested on a single set-up. The length of the line segments tested per smoke test set-up shall be approximately 600 linear feet.

814-7 PAYMENT: Payment for smoke testing will be full compensation for smoke bombs, liquid smoke, blower usage, sand bagging, plugging, smoke test logs, public notification, and photos in accordance with the Specifications.

No direct payment will be made for smoke testing in conjunction with acceptance testing of sewer point repair or in conjunction with warranty item work.

814-8 PAY ITEMS

Item No.	Item	Unit
8140001	Smoke Testing for Leak Identification	Linear Foot

SECTION 815
SEWER LINE, MANHOLE AND WET WELL INSPECTION

815-1 SCOPE OF WORK: The Contractor shall use a closed circuit color video system (CCTV) to remotely inspect and defect code the pipe, manhole, or pump station wet well in “real time” or other methods approved by the Engineer. The television camera used for the inspection and defect coding of the sewer features shall be one specifically designed and constructed for such inspection. The camera must be capable of tolerating a hazardous and corrosive environment.

a. After the required cleaning is completed in accordance with Section 812, the Contractor will proceed with the television inspection of pipes and defect classification will be based on the latest revision of the Pipeline Assessment and Certification Program (PACP) Condition Grading System as developed by the National Association of Sewer Service Companies (NASSCO) as amended by the Owner.

b. Direction of the CCTV inspection shall be from upstream to downstream, unless otherwise approved by the Engineer.

c. The Owner makes no guarantee that the sewers proposed to be inspected after the cleaning, are clear for the passage of the camera set-up. The equipment, tools and method(s) used for securing the passage of the camera are to be at the discretion of the Contractor with the approval of the Engineer.

d. The Contractor shall comply with all requirements of local, state, and federal confined space entry laws and regulations.

e. CCTV inspection required for pre-installation assessments and acceptance of work does not require defect coding.

815-2 SUBMITTALS:

a. A Traffic Control Plan will be submitted to DPW. The plan shall include an outline of the permit acquisition procedure for lane closure, methods for proper signing and barricades, which complies with local requirements and the MUTCD, and site Contractor telephone numbers for emergencies.

b. Schedules of work shall be submitted to the Engineer on a weekly basis. Any deviation from the submitted plan not caused by weather or natural causes shall be preceded by a 24-hour notice.

c. Copies of all the technical certifications for the Characterization Technicians that will work on the project must be submitted to the Engineer prior to commencing work.

d. Contractor shall submit a signed affidavit stating that all required OSHA regulations are adhered to.

815-3 PREPARATION:

a. Public notification and coordination with the homeowners shall be identified in the submittals and accomplished according to the following:

    1. At least 7 days prior to the inspection of any line segment or manhole and prior to beginning the inspection, the Contractor shall go door-to-door to

distribute an Owner approved Homeowner Notification Door Knocker describing the work to be performed.

2. On the day of inspection, prior to commencing operations, Contractor shall knock on the doors of all structures potentially impacted by the testing to personally notify occupants.

3. Contractor shall notify by fax or email to the Owner's designated office the location of the work to be performed daily prior to 7:00 a.m.

b. Prior to CCTV inspections Contractor shall clean the pipelines, manholes and wet wells of debris in accordance with Section 812. Immediately after cleaning, the sewer line section, manhole or wet well shall be visually inspected by means of CCTV. Sewer line sections shall be characterized according to specifications from manhole to manhole.

c. With the agreement of the Engineer, a Traffic Control Director may be utilized onsite where equipment is in or near to a roadway to assist in alerting or directing traffic near the work area.

815-4 TELEVISION INSPECTION OF SEWER LINES:

a. The system shall have the capability of recording on the digital video disk (DVD) written information identifying each pipe segment inspected and a metering device measuring distance to the nearest whole foot. Lighting for the camera shall be suitable to allow a clear picture of the entire periphery of the pipe. Digital videos of poor and unacceptable quality will be rejected. Re-recording will be at no additional cost to the Owner.

b. The television camera used for the inspection shall be one specifically designed and constructed for such inspection. The camera shall be operative in 100% humidity conditions. The camera, television monitor, and other components of the video system shall be capable of producing a minimum 500-line resolution picture. The camera shall have an imager with minimum 0.7 lux sensitivity and utilize high intensity discharge lamps for illumination. Maintenance of video equipment is a must. Camera distortions, inadequate lighting, dirty lens or blurred/hazy picture will be cause for rejection. A backup camera, in good working conditions, shall be available on the project site. Camera shall be operative in a hazardous and corrosive environment.

c. All internal pipe damage shall be still photographed in color by the Contractor utilizing picture capture equipment, and shall be clearly labeled with the date, upstream manhole (UM) number, footage to the UM, and type of defect generated in a _.JPEG file format. These files will be recorded on a DVD and delivered to the Owner with the video. All videos, photos and data acquired are the property of the Owner.

d. The entire circumference of the pipe (360 degrees) shall be viewable. The Contractor will be required to pause and pan all service lateral connections. The Contractor will also be required to dewater pipe as necessary to allow the required visibility. This dewatering will be considered incidental to the television inspection

e. The camera shall be moved through the line at a uniform rate and at a maximum camera speed of 30 ft/minute, stopping when necessary to insure proper

documentation of the pipe's condition. Digital video shall be captured at a minimum video bit rate of 5.0 M Bit/second. Manual winches, power winches, TV cable, and powered rewinds or crawler device or other devices that do not obstruct the camera view or interfere with proper documentation of the pipe conditions shall be used to move the camera through the line.

f. If during the inspection operation the television camera will not pass through the entire section because of an obstruction such as a dropped joint, crushed pipe, etc., with the approval of the Engineer, the Contractor shall perform an additional setup of his equipment so that the inspection can be performed from the opposite end in order to obtain a "full" section (returning unimpeded to the original blockage). If, again the camera fails to obtain a "full" section because of a second obstruction preventing passage, the inspection shall be considered incomplete and marked survey abandoned at this time. If an additional setup is required, the Contractor will get paid for only one (1) additional setup per mainline segment.

g. When remotely operated methods are used to move the television camera through the line, radios or other suitable means of communication shall be set up between the two ends of the section being inspected to insure good communications between members of the crew.

h. Any obstructions causing a stuck camera are the responsibility of the Contractor. Likewise the retrieval of equipment or cameras is the Contractor's responsibility and will be performed at the Contractor's expense.

i. Metering equipment will be accurate to two percent (2%) over the length of the sewer line section being inspected. Accuracy of the meters shall be checked daily by use of a walking meter, roll-a-tape, or other suitable device. Also a distance between all manholes will be recorded by a surface measure center to center in the provided database.

j. The location of all pipe defects shall be noted in accordance with the PACP code as amended by the Owner. All CCTV operators must be PACP certified. The defects shall be recorded in "real time" or as approved by the Engineer in accordance with the latest revision of the PACP code as noted, and on the inspection sheet. The inspection sheet shall also show pipe type, size, depth, manhole locations, street addresses of all manholes, and location of all service lateral connections.

k. The camera height shall be adjusted within the pipe to maintain a centered position for filming. The lighting should always be sufficient for high quality pictures. A reflector light system in front of the camera may be required to enhance the lighting of a dark colored pipe.

l. Camera footage counter shall be set to measure and record length of each sewer line segment from centerline of its terminal manholes. If multiple sewer line segments are to be videoed from one setup, footage counter shall be reset for each line segment at its starting manhole.

815-5 TELEVISION INSPECTION OF LATERALS:

a. Service laterals will be photographed and characterized in accordance with this specification.

b. A self-leveling radial view camera (360 degree optical lens) will be used for lateral

inspection. Cameras incorporating mirrors for viewing sides or cameras using exposed rotating heads are not acceptable. The camera must be an auto-iris type with remote controlled manual override. The camera light head includes a high-intensity side viewing lighting system to allow illumination of internal sections of lateral sewer connections.

c. A main sewer television camera is used to position the lateral camera launcher. The lateral sewer camera is used to inspect each lateral from the mainline to the cleanout.

d. The television inspection of the lateral must be attempted from the mainline to the cleanout. After an unsuccessful attempt, the inspection may be performed from the cleanout to the mainline by using a mini-push camera if necessary.

e. Lateral inspection will be performed with the same minimum criteria for mainline inspections. Cleaning, conditions, classifications, and recording of datum will also apply.

f. The Contractor may request permission from the Engineer not to perform lateral inspections in conjunction with mainline inspections. However if approved by the Engineer, the Contractor shall complete lateral inspections within one working day of the mainline inspection.

g. If an additional set-up is approved for the mainline inspection for a mainline segment, another additional set-up will not be approved for the lateral inspection for the same mainline segment. Multiple additional setups on the same mainline segment will not be paid for due to the preferred method of inspection chosen by the Contractor.

815-6 SONAR INSPECTION OF SEWER LINES:

a. **Description:** Contractor will be required to introduce equipment to create a volumetric section of the pipe in "difficult to see" and opaque submerged environments. This equipment, capable of withstanding harsh environments, will use sound to acoustically locate and document features and defects in the pipe to be investigated.

b. **Data Acquisition**: The sonar system shall be designed to provide accurate dimensional data on silt level, grease accumulation, pipe deformation, offsets, etc, below the waterline. In full flowing lines or siphons, the system shall provide visual profile, profile comparison, and dimension data of significant items or defects. A sonar inspection of a fully or partially flowing line shall provide a two-dimensional profile of the interior pipe wall. In partially flowing lines, the sonar may be required to be combined with CCTV to provide a simultaneous composite image of the pipe both above and below the waterline.

c. **General Sonar Specifications:**

Minimum Deployment Specifications

Above or Below Waterline:	Below
Wet or Dry Operating Environment	Wet
Minimum Pipe Diameter	36"
Maximum Pipe Diameter	144”
Manhole Minimum Diameter	24"
Maximum Inspection Length	600’

815-7 TELEVISION INSPECTION OF MANHOLES OR WET WELLS: This specification covers “non-entry” inspection of manholes and wet wells using internal video equipment for the purposes of assessing thoroughness of cleaning, observing and recording structural and service lateral defects and construction features and to verify new sewer construction prior to acceptance.

a. **Operations**:

1. Each manhole or wet well inspection unit is to consist of a self-contained vehicle with separate areas for viewing and storage complete with the following equipment as a minimum:

   i. Fans and blowers capable of removing fog that may be present in sewers at the time of the inspection.
   ii. Video cameras, lighting, cables and power source.
   iii. Video monitor, DVD recorder and digital video recorder.
   iv. Computer system with video capture card or dedicated unit and other related equipment.

b. **Video Inspection Equipment**

1. Video equipment is to consist of a minimum of the following:

   i. Video camera capable of panning 360° and tilting 270° with optimum picture quality provided by focus and iris adjustment. Focal range to be adjustable from 100 millimeters to infinity.
   ii. Adjustable light source to allow an even distribution of light around the manhole perimeter without loss of contrast, flare out of picture, or shadowing. Ensure lighting illuminates the sewer or manhole ahead of the camera to be able to determine general condition, features and upcoming defects.
   iii. Video overlay equipment capable of superimposing a minimum of 15 lines with up to 30 characters per line of alphanumeric information onto the video recording.

c. **Manhole and Wet Well Camera Transport Equipment:**

1. Video camera transport equipment to consist of the following:

   i. A pole mounted device for manhole or wet well inspections that will securely orient the camera with the 12:00 video position facing north and capable of moving the camera through the entire vertical length of the manhole or wet well in a systematic manner.

d. **Manhole Inspections:**

1. Manhole inspections are used to determine the location and the physical condition and isolate current and possible infiltration and inflow sources. Each component of the manhole is inspected to establish a complete inventory, update existing records, and/or identify defects.

2. When performing manhole inspections, always follow all safety rules and regulations. All crew members are required to have the necessary safety training prior to performing any field work.

3. Once the location has been secured for safety, always open the manhole cover and verify that;

    i. You are at the correct manhole.
    ii. That the manhole can be inspected (MH is not surcharged, broken lid, unsafe, gas etc.).

4. Gather the following information for MH inspection:

    i. General Data - Document the following items:
        A. MH Number
        B. Project Number
        C. Date/Time
        D. Inspector/Company Initials
        E. Digital Photo Numbers & File Names
        F. MH location
        G. Surface Type
        H. Precipitation
        I. Traffic
        J. Details of Incoming Pipes
        K. MH Depth
        L. MH Diameter
        M. Flow Depth

    ii. Manhole Cover- Inspect the cover before and after it has been removed from the frame. Be sure to inspect both sides of the cover. The cover inspection should include:
        A. Cover Diameter
        B. Cover Type
        C. MH Cover Condition
        D. MH Cover to Rim fit
        E. Distance above or below grade

    iii. Frame and Grade Adjuster- The frame is the "seat" for the manhole cover. The grade adjuster is used in construction to adjust for difference between the top of the cone and the surface. It is important to understand that not all manholes will have an adjuster. inspection includes:
        A. Frame Condition
        B. Frame to MH Seal
        C. Insert
        D. Riser Type
        E. Riser Condition
        F. Evidence of I/I from Riser

iv. Inspect MH Cone - The cone is used to reduce the size of the manhole body to the size of the adjuster or the cover. The cone inspection includes:
   A. MH Wall and Cone Type
   B. Cone Condition
   C. Evidence of I/I from Cone

v. Document the Cone Shape:
   A. Concentric
   B. Eccentric
   C. Flat Top

vi. Document the MH Wall Construction:
   A. Wall Condition
   B. Evidence of I/I from Wall
   C. No. of Steps

vii. Bench - The bench is the floor or the base of the manhole. Clean the debris and/or redirect flow prior to inspection if necessary to reveal bench.

viii. Inspect bench for Defects - Depending on the construction several different defects are possible. Most common defects are cracks, leaking construction joints and roots:
   A. Bench and Invert Type
   B. Bench and Invert Condition
   C. Evidence of Infiltration at Bench and Invert
   D. Bench Deposits
   E. Work Order Issued

e. **Operator Qualifications for Inspection and Condition Coding:**

1. Provide a minimum one operator on site at all times with each inspection unit who holds a valid certificate in Manhole Assessment & Certification Program (MACP) or an acceptable alternate training program. Ensure each operator is fully trained in all aspects of manhole inspection and capable of making accurate observations and recording all conditions that may be encountered in manholes.

2. Perform inspection work only when MACP certified operators are operating on site.

3. Submit a valid copy of the MACP Operators Certificate for each operator to the Engineer as outlined in Submittals.

f. **Manhole Condition Coding:**

1. Perform manhole condition coding in accordance with the requirements of the latest revision of MACP as developed by the National Association of Sewer Service Companies (NASSCO) as amended by the Owner.

2. Record GPS coordinates (+/- 1 meter accuracy), manhole designation, place names and other data in accordance with this specification. If GPS

coordinates cannot be obtained due to tree or cloud cover, Contractor shall note this on the inspection form. Conventional surveying is not required.

815-8 DELIVERABLES:

a. A DVD recording shall be made by the Contractor of all pipe and manhole sections television inspected and photographed. Each line segment and manhole shall be recorded and saved in a continuous single digital video file labeled in accordance with the format shown below. The digital video will include a complete "color" video and audio record of the entire inspection. The digital video shall have the capability of permanently displaying information concerning the segment inspected, including the date, upstream and downstream manhole (MH) numbers, GPS manhole coordinates, the size of pipe, and the footage counter.

b. All digital video files shall also be submitted on DVD-ROM with a file reference number, which have been scanned for viruses. The DVD index sheet shall be labeled with the DVD reference number, the project name, project number, date of inspection, and upstream and downstream manhole numbers listed by line segments as they appear on the DVD. The television inspection shall be recorded directly to digital format as specified herein. Recording to VHS or other media and converting to digital format are not acceptable.

File Naming: xxx-xxxxx_yyy-yyyyy.mpg where

x= upstream manhole and y= downstream manhole.
xxx, yyy - Numerical 3-digit Pump Station Area
xxxxx, yyyyy – Numerical 5-digit Manhole Number

c. The inspection sheets, electronic database, and DVD of all television inspections of sewer lines and manholes shall be kept by the Contractor and submitted to the Owner with monthly Payment Request. Contractor shall include an electronic spreadsheet listing all manholes inspected and included in the submittal. All inspection sheets shall be submitted on a standard inspection form which has been reviewed and approved by the Owner and shall be completed electronically. PDF electronic copies of the inspection sheets, CNL forms and Map Edit Forms shall be submitted on a DVD. The digital videos, images, files and disks shall become the property of the Owner.

d. The Engineer shall provide an unpopulated electronic database. The Contractor shall populate the database with pipe defects/condition information as indicated in the PACP. The Contractor shall not make any design changes to the database prior to submittal. The Engineer will perform a quality assurance check of the defect database. Any inconsistencies, irregularities, errors, or incomplete data will be returned to the Contractor for resolution and correction at no additional cost to the Owner.

e. Unless authorized by the Engineer, television inspection shall not be conducted in sewer lines with sewer flow. It shall be the Contractor's responsibility to dewater the lines as necessary in order to achieve the above criteria and shall be included in the cost of the television inspection. If plugging, blocking or bypassing is necessary sufficient precautions must be taken to protect the sewer lines from damage that might result from sewer surcharging. Further, precautions must be taken to insure that sewer flow control operations do not cause flooding or damage to public or private property being served by the sewers involved and as outlined more

specifically in Specification 813 Sewer Flow Control.

f. The Contractor shall complete and submit a Map Edit form provided by the Owner for any field condition that is not shown or is different from that shown on the original maps. These forms shall be submitted with the monthly inspection forms.

g. GPS coordinates (+/- 1 meter accuracy) will be recorded for the upstream and downstream manholes based on the La. State Plane Coordinate System (south) whenever any physical inspection is performed.

815-9 MEASUREMENT:

a. **Television Inspection:** Measurement for this Item shall be made on a linear foot basis, measured to the nearest whole foot, from center of upstream manhole to center of downstream manhole. One setup shall be included in each mainline segment.

b. **Sonar Inspection**: Sonar may be substituted for television inspection with the permission of the Engineer. Measurement for Sonar Inspection shall be made on a linear foot basis, measured to the nearest whole foot, from the center of the upstream manhole to the center of the downstream manhole. One setup shall be included in each mainline segment.

c. **Lateral Television Inspection:** Measurement for this item shall be made on a linear foot basis, measured to the nearest whole foot, from the mainline to the cleanout or from the cleanout to the mainline.

d. **Additional Television Set-up:** Measurement for this Item shall be made per each for one additional equipment set-up after the initial set-up per mainline segment.

e. **Manhole Inspection:** Measurement for this Item shall be made per each manhole inspected.

f. **Pump Station Wet Well Inspection:** Measurement for this Item shall be made per each wet well inspected.

815-10 PAYMENT:

a. **Television Inspection:** Payment of this Item will be full compensation for television inspection, one equipment set-up per mainline segment, dewatering, camera retrieval, defect coding, report, DVD production and other deliverables in accordance with the specifications. No mainline segment will be paid until lateral television inspection has been attempted and/or completed for that mainline segment.

b. **Sonar Inspection:** Payment of this Item will be full compensation for sonar inspection, one equipment set-up per mainline segment, dewatering, equipment retrieval, defect coding, report, and DVD production in accordance with the specifications.

c. **Lateral Television Inspection:** Payment of this item will be full compensation for television inspection of laterals to the main sewer line. This will be the total payment whether mainline or cleanout introduction of the camera is used. For lateral television inspection, setup shall be included in this pay item and no additional setups will be paid for this Work.

d. **Additional Television Set-up:** Payment for this Item will be full compensation for the additional equipment set-up cost for full length mainline camera inspection after encountering blockage.

e. **Manhole Inspection:** Payment of this item will be full compensation for television inspection of the full depth of the manhole, top and bottom conditions.

f. **Pump Station Wet Well Inspection:** Payment of this item will be full compensation for television inspection of the full depth of the wet well, top and bottom conditions.

815-11 PAY ITEMS

Item No.	Item	Unit
8150015	Television Inspection of Sewer Line Less Than or Equal to 16”	Linear Feet
8150020	Television Inspection of Sewer Line Greater Than 16”	Linear Feet
8150101	Additional Television Setups	Each
8150102	Television Inspection Lateral of Sewer Line	Linear Feet
8150103	Sonar Inspection of Sewer Line	Linear Feet
8150104	Television Inspection of Manhole	Each
8150105	Television Inspection of Pump Station Wet Well	Each

SECTION 819
MICROTUNNELING AND PIPE-JACKED TUNNELS

819-1 DESCRIPTION: This Work consists of all materials, labor and equipment required to directly install product pipelines typically 24” and larger, underground in a single pass using an appropriate tunnel boring machine combined with pipe-jacking techniques.

This specification also covers Pilot Tube Microtunneling (PTMT). Pilot Tube Microtunneling shall be defined as an alternate microtunneling system typically for sizes 6" through 27" inner diameter. This system is a two or three stage system, which allows both trenchless guided installation of house connection sewers as well as accurate direct jacking of smaller diameter pipelines without use of casing.

819-1.1 Scope of Work:

a. Construction of tunnels by one-pass methods with or without man entry. The construction methods involve jacking pipe following a hand-shield excavation or a tunnel boring machine (TBM) or micro-tunnel boring machine (MTBM), with the pipe serving as both the tunnel liner during construction and the sewer pipe after completion of construction.

b. Construction of smaller diameter pipelines utilizing the Pilot Tube Microtunneling process. The system shall utilize a two or three phase system.

c. The Contractor may select pipe materials as listed in the QPL for Microtunneling and Pipe-Jacked Tunnels, or approved equal.

d. Ancillary work includes mix design requirements, testing, furnishing and production of grout for:

   1. Pressure grouting of bolted liner plates for shafts.
   2. Pressure grouting of primary tunnel liner.
   3. Pressure grouting of jacked-pipe.
   4. Annular grouting uncased sewer pipe.
   5. Grouting voids in ground resulting from caving, loss of ground, or settlement.
   6. Grouting of manholes constructed in shafts.
   7. Compaction grouting is not part of this specification.

e. Construction, maintenance, and backfilling of tunnel shafts.

819-1.2 Definition:

a. **Jacked Pipe:** A method for installing sewer pipe that serves as initial construction lining and tunnel support, installed for stability and safety during construction, and as the sewer pipe. The pipe is shoved forward, or jacked, as the tunnel is advanced.

b. **Microtunneling:** A method of installing pipe by jacking the pipe behind a microtunnel boring machine which is connected to and shoved forward by the pipe being installed, generally precluding man entry.

c. **Pilot Tube Microtunneling (PTMT):** Multi stage method of accurately installing a product pipe to line and grade by use of a guided pilot tube and followed by upsizing to install the product pipe. The system must use a guidance system to insure

accuracy, is remotely operated and does not require man entry to the tunnel for normal operations. The guidance system, consisting of target, theodolite, camera, and monitor, can detect the deviation of the drilling profile, and gives the operator continuous information about the location of the steering head.

d. **Tunnel Boring Machine (TBM):** Mechanized excavating equipment that is steerable, guided and articulated, connected to and shoved forward by the pipe being installed, with man entry.

e. **Microtunnel Boring Machine (MTBM):** Mechanized excavating equipment that is remotely-controlled, steerable, guided and articulated, connected to and shoved forward by the pipe being installed, usually precluding man entry.

f. **Tunneling Methodology:** A written description, together with supporting documentation that defines Contractor's plans and procedures for the microtunneling or pipe jacking operations.

g. **Zone of Active Excavation:** Area located within a radial distance about a surface point immediately above the face of excavation equal to the depth to the bottom of the excavation.

h. **Critical Structure:** Any building, structure, pipeline, utility, bridge, pier, or similar construction partially or entirely located within a zone of active excavation.

i. **Pressure Grouting:** Filling a void behind a liner or pipe with grout under pressure sufficient to ensure void is properly filled but without overstressing temporary or permanent ground support, or causing ground heave to occur.

j. **Back Grouting:** Secondary pressure grouting to ensure that voids have been filled between shaft liners and the surrounding ground.

k. **Annular Grouting:** Filling the annular space between the carrier pipe and the ground, by pumping.

l. **Ground Stabilization Grouting:** The filling of voids, fissures, or under-slab settlement due to caving or loss of ground by injecting grout under gravity or pressure to fill the void.

819-1.3 Qualifications:

a. Tunneling and Microtunneling Contractors will have actively engaged in the installation of pipe using tunneling and microtunneling for a minimum of three years, during which time the Contractor will have completed at least 15,000 linear feet of microtunneling installations.

b. Field supervisory personnel employed by the Tunneling or Microtunneling Contractor will have at least two years experience in the performance of the work and tasks as stated in the Contract Documents.

819-1.4 Submittals:

a. **Qualifications:** Submit documentation showing that the Contractor and personnel meet the minimum required qualifications stated in Section 819-1.3. Include a list of a minimum of three wastewater collection projects similar in scope and value to the

project specified in the contract documents. Information must include, but not be limited to date and duration of work, location, pipe information (i.e. length, diameter, depth of installation, pipe material, etc.), project owner information (i.e. name, address, telephone number, contact person), and the contents handled by the pipeline (water, wastewater, etc.).

b. **Materials:**

1. Submit pipe material reference sheets and manufacturer's certification of pipe meeting or exceeding the required specifications.

2. Submit a description of materials, grout mix, equipment and operational procedures to accomplish each grouting operation. The description may include sketches as appropriate, indicating type and location of mixing equipment, pumps, injection points, venting method, flowlines, pressure measurement, volume measurement, grouting sequence, scheule, and stage volumes.

   i. Submit a grout mix design report, including:

      A. Grout type and designation.
      B. Grout mix constituents and proportions, including materials by weight and volume.
      C. Grout densities and viscosities, including wet density at point of placement.
      D. Initial set time of grout.
      E. Bleeding, shrinkage/expansion.
      F. Compressive strength.

   ii. For cellular grout, also submit the following:

      A. Foam concentrate supplier's certification of the dilution ratio for the foam concentrate.
      B. A description of the proposed cellular grout production procedures.

   iii. Maintain and submit logs of grouting operations indicating pressure, density, and volume for each grout placement.

c. **Tunneling Methodology:** A brief description of proposed tunnel methodology for review. The description should be sufficient to convey the following:

1. Proposed method of tunnel construction and type of face support.

2. Manufacturer and type of tunneling equipment proposed. Describe type of lighting and ventilation systems.

3. Number and duration of shifts planned to be worked each day.

4. Sequence of operations.

5. Locations of access shafts and work sites. Describe method of construction for tunnel shafts.

6. Method of spoil transportation from the face, surface storage and disposal

location.

7. Capacity of jacking equipment and type of cushioning.

8. Identify critical utility crossings and special precautions proposed.

9. Slurry injection system details.

d. **Tunnel Shaft Schedule of Values:** Cost per shaft by station, diameter, and depth.

e. **Tunnel Shafts:** Submit shaft construction drawings together with calculations. As a minimum the submittal shall include:

1. Shaft dimensions, design criteria, and details for ground support system, such as sheeting, shoring, bracing, and stabilization, protection of the excavation, special requirements for shaft penetrations, tunnel "eye", starter and back tunnels, and seal slabs. Allowable surcharge loads and any restrictions on surcharge capacity, including live loads, shall be clearly shown on the shaft construction drawings. Thrust blocks or other reactions required for pipe jacking shall be shown, if applicable.

2. Location of shafts by station and limits of working sites.

3. Description of site security arrangements in conformance with Subsection 819-3.6.

4. Description of method of extending the shaft above the flood level in compliance with Subsection 819-1.5.b.

5. Any geotechnical / boring undertaken by the Contractor for whatever purpose connected to the Work.

6. Submit shaft temporary deck drawings and calculations in the event that a shaft is not needed for immediate construction activity, in conformance with Subsection 819-1.5.b.

7. Shaft design submittals by the Contractor shall be signed and sealed by a Professional Engineer registered in the State of Louisiana.

f. **Drawings and Calculations:** Submit for record purposes, drawings, and calculations for any tunnel support system designed by the Contractor. Drawings shall be adequate for construction, and include installation details. For pipe jacking and microtunneling show pipe and pipe joint detail. Documents must be signed and sealed by a Professional Engineer registered in the State of Louisiana. Calculations shall include clear statement of criteria used for the design as described in Subsection 819-1.5. Engineer's review of all drawings and calculations is for information purposes and overall compliance.

g. **Quality Control:** Submit for review a brief description of quality control methods including:

1. Method and frequency of survey control.

2. Example of tunnel daily log.

h. **Geotechnical Investigation:** When geotechnical investigations are conducted by the Contractor, submit results in both hardcopy and electronic form to the Engineer for record purposes.

i. **Monitoring Plans:** The Contractor shall provide monitoring plans per Subsection 819-3.10 for assessing ground movement (settlement or heave) due to drilling operations as follows:

1. Instrumentation Monitoring Plan: Submit for review, prior to construction, a monitoring plan that includes a schedule of instrumentation design, layout of instrumentation points, equipment installation details, manufacturer's catalog literature, and monitoring report forms.

2. Surface Settlement Monitoring Plan. Submit a settlement monitoring plan for review prior to construction. The plan shall identify the location of settlement monitoring points, reference benchmarks, survey frequency and procedures, and reporting formats.

j. **Structures Assessment:** Pre-construction and post-construction assessment reports shall be provided for critical structures, namely those located within the zone of active excavation from the proposed tunnel centerline. Photographs or a video of any existing/pre-construction damage to structures in the vicinity of the sewer alignment shall be included in the assessment reports.

k. The readings of all monitoring shall be submitted to the Engineer.

l. **Daily Reports:** The shift log as defined in Subsection 819-3.5, Pipe-jacked Tunneling Data, shall be maintained by the Contractor, and must be made available to the Engineer on request.

m. **Traffic Control Plan:** If traffic maintenance is required as part of the Work, a Traffic Control Plan will be submitted to DPW. The plan shall include an outline of the permit acquisition procedure for lane closure, methods for proper signing and barricades, which complies with local requirements and the MUTCD, and site Contractor telephone numbers for emergencies.

819-1.5 Design Criteria:

a. **Pipe:**

1. Contractor is responsible for selection of the appropriate pipe and pipe joints to carry the thrust of any jacking forces or other construction loads in combination with overburden, earth and hydrostatic loads. Design of any pipe indicated on the Contract Documents considers in-place loads only and does not take into account any construction loads. The criteria for longitudinal loading (jacking forces) on the pipe and joints shall be determined by the contractor, based on the selected method of construction.

2. The jacked pipe shall be designed to withstand the thrust from the MTBM, TBM, PTMT or shield and pipe advance without damage or distortion. The propulsion jacks shall be configured so that the thrust is uniformly distributed and will not damage or distort the pipe.

3. Take into account loads from handling and storing.

4. The criteria to be used at railroad crossings shall be as specified by the AREA Manual for Railway Engineering and as otherwise specified by the Railroad Agency having jurisdiction. In the design, account for additive loadings due to multiple tracks.

5. The criteria to be used for truck loading shall be HS-20 vehicle loading distributions in accordance with AASHTO and as otherwise specified by the LADOTD.

6. Provide pipes of diameter shown on the Contract Documents. Substitution of pipe with larger diameter to suit MTBM, TBM, or PTMT equipment availability will only be permitted if the Contractor can demonstrate to the Engineer's satisfaction that design flows and velocities can be achieved.

7. All tunneled pipes 36-inches in diameter or larger shall have grout injection ports built into the pipe at the 12 o'clock position for pumping slurry during the pipe installation and for grouting the annular space once the tunneling is complete.

b. **Tunnel Shafts:**

1. Shaft design must include allowance for contractor's equipment and stored material and spoil stockpile as appropriate. Design must also allow for HS-20 highway loading if located in the vicinity of a paved area.

2. The shaft shall be designed to withstand full hydrostatic head without failure.

3. Shaft located within the 100-year floodplain shall be designed with a water retaining liner extending 2 feet above the 100-year flood elevation. It is acceptable if liner is stored at the site for immediate installation in lieu of its being installed at the shaft, provided that the shaft liner extends at least 2 feet above existing ground elevation.

4. Shaft cover, if used in lieu of shaft perimeter security fencing, shall be designed for a minimum 25 pounds per square foot distributed load plus a 300-pound point load.

5. Steel plate deck, if such is required, shall be designed for HS-20 loading.

819-2 PRODUCTS:

819-2.1 Sewer Pipe:

a. Contractor shall be responsible for selecting appropriate pipes and pipe joints to safely carry the loads imposed during construction, including jacking forces. The Contractor shall select approved pipe materials from the QPL and conforming with the following Sections:

1.	Vitrified Clay Pipe	1016-1.5
2.	Fiberglass Reinforced Polymer (FRP)	1016-1.6
3.	Polymer Concrete Pipe	1016-1.7

b. Use pipe that is round with a smooth, even outer surface, and has joints that allow for easy connections between pipes. Pipe ends shall be designed so that jacking loads are evenly distributed around the entire pipe joint and such that point loads will not occur when the pipe is installed. Pipe used for pipe jacking shall be capable of withstanding all forces that will be imposed by the process of installation, as well as the final in-place loading conditions. Protect the driving ends of the pipe and joints against damage.

819-2.2 Slurry:

a. Slurry will be a mixture of water and bentonite clay. The fluid will be inert. The fluid should remain in the tunnel to ensure the stability of the tunnel, reduce drag on the jacked pipe, and provide backfill within the annulus of the pipe and tunnel.

b. Disposal of excess slurry and spoils will be the responsibility of the Contractor who must comply with all relevant regulations, right-of-way, workspace, and permit agreements. Excess slurry and spoils will be disposed at an approved location. The Contractor is responsible for transporting all excess slurry and spoils to the disposal site and paying any disposal costs. Excess slurry and spoils will be transported in a manner that prevents accidental spillage onto roadways. Excess slurry and spoils will not be discharged into sanitary or storm drain systems, ditches or waterways.

c. Mobile spoils removal equipment capable of quickly removing spoils from the Microtunneling machine face will be present during drilling operations to fulfill the requirements of item b. above.

d. The Contractor will be responsible for making provisions for a clean water supply for the mixing of the slurry.

819-2.3 Grouting Materials: Prepare mixes that satisfy the required application. Materials used in grout mix shall meet the following standards:

a. Cementitious Material:

1. Portland Cement: ASTM C 150, Type II, unless the use of Type III is authorized by the Engineer; or ASTM C 595, Type IP. For concrete in contact with sewage use Type II cement.

2. When aggregates are potentially reactive with alkalis in cement, use cement not exceeding 0.6 percent alkali content in the form of $Na_2O + 0.658K_20$.

b. Water: Clean, free from harmful amounts of oils, acids, alkalis, or other deleterious substances, and meeting requirements of ASTM C 94.

c. Fine Aggregate: ASTM C 33. Determine the potential reactivity of fine aggregate in accordance with the Appendix to ASTM C 33.

d. Fluidifier: Use a fluidifier meeting ASTM C 937 that holds the solid constituents of the grout in colloidal suspension and is compatible with the cement and water used in the grouting operations.

e. Admixtures:

1. Use admixtures meeting ASTM C 494 and ASTM C 1017 as required, to improve pumpability, to control time of set, to hold sand in suspension and to reduce segregation and bleeding.

2. For cellular grout, do not use foam or admixtures that promote steel corrosion.

3. Ensure that admixtures used in a mix are compatible. Provide written confirmation from the admixture manufacturers of their compatibility.

f. Water Reducers: ASTM C 494, Type A.

1. Water Reducing Retarders: ASTM 494, Type D.

2. High Range Water Reducers (Superplasticizers): ASTM C 494, Types F and G.

g. Prohibited Admixtures: Admixtures containing calcium chloride, thiocyanate, or materials that contribute free chloride ions in excess of 0.1 percent by weight of cement.

h. Grout Type Applications.

1. Grout for pressure grouting and back grouting: Sand-cement mortar mix.

2. Grout for annular grouting: Low density (cellular) grout or sand-cement mortar mix.

3. Ground stabilization: Sand cement mortar mix.

i. Do not include toxic or poisonous substances in the grout mix or otherwise inject such substances underground.

j. Provide grout that meets the following minimum requirements:

1. Minimum 28-day unconfined compressive strength: 1000 psi for sand- cement mortar grout; 300 psi for cellular grout.

2. Determine strength by ASTM C 942.

819-3 GENERAL EXECUTION:

819-3.1 Construction Operations Criteria:

a. Use methods for microtunneling and pipe-jacked tunneling operations that will minimize ground settlement. Select a method which will control flow of water and prevent loss of soil into the tunnel and provide stability of the face under anticipated conditions.

b. The Pilot Tube Microtunneling system shall utilize a two or three phase system as described below:

1. Three Pass System

i. Phase 1 – A rigid steel pilot tube in approximately one-meter lengths shall

be installed through the ground from the drive shaft to the receiver shaft by earth displacement with the jacking frame. The alignment of the pilot tube shall be established with a theodolite mounted at the rear of the drive shaft and accurately set to the desired line and grade. The theodolite shall view a lighted target in the lead or steering pilot tube. A camera shall be fitted to the theodolite and shall transmit the image of the crosshair and the target onto a monitor screen to be viewed in the drive shaft by the operator. As the operator advances the pilot tube through the earth the center of the target will drift from the crosshair as a result of the biased or slanted leading tip of the pilot tube. The operator shall rotate the pilot tube as required to orient the slanted steering tip toward the crosshair and continue to advance the pilot tube until it reaches the receiver shaft.

ii. Phase 2 – An enlargement casing with an outside diameter up to 1 ½" larger than the product pipe shall be rigidly connected to the final pilot tube and advanced into the earth behind the pilot tube. An auger shall be used inside the enlargement casing to remove the material being excavated. The auger shall be contained inside the limits of the enlargement casing as it progresses along the proposed alignment. A train of temporary steel casings with an outside diameter very similar to the enlargement casing and used to move the enlargement casing from the drive shaft to the receiver shaft. The enlargement casing will cut a bore hole from the drive shaft to the receiver shaft and the temporary casings will case the hole as it is cut. Each temporary casing shall be fitted with an internal auger to transport the excavated material to the drive shaft where it shall be removed from the shaft and disposed of at an approved location. The pilot tubes shall be recovered in the receiver shaft as the temporary casings are installed.

iii. Phase 3 – The product pipe shall then be installed directly behind the final temporary casing pipe with the jacking frame. The casing pipes and augers shall be recovered in the receiver shaft as the product pipe is installed.

2. Two Pass System

i. Phase 1 – The pilot tube shall be installed in the same manner described Phase 1 of the Three Pass System.

ii. Phase 2 – The enlargement casing shall be installed in the same manner described in Phase 2 of the Three-Phase System. Each product pipe shall be fitted with an internal protective-casing pipe to house the auger and prevent damage to the product pipe. The product pipe shall be installed directly behind the enlargement casing with the internal casing rigidly connected to the auger chamber of the enlargement casing. The internal casing shall be manufactured such that the excavated material does not leak excessively into the product pipe. The internal casing shall be fitted with a protective shoe to protect the product pipe from damage and to support the casing and auger at the centerline of the pipe. The product pipe shall be advanced along the proposed alignment with the jacking frame thus progressing the enlargement casing from the drive shaft to the receiver shaft with the pilot tubes being recovered in the receiver shaft. The excavated material shall be funneled into and

conveyed through the internal casing to the drive shaft where it shall be removed from the shaft and disposed of at an approved location. Upon reaching the receiver shaft the enlargement casing shall be removed and the internal casings and augers retracted and recovered at the drive shaft.

c. Conduct tunneling operations in accordance with applicable safety rules and regulations, OSHA standards and Contractor's safety plan. Use methods, which include due regard for safety of workmen, adjacent structures, utilities, and the public.

d. Maintain clean working conditions on the project site.

e. For tunneling under railroad embankments, highways, or streets, perform the installation so as to avoid interference with the operation of the railroads, highways, or streets, except as approved by the owner of the facility.

819-3.2 Location of Tunnel Shafts:

a. The number of tunnel shafts shall be kept to a minimum and shall be typically sited at proposed manhole locations.

b. When shaft sites are indicated on the Contract Documents, the Contractor may alter locations of shaft sites as needed for construction operations. Relocation shall be subject to the Engineer’s approval.

c. Locate shafts and associated work areas to avoid blocking driveways and cross streets, and to minimize disruption to business and commercial interests. Avoid shaft locations near areas identified as residential or potentially contaminated.

d. Locate shafts and associated work areas to avoid any major utility relocations. Any required utility relocations for shaft construction shall be coordinated by Contractor with the utility owner.

e. The Contractor shall verify all existing utilities, pipelines, and structures in the project area, and take all precautions and measures to protect them during the installation, subsequent tunneling and backfilling of the shafts after completion of sanitary sewer installations. Relocation of City-Parish-owned utilities for the construction of temporary shafts are considered incidental to shaft construction and shall be included in the Tunnel Shaft unit price.

f. Plan shaft locations to minimize interference with storm drainage channels, ditches, water mains, sanitary sewers, storm water sewers or culverts, which, if damaged, could result in ground washout or flooding of shafts and tunnels.

819-3.3 Ground Water Control: Provide ground water control measures in conformance with Section 801, when necessary to perform the Work.

819-3.4 Equipment:

a. Full directional guidance of a shield, TBM, or MTBM is a prerequisite of this method of construction.

b. The Contractor shall be responsible for selection of tunneling equipment which,

based on past experience, has proven to be satisfactory for excavation of the soils to be encountered.

c. The Contractor shall employ tunneling equipment that will be capable of handling the various anticipated ground conditions and is capable of minimizing loss of soil ahead of and around the machine and shall provide satisfactory support of the excavated face.

d. The TBM used for pipe-jacking shall conform to the shape of the tunnel with a uniform perimeter that is free of projections that could produce over- excavation or voids. An appropriately sized overcutting head may be provided to facilitate steering. In addition it shall:

    1. Be capable of full face closure.

    2. Be equipped with appropriate seals to prevent loss of bentonite lubricant.

    3. Be capable of correcting roll by reverse drive or fins.

    4. Be designed to handle adverse ground conditions including ground water inflow.

    5. Be equipped with visual display to show the operator actual position of TBM relative to design reference.

e. If a hand shield is used for pipe-jacked tunneling (with or without attached mechanized excavating equipment), the shield must be capable of handling the various anticipated ground conditions. In addition, the shield shall:

    1. Conform to the shape of the tunnel with a uniform perimeter that is free of projections that could produce over-excavation or voids. An appropriately-sized overcutting head may be provided to facilitate steering.

    2. Be designed to allow the face of the tunnel to be closed by use of gates or breasting boards without loss of ground.

f. In the case of MTBM, use a spoil transportation system which:

    1. Either balances the soil and ground water pressures by the use of a slurry or earth pressure balance system; system shall be capable of adjustments required to maintain face stability for the particular soil condition and shall monitor and continuously balance the soil and ground water pressure to prevent loss of slurry or uncontrolled soil and ground water inflow, or, in the case of a slurry spoil transportation system:

        i. Provides pressure at the excavation face by use of the slurry pumps, pressure control valves, and a flow meter.

        ii. Includes a slurry bypass unit in the system to allow the direction of flow to be changed and isolated, as necessary.

        iii. Includes a separation process designed to provide adequate separation of the spoil from the slurry so that slurry with sediment content within the limits required for successful tunneling can be returned

to the cutting face for reuse. Appropriately contain spoil at the site prior to disposal.

iv. Uses the type of separation process suited to the size of tunnel being constructed, the soil type being excavated, and the workspace available at each work area for operating the plant.

v. Allows the composition of the slurry to be monitored to maintain the slurry weight and viscosity limits required.

2. In the case of a cased auger earth pressure balance system, the system shall be capable of adjustments required to maintain face stability for the particular soil condition to be encountered. Monitor and continuously balance the soil and ground water pressure to prevent loss of soil or uncontrolled ground water inflow.

   i. In a cased auger spoil transportation system; manage the pressure at the excavation face by controlling the volume of spoil removal with respect to the advance rate. Monitor the speed of rotation of the auger flight, and the addition of water.

3. Provide an MTBM which includes a remote control system with the following features:

   i. Allows for operation of the system without the need for personnel to enter the tunnel. Has a display available to the operator, at a remote operation console, showing the position of the shield in relation to a design reference together with other information such as face pressure, roll, pitch, steering attitude, valve positions, thrust force, and cutter head torque; rate of advance and installed length.

   ii. Integrates the system of excavation and removal of spoil and its simultaneous replacement by pipe. As each pipe section is jacked forward, the control system shall synchronize all of the operational functions of the system.

4. Provide an MTBM that includes an active direction control system with the following features:

   i. Controls line and grade by a guidance system that relates the actual position of the MTBM to a design reference (e.g., by a laser beam transmitted from the jacking shaft along the pipe to a target mounted in the shield).

   ii. Provides active steering information that shall be monitored and transmitted to the operating console.

   iii. Provides positioning and operation information to the operator on the control console.

5. Use generator which is suitably insulated for noise reduction in residential or commercial areas. Use of generator must be in accordance with City/Parish noise ordinance.

g. In the case of PTMT the following are minimum major components required:

1. Line and Grade Control System – The control system shall include but not be limited to a theodolite, lighted target, camera, and monitor screen. The equipment must be capable of installing the pipe to the desired line and grade with a tolerance described in Section 819-3.9

2. Jacking Frame – The jacking frame shall possess adequate strength to advance the pilot tube, the enlargement casing and the string of product pipe from the drive shaft to the receiver shaft. The jacking force shall be easily regulated down to the safe working load rating of the pipe. The frame shall develop a uniform distribution of jacking forces on the end of the pipe. The auger motor shall possess adequate torque to steer the pilot tube and adequate torque and speed to effectively auger the excavated material from the face of the bore to the drive shaft.

3. Pilot Tube – The pilot tubes shall be constructed of steel in rigid but short sections to accommodate the small drive and receiver shafts. The tubes shall rigidly connect to each other, the steering tip and the enlargement casing and have a clear inside diameter large enough to adequately view the lighted target. The tubes shall withstand the torque encountered in the steering process.

4. Enlargement Casing – The enlargement casing shall be constructed of steel to a diameter just larger than the product pipe and have a leading connection compatible with the pilot tube. The leading face of the casing shall possess several large openings for the soil to enter as it advances along the proposed alignment. An internal auger chamber shall funnel the excavated material into the temporary full diameter casings of the Three-Phase Process or into the internal auger casings of the Two-Phase Process. Structural members shall connect the leading edge of the casing to the pilot tube connections.

5. Soil Transportation System – The soil transportation system shall consist of an auger train operating inside the full diameter temporary steel casings of the Three-Phase System and an internal casing and auger train operating inside the product pipe. The internal casings of the Two-Phase Process shall be manufactured to minimize leakage of the excavated material into the product pipe.

6. Soil Removal – A soil removal system shall be provided to safely remove the excavated material from the drive shaft to the surface.

7. Hydraulic Power Unit – The hydraulic power unit shall rest on the surface and be connected to the jacking frame by hoses. The unit shall meet all applicable noise standards.

8. Lubrication System – A lubrication system shall be employed to minimize pipe friction to insure that pipe can be installed from the drive shaft to the receiver shaft within the safe working load rating of the pipe. The system may also be required to minimize the torque required to transport the excavated material to the drive shaft.

h. Provide a pipe jacking system with the following features:

1. Has the main jacks mounted in a jacking frame located in the starting shaft.

2. Has a jacking frame which successively pushes a string of connected pipes following the tunneling excavation equipment towards a receiving shaft.

3. Has sufficient jacking capacity to push the tunneling excavation equipment and the string of pipe through the ground. Incorporate intermediate jacking stations, if required.

4. Develops a uniform distribution of jacking forces on the end of the pipe by use of spreader rings and packing, measured by operating gauges.

5. Provides and maintains a pipe lubrication system at all times to lower the friction developed on the surface of the pipe during jacking.

i. Use thrust reactions for pipe jacking that are adequate to support the jacking pressure developed by the main jacking system. Special care shall be taken when setting the pipe guide rails in the jacking shaft to ensure correctness of the alignment, grade, and stability.

j. Provide equipment to maintain proper air quality of manned tunnel operations during construction in accordance with OSHA requirements.

k. Enclose lighting fixtures in watertight enclosures with suitable guards. Provide separate circuits for lighting, and other equipment.

l. Electrical systems shall conform to requirements of National Electrical Code – NFPA 70.

819-3.5 Pipe-Jacked Tunneling Data:

a. Maintain shift logs of construction events and observations. The Engineer shall have access to the Contractor's logs with regard to the following information:

1. Location of boring machine face or shield by station and progress of tunnel drive during shift.

2. Hours worked per shift on tunneling operations.

3. Completed field forms for checking line and grade of the tunneling operation, showing achieved tolerance relative to design alignment. Steering control logs will generally be acceptable.

4. Maximum pipe jacking pressures per drive.

5. Location, elevation and brief soil descriptions of soil strata.

6. Ground water control operations and piezometric levels.

7. Observation of any lost ground or other ground movement.

8. Any unusual conditions or events.

9. Reasons for operational shutdown in the event a drive is halted.

819-3.6 Tunnel Shaft Construction:

a. Ground support systems shall be in accordance with the following:

1. Liner elements, bracing and shoring structural members shall be installed at the locations and in the method sequence and tolerances defined on shaft construction drawings as the excavation progresses.

2. The bracing and shoring shall be in contact with the liner to provide full support as shown in shaft construction drawings. Any modifications to liner, bracing and shoring shall be evaluated, checked and approved by Contractor's Professional Engineer, and submitted to the Engineer.

3. A seal slab shall be installed as soon as final depth and stable bottom conditions have been reached and accepted by the Engineer. The seal slab shall be capable of withstanding the full piezometric pressure, either by pressure relief using under drains, or in the case of more permeable ground condition, by the use of a structural reinforced slab. In either case, the seal slab shall be constructed in accordance with the design provided by the Contractor’s Professional Engineer.

4. The entire shaft shall be designed and constructed to appropriate factors of safety against yield, deformation, or instability as determined by Contractor's Professional Engineer, and shall withstand a full hydrostatic head without failure.

5. Special framing, bracing or shoring required around tunnel "eyes" or other penetrations shall be in-place according to shaft construction drawings before the liner or any bracing or shoring at the penetration is cut or removed.

6. Conduct annular space grouting in accordance with Subsection 819-3.8.

b. Install suitable thrust or reaction blocks as required for pipe jacking equipment.

c. Provide drainage from shafts while work is in progress and until adjacent pipe joints have been sealed and the shaft is backfilled. Conform to the requirements with Section 801.

d. Divert surface water runoff and discharge from dewatering system away from the shaft. Protect the shafts from infiltration or flooding.

e. Each surface work site is to be surrounded by a security fence, which shall be secure at any time the site is unattended by Contractor’s personnel.

f. In addition to the above, the shaft, when not in use shall be protected by a second security fence at the perimeter of the shaft, or alternatively by a cover designed in accordance with Subsection 819-1.6.b.

g. A shaft which is constructed more than 60 days in advance of its intended use shall be covered by a steel plate deck designed by the Contractor’s Professional Engineer, and the surface restored to permit full traffic flow during the time the shaft is not in use. All other Contractor’s material including portable concrete traffic

barriers, traffic control system, fencing and other materials and equipment must be removed from the site and reinstalled at the time the shaft is re-opened for use.

h. Backfill and compaction of the shaft shall be provided in accordance with Section 801. Grouting of manhole or structure annular space in accordance with Subsection 819-3.8, will be permitted in cases where insufficient workspace exists.

i. Remove the shaft liner above the level of 8 feet below ground surface, unless otherwise indicated on the Contract Documents. Maintain sufficient ground support to meet excavation safety requirements while removing the shaft structure.

j. A CLSM backfill may be used by the Contractor for backfill of Tunnel Shafts. CLSM backfill shall be in accordance with Section 801.

819-3.7 Excavation and Jacking of Pipe:

a. Tunnel Excavation:

1. Keep tunnel excavation within the servitudes and rights-of-way indicated on the Contract Documents and to the lines and grades designated on the Contract Documents.

2. Perform tunneling operations in a manner that will minimize the movement of the ground in front of and surrounding the tunnel. Prevent damage to structures and utilities above and in the vicinity of the tunneling operations.

3. Open-face excavations:

i. Keep the face breasted or otherwise supported and prevent falls, excessive raveling, or erosion. Maintain standby face supports for immediate use when needed.

ii. During shut-down periods, support the face of the excavation by positive means; no support shall rely solely on hydraulic pressure.

4. Closed-face excavation:

i. Carefully control volume of spoil removed. Advance rate and excavation rate to be compatible to avoid over excavation or loss of ground.

ii. When cutting head is withdrawn or is open for any purpose, keep excavated face supported and stabilized.

5. Excavated diameter should be a minimum size to permit pipe installation by jacking with allowance for bentonite injection into the annular space.

6. Whenever there is a condition encountered which could endanger the tunnel excavation or adjacent structures, operate without intermission including 24-hour working, weekends and holidays, until the condition no longer exists.

7. The Contractor shall be responsible for damage due to settlement from any construction-induced activities. Replacement of all damaged areas shall be the responsibility of the Contractor at no additional cost to the Owner.

b. Pipe Jacking:

i. Cushion pipe joints as necessary to transmit the jacking forces without damage to the pipe or pipe joints.

ii. Maintain an envelope of bentonite slurry around the exterior of the pipe during the jacking and excavation operation to reduce the exterior friction and possibility of the pipe seizing in place.

iii. If the pipe seizes up in place and the Contractor elects to construct a recovery access shaft, approval must be obtained from the Engineer. Coordinate traffic control measures and utility adjustments as necessary prior to commencing work.

iv. In the event a section of pipe is damaged during the jacking operation, or joint failure occurs, as evidenced by inspection, visible ground water inflow or other observations, the Contractor shall submit for approval his methods for repair or replacement of the pipe. Any pipe damaged or misaligned shall be removed and replaced by the Contractor at no additional cost to the Owner.

v. Overcutting shall be remedied by grouting along the entire length of the installation.

vi. All tunneled pipes 36-inches in diameter or larger shall have grout injection ports built into the pipe at the 12 o'clock position for pumping slurry during the pipe installation and for grouting the annular space once the tunneling is complete.

819-3.8 Grouting:

819-3.8.1 Preparation:

a. Notify the Engineer at least 24 hours in advance of grouting operations.

b. Select and operate grouting equipment to avoid damage to new or existing underground utilities and structures.

c. In selection of grouting placement consider pipe flotation, length of pipe, length of tunnel, depth from surface, and type of sewer pipe, type of pipe blocking and bulkheading, grout volume and length of pipe to be grouted between bulkheads.

d. The Contractor is to ensure there is no water in the annular space between the carrier pipe and the tunnel liner prior to pumping the cellular grout into the annular space.

e. Operate any dewatering systems until the grouting operations are complete.

819-3.8.2 Equipment:

a. Batch and mix grout in equipment of sufficient size and capacity to provide the necessary quality and quantity of grout for each placement stage.

b. Use equipment for grouting of a type and size generally used for the work, capable of

mixing grout to a homogeneous consistency, and providing means of accurately measuring grout component quantities and accurately measuring pumping pressures. Use pressure grout equipment, which delivers grout to the injection point at a steady pressure.

819-3.8.3 Pressure Grouting for Jacked or Pulled Pipe:

a. For jacked pipe 60 inches in diameter or greater, pressure grout the annulus after installation, displacing the bentonite lubrication. Jacked or pulled pipes less than 60- inch diameter may be left ungrouted unless the excavated diameter exceeds the external pipe diameter by more than one inch.

b. Inject grout through grout holes in the sewer pipe. Drilling holes from the surface or through the carrier pipe walls is not allowed. Perform grouting by injecting it at the pipe invert with bentonite displacement occurring through a high point tap or vent.

c. Control ground water as necessary to permit completion of grouting without separation of the grout materials.

d. Limit pressures to prevent damage or distortion to the pipe or to keep flexible pipe within acceptable tolerances.

e. Pump grout until material discharging is similar in consistency to that at point of injection.

819-3.8.4 Pressure Grouting for Shaft Liner:

a. If required, perform grouting operations to fill voids outside of the shaft liner.

b. For nonexpendable primary liners installed by hand mining or in shafts, grout once every 4 feet or more frequently if conditions dictate.

c. Control grout pressures so that shaft liner is not overstressed, and ground heave is avoided.

d. For liner requiring grout, perform back grouting once each shift, or more often if required to ensure that all voids are filled.

819-3.8.5 Ground Stabilization Grouting:

a. Completely fill voids outside the limits of excavation caused by caving or collapse of ground. Fill with gravity or pressure injected sand-cement grout as necessary to fill the void.

b. Take care in grouting operations to prevent damage to adjacent utilities or public or private property. Grout at a pressure that will not distort or imperil any portion of the work or existing installations or structures.

c. Verify that the void has been filled by volumetric comparisons and visual inspection. In the case of settlement under existing slabs, take cores as directed by the Engineer, at no additional cost to the Owner, to demonstrate that the void has been filled.

819-3.8.6 Field Quality Control:

a. Pressure Grouting for Shaft Liners. For each shaft, make one set of four compressive test specimens for each 30-foot depth and one set for any remaining portion less than a 30-foot increment.

b. Pressure Grouting for Jacked Pipe. Make one set of four compressive test specimens for every 400 feet of jacked pipe pressure grouting.

c. Pressure Grouting for Pulled Pipe. Make one set of four compressive test specimens for every 400 feet of pulled pipe pressure grouting.

d. Ground Stabilization Grouting. Make one set of four compressive test specimens for every location where ground stabilization grouting is performed.

819-3.9 Control of Line and Grade:

a. Construction Control:

1. Contractor shall check baselines and control points at the beginning of the Work and report any errors or discrepancies to the Engineer.

2. Use the baselines and control points indicated on the Contract Documents to establish and maintain construction control points, reference lines and grades for locating tunnel, sewer pipe, and structures. These control points are given to assist the Contractor and if deemed necessary the Contractor should establish additional control points or benchmarks in order to perform the work accurately.

3. Establish construction control points sufficiently far from the work so as not to be affected by ground movement caused by pipe-jacked tunneling operations.

b. Bench Mark Movement. The Contractor shall ensure that if settlement of the ground surface occurs during construction which affects the accuracy of the temporary benchmarks the Contractor shall detect and report such movement and reestablish temporary bench marks.

c. Line and Grade.

1. Check and record the survey control for the tunnel against an above-ground undisturbed reference at least once for each 250 feet of tunnel constructed.

2. Record the exact position of the MTBM, TBM, PTMT or shield after each shove to ensure the alignment is within specified tolerances. Make immediate correction to alignment before allowable tolerances are exceeded.

3. When excavation is off line or grade, make alignment corrections to avoid reverse grades in gravity sewers. A belly in the tunnel which will hold water is not acceptable and shall be replaced at no additional cost to the Owner.

i. The sewer pipe shall not vary more than plus or minus one inch (1) in elevation or plus or minus six inches (6) horizontally from the established line and grade (as shown on the Contract Documents) at any point between manholes, including the receiving end. The installed

pipe shall not hold water.

ii. Pipe installed outside tolerances and subsequently abandoned shall first be fully grouted.

819-3.10 Monitoring:

a. Instrumentation Monitoring. Instrumentation specified shall be accessible at all times to the Engineer. Readings shall be submitted promptly to the Engineer.

1. Install and maintain an instrumentation system to monitor and detect movement of the ground surface and adjacent structures. Establish vertical control points at a distance from the construction areas that avoids disturbance due to ground settlement.

2. Installation of the instrumentation shall not preclude the Engineer, through an independent contractor or consultant, from installing instrumentation in, on, near, or adjacent to the construction work. Access shall be provided to the work for such independent installations.

3. Instruments shall be installed in accordance with the Contract Documents and the manufacturer's recommendations.

4. Monitoring locations given on the Contract Documents are not inclusive and are given to assist the Contractor. Additional locations may need to be established by the Contractor. The Contractor is responsible for all construction induced ground movement and the monitoring thereof.

b. Surface Settlement Monitoring

1. Establish monitoring points on all critical structures.

2. Minimum monitoring points are indicated on the Contract Documents.

3. Record location of settlement monitoring points with respect to construction baselines and elevations. Record elevations to an accuracy of 0.01 feet for each monitoring point location. Monitoring points should be established at locations and by methods that protect them from damage by construction operations, tampering, or other external influences.

4. Ground surface elevations shall be recorded on the centerline ahead of the tunneling operations at a minimum of 100-foot intervals or at least three locations per tunnel drive. For sewers greater than 60-inch diameter, also record similar data at approximately 20 feet each side of the centerline. Settlement monitoring points must be clearly marked by studs or paint for ease of locating.

5. Monitoring points to measure ground elevation are required at a distance of 0 feet, 10 feet and 20 feet from the perimeter of the shaft on each of four radial lines, the radial lines being at 90 degrees to each other.

6. Railroads. Monitor ground settlement of track subbase at centerline of each track.

7. Utilities and Pipelines. Monitor ground settlement directly above and 10 feet before and after the utility or pipeline intersection.

c. Reading Frequency and Reporting. The Contractor shall submit to the Engineer, records of readings from the various instruments and survey points.

1. Instrumentation monitoring results to be read at the frequency specified and unless otherwise specified, shall be started prior to the zone of active excavation reaching that point, and shall be continued until the zone of active excavation has passed and until no further detectable movement occurs.

2. Surface settlement monitoring readings shall be taken:

i. Prior to the zone of active excavation reaching that point,

ii. When the tunnel face reaches the monitoring point (in plan), and

iii. When the zone of active excavation has passed and no further movement is detected.

3. All monitoring readings shall be submitted promptly to the Engineer.

4. Immediately report to the Engineer any movement, cracking, or settlement which is detected.

5. Following completion but prior to final acceptance, make a final survey of all monitoring points.

819-4 DISPOSAL OF EXCESS MATERIAL: Remove spoil in accordance with Section 801.

819-5 ACCEPTANCE TESTING: Acceptance testing and inspection is to be carried out by methods described in Section 802.

819-6 SITE RESTORATION: All surfaces affected by the Work shall be restored to their preconstruction conditions. Performance criteria for restoration work will be similar to those employed in traditional open excavation work as described in Section 903.

819-7 POST CONSTRUCTION EVALUATION:

a. The Contractor shall provide a set of Field Record Drawings including both alignment and profile to the Engineer. Drawings should be developed from actual field readings. Raw data should be available for submission at any time upon request. As part of the Field Record Drawing, the Contractor shall specify the tracking equipment used, including method of confirmatory procedure used to ensure the data was captured. Field Record Drawings having survey data shall be stamped by a Professional Land Surveyor registered in the State of Louisiana.

b. All fittings, valves, manholes, connections, etc., including all critical structure monitoring points as shown on Contract Documents, shall be located by GPS and based on the Louisiana State Plane - South coordinate system as shown on Contract Documents and shall be provided on the Field Record Drawings. No landmarks shall be used. The record drawings shall be stamped by a Professional Land Surveyor registered in the State of Louisiana.

819-8 MEASUREMENT:

a. **Microtunneled Pipe:** Measurement for the installation of microtunneled sewer pipe shall be made horizontally, on a linear foot basis, for various sizes listed in the Bid Form, as designated on the Contract Documents; and to the end of stubs or the termination of the pipe; and to the inside face of pump station and treatment plant works.

b. **Tunnel Shaft:** Measurement for tunnel shafts (includes entry and receiving pits and any construction access shafts) utilized to facilitate construction of the proposed sanitary sewer by tunneling (regardless of method) shall be on a lump sum basis, as specified in the Contract Documents.

819-9 PAYMENT:

a. **Microtunneled Pipe:** Payment for this Item shall be full compensation for pipe and fittings, sewer flow control, plugging and bypass, connections to existing pipe and service lines when no separate payment is made under another Bid Item, jointing, bedding, traffic control, testing, and clean-up in accordance with the Specifications; and all else incidental thereto for which separate payment is not provided under any other item in the Bid Form.

b. **Tunnel Shaft:**

1. Payment for this Item shall be made at the contract lump sum price, as specified in the Contract Documents. This payment shall be full compensation for labor, equipment, submittals, materials and supervision for the construction and excavation of the proposed shafts (regardless of size, type and number of shafts), complete in place, including traffic control, disposal of excess materials, bedding, backfill and compaction, surface restoration (including sawcutting, pavement removal and replacement) monitoring (including associated instrumentation and premonitoring activity) as per specifications, protection of existing structures and utilities (gas, water, sanitary sewer, power, telephone), utility adjustments, sheeting, shoring or bracing, dewatering, grouting (if required), cleanup, ground support systems, post construction evaluation; and all else incidental thereto for which separate payment is not provided under any other item in the Bid Form.

2. The Contractor, prior to construction shall provide a schedule of values. On this schedule of values, the Contractor shall itemize the cost by station, diameter and depth for each tunnel shaft necessary to complete the work and any additional shafts required for construction operations.

819-10 PAY ITEMS:

Pipe Inner Diameter (I.D.) Schedule
(as Shown on Drawings)

A	=	4" Pipe	N	=	27" Pipe
B	=	6" Pipe	O	=	30" Pipe
C	=	8" Pipe	P	=	32" Pipe
D	=	10" Pipe	Q	=	36" Pipe
E	=	12" Pipe	R	=	42" Pipe
F	=	14" Pipe	S	=	48" Pipe

G	=	15" Pipe	T	=	54" Pipe
H	=	16" Pipe	U	=	60" Pipe
I	=	18" Pipe	V	=	64" Pipe
J	=	20" Pipe	W	=	66” Pipe
K	=	21" Pipe	X	=	72” Pipe
L	=	24" Pipe	Y	=	76” Pipe
M	=	26" Pipe	Z	=	80” Pipe

Item No.	Description	Units
819100_	_ _” Microtunneled Pipe	Linear Feet
819110_	_ _” Pilot-Tube Microtunneled Pipe	Linear Feet
8192000	Tunnel Shafts	Lump Sum

SECTION 821
MISCELLANEOUS WORK AND CLEANUP

821-1 SCOPE OF WORK: This Section includes operations which cannot be specified in detail as separate Items, but can be sufficiently described as to the kind and extent of Work involved. The Contractor shall furnish all labor, materials, equipment and incidentals to complete the Work under this Section.

The Work of this Section includes, but is not limited to, the following:

a. Restoring servitudes, rights-of-way and private property.

b. Cleaning up.

c. Incidental work.

821-2 WORK SPECIFIED UNDER OTHER SECTIONS: All Work shall be completed in a workmanlike manner by competent workmen in full compliance with all applicable sections of these Specifications.

821-3 MATERIALS: Materials required for this Section shall be of at least the same type and quality as materials that are to be restored. Where possible, the Contractor shall reuse existing materials that are removed and then replaced, with the exception of paving.

821-4 RESTORING OF FENCES AND GUARD RAILS: At several locations, it may be necessary for the Contractor to remove, store and replace existing fences and guard rails during construction. Only the sections directed by the Engineer or those sections required to access the work site shall be removed. The Contractor shall provide adequate temporary fences and gates if necessary to contain or restrict domesticated and farm animals within their proper areas during the work and shall provide access where and when required. If any section of fence or guard rail is damaged due to the Contractor's negligence, it shall be replaced with fencing or guard rail equal to or better than that damaged, and the Work shall be satisfactory to the Engineer.

821-5 REMOVAL AND REPLACEMENT OF SMALL TREES, SHRUBS, AND LANDSCAPING (ANNUAL, PERENNIAL, AND ORNAMENTAL PLANTINGS): Contractor shall be responsible for removing all trees, shrubs, and landscaping located within the servitude or right-of-way that are in conflict with the required Work. Contractor shall coordinate with the property owner prior to removal and replacement in accordance with Section 7-7.3. Removal of existing trees less than 13 inches in diameter shall be included under this item. Larger diameter trees shall be paid in accordance with Section 201. Tree diameter shall be measured at a location four feet from ground level and approved by the Engineer. Trees, shrubs, and landscaping shall be replaced in kind or of reasonable size (5 gallon minimum, up to 25 gallon for mature growth plantings) as directed by the Engineer.

821-6 RESTORING SERVITUDES, RIGHTS-OF-WAY, AND PRIVATE PROPERTY:

a. When portions of the construction occur in servitudes through private property, the Contractor shall be responsible for all damage to private property due to his operations. Contractor shall protect from damage all walls, fences, cultivated shrubbery, pavement, buildings, signs, underground facilities such as water pipe, sprinkler systems, or other utilities, or other improvements that may be encountered.

If removal and replacement are required, it shall be done in a workmanlike manner so that the replacement is equivalent to that which existed prior to construction. If this is not feasible, a reasonable settlement shall be made with the owner of the damaged property.

b. Existing lawn, pasture or other grassed surfaces damaged by construction shall be regraded and resodded. Contractor shall restore area to ensure positive drainage to and/or through disturbed area. These areas shall be maintained until all Work under this Contract has been completed and accepted.

821-7 CLEANING UP: The Contractor shall remove all construction material, excess excavation, buildings, equipment and other debris remaining on the job as a result of construction operations and shall render the site of the Work in a neat and orderly condition.

821-8 INCIDENTAL WORK: Perform all incidental Work not otherwise specified (such as erosion control when no specific pay items are included), but obviously necessary for the proper completion of the Contract as specified and as shown on the Drawings.

821-9 MEASUREMENT: Measurement for miscellaneous work and cleanup shall be on a lump sum basis or per work order as specified in the Contract Documents.

821-10 PAYMENT: Payment for miscellaneous work and cleanup will be full compensation for furnishing all labor, materials, equipment, and incidentals required to complete the miscellaneous work and cleanup specified herein and/or as shown on the Contract Documents; including restoration of lawns and grasses outside the established pay limits of the slab sod pay item described in Section 903 and replacement of fences outside of public servitudes or rights-of-way; and any other miscellaneous work not specifically included for payment under any other Items in the Bid Form but obviously necessary to complete the Contract and fulfill all requirements of these Specifications and Contract Documents.

Payment under this Item can be made on a monthly basis, based on the percentage of work completed. However, the final payment cannot be made until the Contract is complete

821-11 PAY ITEMS:

Item No.	Item	Unit
8211100	Miscellaneous Work and Cleanup	Each
8211101	Miscellaneous Work and Cleanup	Lump Sum

SECTION 822
PROTECTIVE COATING

822-1 SCOPE OF WORK: The Contractor shall provide surface preparation and protective coatings, complete and in place, in accordance with the Contract Documents.

822-2 GENERAL:

a. References - The following is a list of standards which may be referenced in this Section:

1. American Water Works Association (AWWA):

   i. C203, Coal-Tar Protective Coatings and Linings for Steel Water Pipelines—Enamel and Tape—Hot-Applied.

   ii. C209, Cold-Applied Tape Coatings for the Exterior of Special Sections, Connections, and Fittings for Steel Water Pipelines.

   iii. C213, Fusion-Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines.

   iv. C214, Tape Coating Systems for the Exterior of Steel Water Pipelines.

2. Applicable sections of NACE International (NACE)(approved for field performance testing).

3. NSF International (NSF): 61, Drinking Water System Components - Health Effects.

4. Applicable standard of The Society for Protective Coatings (SSPC) (approved for field performance testing)

5. ACI305R - Hot Weather Concreting.

6. ACI 503R - Use of Epoxy Compounds for Coating Concrete.

7. ASTM B 117 – Standard Practice for Operating Salt Spray Apparatus

8. ASTM C 109 - Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or 50-mm Cube Specimens).

9. ASTM C 579 - Standard Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings and Polymer Concretes

10. ASTM C 496 - Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens

11. ASTM C 868 - Standard Test Method for Chemical Resistance of Protective Linings

12. ASTM D 1014 – Standard Practice for Conducting Exterior Exposure Tests of Paints and Coatings on Metal Substrates

13. ASTM D 4138 - Measurement of Dry Film Thickness of Protective Coating Systems by Destructive Means (approved for field performance testing)

14. ASTM D 4060 – 10 Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser

15. ASTM D 3359 Method B – Standard Test Methods for Measuring Adhesion by Tape Test (approved for field performance testing)

16. ASTM D4285 - Standard Test Method for Indicating Oil or Water in Compressed Air

17. ASTM D 7234 – Test Method for Pull-off Adhesion Strength of Coatings on Concrete Using Portable Pull-Off Adhesion Testers (approved for field performance testing)

18. ASTM D 4541 - Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers (approved for field performance testing)

19. ASTM D 4585 - Standard Practice for Testing Water Resistance of Coatings Using Controlled Condensation

20. ASTM D 4587 - Standard Practice for Fluorescent UV-Condensation Exposures of Paint and Related Coatings

21. ASTM D 2794 - Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)

22. ASTM D4285 - 83(2012) Standard Test Method for Indicating Oil or Water in Compressed Air

23. ASTM G 210 - Standard Practice for Operating the Severe Wastewater Analysis Testing Apparatus

24. International Concrete Repair Institute (ICRI) Technical Guideline No. 03730 - Surface Preparation Guidelines for the Repair of Deteriorated Concrete Resulting From Reinforcing Steel Corrosion (approved for field performance testing)

25. National Association of Corrosion Engineers International, NACE RP 0188 - Discontinuity (Holiday) Testing of Protective Coatings.

26. National Association of Pipe Fabricators, NAPF 500-03 – Surface Preparation Standard for Ductile Iron Pipe and Fittings in Exposed Location Receiving Special External Coatings and/or Special Internal Linings (approved for field performance testing)

b. Definitions

1. The term "paint," "coatings," or "finishes" as used herein, shall include surface

treatments, emulsions, enamels, paints, epoxy resins, and all other protective coatings, excepting galvanizing or anodizing, whether used as a pretreatment, primer, intermediate coat, or finish coat.

2. MDFT: Minimum Dry Film Thickness.

3. MDFTPC: Minimum Dry Film Thickness per Coat.

4. Coverage: Total minimum dry film thickness in mils or square feet per gallon.

5. Mil: Thousandth of an inch.

6. PSDS: Paint System Data Sheet.

7. SFPG: Square Feet per Gallon.

c. The following surfaces shall not be protective coated:

1. Concrete, unless required by items on the concrete coating schedule below or the Drawings.

2. Stainless steel

3. Machined surfaces

4. Grease fittings

5. Glass

6. Equipment nameplates

7. Platform gratings, stair treads, door thresholds, and other walk surfaces unless specifically indicated to be coated.

d. The coating system schedules summarize the surfaces to be coated, the required surface preparation, and the coating systems to be applied. Coating notes on the Drawings are used to show or extend the limits of coating schedules, to show exceptions to the schedules, or to clarify or show details for application of the coating systems.

822-2.1 Compliance with Environmental Regulatory Requirements: Contractor shall comply with all current Federal, State, and Local environmental laws and regulations, including, but not limited to the laws and regulations of the U.S. Environmental Protection Agency (USEPA) and LA Dept. of Environmental Quality.

822-2.2 Protection of Work: The Contractor shall be responsible for any and all damage to his Work or the work of others during the time his Work is in progress.

822-2.3 Right of Rejection: The Owner shall have the right to reject all material or Work that is unsatisfactory, and require the replacement of either or both at the expense of the Contractor.

822-2.4 Pre-job Conference: Prior to commencing Work, a pre-job conference shall be held for the purpose of reviewing and clarifying the painting and coating requirements of the Project. The Contractor, coating applicator, Coating Manufacturer's representative, Engineer and Engineer's third

party assurance inspector shall be present. This meeting shall be scheduled upon completion of coating shop drawing review but at least 7 days prior to surface preparation. A schedule of work to be accomplished will be established.

822-2.5 Warranty: In accordance with Section 4-6, Contractor shall provide a one (1) year warranty against failure of any kind of all coatings. Warranty period shall commence on the date of final acceptance. Failure of any coating during the warranty period shall be repaired by the Contractor who shall absorb all costs related to the accepted repair of the coating. All defective Work shall be repaired in accordance with this Specification and to the satisfaction of the Engineer.

822-3 SUBMITTALS:

a. **General:** Submittals shall be furnished in accordance with Subsection 5-8, unless indicated otherwise below.

b. Submittals shall include the following information and be submitted at least 30 days prior to protective coating work:

1. **Coating Materials List:** Six copies of a coating materials list showing the Manufacturer and the coating number keyed to the coating systems herein.

2. **Coating Manufacturer's Information:** For each coating system to be used, the following data:

i. Coating Manufacturer's Paint System Data Sheet (PSDS) for each system proposed, including statements on the suitability of the material for the intended use.

ii. Technical and performance information that demonstrates compliance with the system performance and material requirements.

iii. Coating Manufacturer's instructions and recommendations on surface preparation and application.

iv. Colors available for each product (where applicable).

v. Compatibility of shop and field applied coatings (where applicable).

vi. Material Safety Data Sheet for each product used.

3. **Reference Panels:**

i. Prior to start of surface preparation, furnish a 4-inch by 4-inch steel panel for each grade of sandblast specified herein, prepared to specified requirements.

ii. Provide panel representative of the steel used and prevent deterioration of surface quality.

iii. The panels will be used as a reference for quality control inspections by the engineer.

4. Provide five (5) references that show that the coating subcontractor has previous successful experience with the indicated or comparable coating

systems. Include the name, address, and the telephone number for the owner of each installation for which the painting subcontractor provided the protective coating.

c. **Quality Control Submittals**:

1. Factory Applied Coatings: Manufacturer's certification stating factory applied Coating system meets or exceeds specified requirements.

2. If the manufacturer of finish coating differs from that of the shop primer, provide both manufacturers' written confirmation that materials are compatible.

3. Manufacturer's written instructions and special details for application of each system.

4. Contractor's Quality Control Plan in accordance with subsection 822-4.

5. Contractor's Daily Activity Reports in accordance with subsection 822-4.

d. **Manufacturer's Certification:** For all coating systems, the Contractor shall require the coating manufacturer to certify in writing to the following:

1. The manufacturer's representative has provided on-site instruction in the proper surface preparation, use, mixing, application, and curing of the coating systems.

2. The manufacturer's representative has personally observed and endorsed the start of surface preparation, mixing and application of the coating materials.

3. Written certification from the selected coating product manufacturer must be provided for each of the specified coating systems. This certification shall clearly state the product, applicator and site specific service conditions when the manufacturer certifies their acceptance of the applicator. This certification is to be submitted with the coating product shop drawings. Shop drawings will be deemed incomplete without this certification.

e. **Mockup**:

1. **<u>Before</u> application of any coating or coating system, a performance mockup approved by the manufacturer shall be provided by the Contractor. The performance mockup shall finish one complete space or item of each color scheme required showing selected colors, finish texture, materials, quality of work, and special details.** The mockup shall be subjected to all field performance testing stipulated.

2. After Engineer review and Manufacturer approval, mockup area shall serve as a standard for similar work throughout the project.

3. Accepted mockup area may remain as part of the Work.

822-4 QUALITY CONTROL: Quality control of the Work is solely the responsibility of the Contractor. The Engineer's third party quality assurance inspector and/or the manufacturer's representative are not meant to serve as the Contractor's quality control.

a. The Contractor shall complete his own quality control such as spark testing (Low and High voltage), Dry Film Thickness, adhesion, and others in accordance with the manufacturer's recommendations prior to requesting a final inspection by the Engineer and manufacturer's representative.

b. The Contractor shall submit a Quality Control Plan as part of the shop drawing review process including but not limited to the following:

    1. Provide documented evidence of qualified personnel.
    2. Surface preparation procedure such as methodology, abrasive media to be used, blast pressure and source
    3. Methods and/or equipment for environmental and atmospheric controls.
    4. Protective coating application such as methodology, mixing, thinning, etc.
    5. Examination, measurements or tests to be conducted.
    6. Verification and acceptance criteria for individual tests.
    7. Mandatory inspection surveillance points, witness points, and hold points.
    8. Methods for documenting inspection findings.
    9. Methods to identify conformance or rejection of work in process.
    10. Methods to ensure that corrective actions are re-inspected.
    11. Criteria for final acceptance

c. The Contractor is required to maintain daily (typed) activity reports. Copies of these reports shall be submitted to the Engineer on a weekly basis. Copies of these reports shall also be available onsite. Items including but not limited to the following shall be logged on a daily basis.

    1. Personnel on site.
    2. Ambient conditions in close proximity of actual application including but not limited to humidity, ambient temperature, surface temperature and dew point starting at the commencement of the work, every two hours after and at the completion of the work.
    3. Surface conditions.
    4. Work performed.
    5. Batch numbers and amount of coating materials applied.
    6. Inspections made and actions taken to correct nonconforming work.

822-5 PRODUCTS:

822-5.1 General:

a. **Suitability:** The Contractor shall use suitable coating materials as recommended by the Manufacturer. The materials used shall be designed, manufactured and intended for industrial, water, and wastewater industries.

b. **Compatibility:** In any coating system only compatible materials from a single Manufacturer shall be used in the work. Particular attention shall be directed to compatibility of primers and finish coats. If necessary, a barrier coat shall be applied between existing prime coat and subsequent field coats to ensure compatibility.

c. **Containers:** Coating materials shall be sealed in containers that plainly show the designated name, formula or specification number, batch number, color, date of manufacture, expiration date, and name of manufacturer, all of which shall be plainly legible at the time of use.

d. **Colors:** All colors and shades of colors of all coats of paint shall be as indicated or selected by the Owner. If not specifically indicated on Drawings, color shall be as designated below. Each coat shall be of a slightly different shade, to facilitate inspection of surface coverage of each coat. Finish colors shall be as selected from the manufacturer's standard color samples by the Owner.

Raw Sewage Piping	Green or Gray
Sludge Piping	Brown
Gas Piping	Red
Potable Water Supply Piping	Blue
Non-Potable Water Piping	Orange
Gas or Liquid, Fuel	Red
Heating Piping and Ducts	Aluminum
Elect. Equip. and Conduits	Light Gray
Mechanical Equip., Exposed Interior & Exterior	Dark Gray
Mechanical Equip., Submerged or Intermittently Submerged	Black
Compressed Air Piping	White
Chlorine Gas or Solution Piping	Yellow
Plumbing Drains and Submerged Surfaces	Black
Structural Steel, Interior & Exterior	Pastel Green, Cream Blue, or as Directed
Safety Equipment or Cabinets	Jade Green
Pump Room, Walls and Ceilings	White
Masonry, Interior and Exterior	Pastel Green, Cream, Blue, or as Directed
Masonry and Concrete Normally Unexposed or Submerged	Black

e. **Products:**

1. To establish equality under Subsection 6-3, the Contractor shall furnish satisfactory documentation from the manufacturer of the proposed substitute or "or-equal" product that the material meets the indicated requirements and is equivalent or better in the following properties:

    i. Quality

    ii. Durability

    iii. Resistance to abrasion and physical damage

    iv. Life expectancy

    v. Ability to recoat in future

    vi. Solids content by volume

vii. Dry film thickness per coat

viii. Compatibility with other coatings

ix. Suitability for the intended service

x. Resistance to chemical attack

xi. Temperature limitations in service and during application

xii. Type and quality of recommended undercoats and topcoats

xiii. Ease of application

xiv. Ease of repairing damaged areas

xv. Stability of colors

2. Protective Coating Materials shall be standard products produced by recognized manufacturers who are regularly engaged in production of such materials for water and wastewater services. The Contractor shall provide the Engineer with the names of not less than 10 similar applications of the proposed manufacturer's products that comply with these requirements.

822-5.2 Industrial Coating Systems:

a. **System 1 – Alkyd Enamel:** High quality, gloss, long oil alkyd finish shall have a minimum solids content of 49 percent by volume. Primer shall be as recommended by manufacturer.

1. Prime coat (DFT = 2 mils).

2. Finish coats (two or more, Total DFT = 4 mils).

3. Total system DFT = 6 mils.

Products must meet or exceed the following ASTM tests:

1. Primer Requirements:

i. Adhesion: ASTM D 3359 Method B – Requirement: No less than a rating of 5 or ASTM D 4541 Requirement: No less than a rating of 1000 psi on steel or no less than 350 psi (concrete failure) on concrete.
ii. Salt Fog: ASTM B 117 – Requirement: No blistering, cracking, rusting or delamination of film. No more than a 1/64" rust creepage at scribe after 1,500 hours exposure.
iii. Humidity: ASTM D 4585 – No blistering, cracking, rusting or delamination of film after 5,000 hours exposure.

2. Topcoat Requirements:

i. Exterior Exposure: ASTM D1014 Exposed at 45 degrees facing south, Florida exposure – Requirement: No more than 85% gloss loss after

one year exposure.

ii. UV Exposure: ASTM D 4587 QUV (UVA Bulb, Cycle 4) – Requirement: No less than 90% gloss retention after 2,000 hours exposure.

b. **System 7 – Acrylic Latex:** Single component, exterior grade, water based acrylic latex shall have a minimum solids content of 35 percent by volume. Prime coat shall be as recommended by manufacturer. The coating material shall be available in the ANSI safety colors.

1. Prime coat DFT = 2 mils, as recommended by manufacturer.

2. Finish coats (2 or more, Total DFT = 4 mils).

3. Total system DFT = 6 mils.

Products shall be suitable for application to the intended substrates including galvanized metal, aluminum, polyvinyl chloride (pvc), plastic, and fiberglass.

c. **System 8 – Epoxy, Equipment:** Two component, polyamidoamine cured epoxy coating material shall provide a recoatable finish that is available in a wide selection of colors. The coating material shall have a minimum solids content of 66 percent by volume and be resistant to service conditions of condensing moisture, splash and spillage of lubricating oils, and frequent washdown and cleaning.

1. Prime coat DFT = 3-5 mils.

2. Prime coat, where shop applied, DFT = 3-5 mils, universal primer.

3. Finish coats (2 or more), Total DFT = 6-10 mils.

4. Total system MDFT = 9-12 mils.

Products must meet or exceed the following ASTM tests:

1. Adhesion: ASTM D 3359 Method B – Requirement: No less than a rating of 5 or ASTM D 4541 Requirement: No less than a rating of 1000 psi on steel or no less than 350 psi (concrete failure) on concrete.

2. Abrasion: ASTM D 4060 (CS-17 wheel, 1,000 gram load) – Requirement: No more than 140 mg loss after 1,000 cycles.

3. Salt Fog: ASTM B 117 – Requirement: No blistering, cracking, or delamination of film. No more than 1% rusting on the plane and no more than 1/16" rust creepage at scribe after 6,700 hours exposure.

4. Humidity: ASTM D 4585 – No blistering, cracking, rusting or delamination of film after 10,000 hours exposure.

d. **System 9 – Epoxy plus polyurethane top coat:** Two component, polyamidoamine cured epoxy coating material shall provide a recoatable finish that is available in a wide selection of colors. The coating material shall have a minimum solids content of 67 percent by volume and be resistant to service conditions of condensing moisture, splash and spillage of lubricating oils, and frequent washdown and cleaning. The top coat shall be a two component aliphatic polyurethane coating material. It shall provide

superior color and gloss retention, resistance to splash from acid and alkaline chemicals, resistance to chemical fumes and severe weathering, and contain a minimum solids content of 66 percent by volume.

1. Ferrous Metal System:

    i. Prime coat DFT = 3-5 mils.

    ii. Prime coat, where shop applied. DFT = 3-5 mils

    iii. Intermediate epoxy coat DFT = 3-5 mils.

    iv. Top coat, polyurethane DFT = 2.5-3 mils.

    v. Total system DFT = 8.5-12 mils.

2. Ductile Iron System:

    i. Prime coat DFT = 4-6 mils.

    ii. Prime coat, where shop applied. DFT = 4-6 mils

    iii. Intermediate epoxy coat DFT = 5-6 mils.

    iv. Top coat, polyurethane DFT = 2.5-3 mils.

    v. Total system DFT = 11.5-15 mils.

Products must meet or exceed the following ASTM tests:

1. Primer Requirements:

    i. Adhesion: ASTM D 3359 Method B – Requirement: No less than a rating of 5 or ASTM D 4541 Requirement: No less than a rating of 1000 psi on steel or no less than 350 psi (concrete failure) on concrete.
    ii. Salt Fog: ASTM B 117 – Requirement: No blistering, cracking, or delamination of film. No more than 1% rusting on the plane and no more than 1/16" rust creepage at scribe after 6,700 hours exposure.
    iii. Humidity: ASTM D 4585 – No blistering, cracking, rusting or delamination of film after 5,000 hours exposure.

2. Topcoat Requirements:

    i. Exterior Exposure: ASTM D1014 Exposed at 45 degrees facing south, Florida exposure – Requirement: No more than 85% gloss loss after one year exposure.
    ii. UV Exposure: ASTM D 4587 QUV (UVA Bulb, Cycle 4) – Requirement: No less than 90% gloss retention after 2,000 hours exposure.

e. **System 10 – Acrylic, Concrete:** The acrylic coating material shall be a single component, industrial grade, high molecular weight, waterborne acrylic material with a solids content of at least 35 percent by volume. The filler-sealer shall be a two component epoxy masonry sealer for wet and exterior exposure, with a solids content of at least 64 percent by volume. Either a two component epoxy block filler or three

component cementitious acrylic block filler that are suitable for interior and exterior exposure as recommended by the coating system manufacturer shall be used to fill holes and patch the concrete surface after abrasive blasting.

1. Prime coat (filler-sealer), applied in two coats to the entire surface and worked into the surface with a squeegee to achieve a smooth, void-free surface

2. Finish coats (2 or more), Total DFT = 6-8 mils.

Products must meet or exceed the following requirements:

1. Filler Surfacer Requirements:

    i. Adhesion: ASTM D 7234 – No less than 300 psi per pull, three trials.

2. Topcoat Requirements:

    i. Humidity: ASTM D 4585 – No blistering, cracking, loss of adhesion or color change after 2,000 hours exposure.
    ii. Wind Driven Rain: Federal Test Method TT-C-555B, Section 4.4.7.3 – No water damage or dampness visible on back of light weight block after 48 hours.

f. **System 11 – Aliphatic Polyurethane, Concrete:** Two component aliphatic polyurethane coating material shall provide superior color and gloss retention, resistance to splash from acid and alkaline chemicals, resistance to chemical fumes and severe weathering, and contain a minimum solids content of 66 percent by volume. The filler-surfacer shall be as recommended by the manufacturer and shall be used to provide a smooth surface for the epoxy intermediate coat. The filler-sealer is applied to the entire concrete surface and worked into the concrete surface with a wide blade putty knife or squeegee. The intermediate coat shall be a high-build epoxy coating with a minimum solids content of 67 percent by volume.

    1. Surfacer = Filler-surfacer shall be applied to the entire surface and worked into surface defects and bugholes to achieve a smooth, void-free surface. (Total DFT = Minimum of 1/16” above highest peak of the substrate).

    2. Intermediate coat = 4-6 mils.

    3. Finish coat = 2-3 mils.

    4. Total system DFT = 6-9 mils.

    Top Coat Polyurethane Products must meet or exceed the following ASTM tests:

    1. Adhesion: ASTM D 7234 – Requirement: No less than 300 psi per pull, three trials

    2. Abrasion: ASTM D 4060 (CS-17 wheel, 1,000 gram load) – Requirement: No more than 116 mg loss after 1,000 cycles

g. **System 12 – Aliphatic Polyurethane, Fiber Glass:** Two-component aliphatic polyurethane coating material shall provide superior color and gloss retention, resistance to splash from acid and alkaline chemicals, and resistance to chemical

fumes and severe weathering. A primer, tie coat, or mist coat shall be used as recommended by the manufacturer.

1. Prime coat (Tie coat).

2. Finish coats (2 or more, Total DFT = 3 mils).

822-5.3 Submerged and Severe Service Coating Systems

a. **System 100 – Amine Cured Epoxy:** High build, polyamine cured, epoxy resin shall have a solids content of at least 80 percent by volume, and shall be suitable for long-term immersion service in municipal wastewater.

1. Prime coat = 3-5 mils.

i. Note: Surface shall be scarified by blasting with fine abrasive if more than 60 days has elapsed between application of the prime coat and the intermediate coat (or between any subsequent coats).

2. Intermediate coat = 5-7 mils.

3. Finish coats = 5-7 mils.

4. Total coats = 13-19 mils.

100% Epoxy Products must meet or exceed the following ASTM tests.

1. Adhesion: ASTM D 3359 Method B – Requirement: No less than a rating of 5 or ASTM D 4541 Requirement: No less than a rating of 1000 psi on steel or no less than 350 psi (concrete failure) on concrete.

2. Abrasion: ASTM D 4060 (CS-17 Wheel, 1,000 gram load) – Requirement: No more than 120 mg loss after 1,000 cycles.

3. Salt Fog: ASTM B 117 – Requirement: No blistering, cracking, rusting or delamination of film. No more than a 1/32" rust creepage at scribe after 1,500 hours exposure.

b. **System 101 – Cold-Applied Tape:** Tape coating materials and procedures shall be in accordance with ANSI/AWWA C209. Prefabricated tape shall be Type II. The system shall consist of a primer layer, inner layer tape (50 mils), and an outer layer tape (30 mils). Total system DFT = 80 mils.

c. **System 106 – Fusion Bonded Epoxy:** The coating material shall be a 100 percent powder epoxy, certified as compliant with NSF Standard 61, applied in accordance with the ANSI/AWWA C213 - Fusion-Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines, except that the surface preparation shall be as specified in the coating system schedule of this Section. The coating shall be applied using the fluidized bed or electrostatic spray process.

1. Coating DFT = 16 mils.

2. For coating of valves, DFT - 12 mils.

3. Liquid Epoxy: For field repairs, the use of a liquid epoxy will be permitted, applied in not less than 3 coats to provide a Total DFT of 15 mils. The liquid epoxy shall be a 100 percent solids epoxy recommended by the powder epoxy manufacturer.

d. **System 108 – Epoxy, Concrete:** The coating material shall be a polyamine cured epoxy material suitable for long-term immersion in water and wastewater and for service where subjected to occasional splash and spillage of water and wastewater treatment chemicals. The finish coating material shall have a minimum solids content of 100 percent by volume. The filler-surfacer shall be either a minimum 85 percent solids amine-cured epoxy material with silica and inert fillers or an epoxy-modified cementitious surfacer as recommended by the coating system manufacturer.

1. Filler-surfacer, applied to the entire surface and worked into surface defects and bugholes to achieve a smooth, void-free surface. (Total DFT = Minimum of 1/16" above the highest peak of the substrate)

2. Finish coat: New Sewer Manholes (2 or more, DFT = 60 – 80 mils)
All other Structures (2 or more, DFT = 100 – 125 mils)

Products must meet or exceed the following ASTM tests:

1. Filler-surfacer Requirements:

i. Compressive Strength: ASTM C 579 – Requirement: No less than 5,000 psi.
ii. Tensile Strength: ASTM C 496 – Requirement: No less than 600 psi, 28 days.
ii. Adhesion: ASTM D 7234 – No less than 300 psi per pull, three trials.

2. Epoxy Liner Requirements:

i. Chemical Resistance:
A. ASTM C 868 – Requirement: No blistering, cracking, softening, swelling or loss of adhesion or gloss after 60 days immersion in 25 percent sulfuric acid at 100°F, or
B. Severe Wastewater Analysis Testing Apparatus (SWAT) ASTM G 210 – Requirement: No blistering, cracking, checking or loss of adhesion. Initial impedance greater than 10.0 (log-Z) at 0.01 Hz (ohms cm^2). No less than a final log-Z electrical impedance of 8.5 at 0.01 Hz (ohms cm^2) after 28 days. (Thickness of tested sample to be no more than 20% greater than the maximum film thickness requirement outlined in the specification).

ii. Impact: ASTM D 2794 – Requirement: No visible damage after 88 in-lbs.
iii. Adhesion: ASTM D7234 No less than 300 psi per pull, three trials
iv. Abrasion: ASTM D 4060 – Requirement: No more than 120 mg loss after 1,000 cycles.

e. **System 109 – Coal Tar Epoxy:** Amine or polyamide cured coal tar epoxy coating material with 70% minimum volume solids content for exterior surfaces of buried concrete structures. A filler-surfacer shall be applied after abrasive blasting and prior to the finish coating as recommended by the manufacturer.

1. Finish coat (2 or more), MDFT = 16-20 mils.

822-5.4 Special Coating Systems:

a. **System 200 – PVC Tape:** Prior to wrapping the pipe with PVC tape, the pipe and fittings first shall be primed using a primer recommended by the PVC tape manufacturer. After being primed, the pipe shall be wrapped with a 20-mil adhesive PVC tape, half-lapped, to a total thickness of 40 mils.

b. **System 204 – Water-Retardant:**

1. Two coats (or single coat if manufacturer recommends in writing) of a clear, non-staining, silane-modified-siloxane masonry water-retardant material. The water-retardant system after application shall be provided with not less than a five-year warranty on the performance of the product.

2. Surfaces shall be cleaned with a chemical cleaner approved by the manufacturer and power wash. Surfaces shall be clean and dry before application of the material. Method and rate of application shall be in accordance with manufacturer's published instructions. A manufacturer's representative shall be present during applications if necessary for warranty.

c. **System 205 – Polyethylene Encasement:** Refer to subsection 1016-2.3.1. Application of polyethylene encasement shall be in accordance with ANSI/AWWA C105 using Method C.

d. **System 208 – Aluminum Metal Isolation:** Two coats of a high build polyamide epoxy paint. Total thickness of system DFT = 8 mils.

e. **System 209 – Alkyd-Wood:** Industrial quality, gloss or semi-gloss, medium long oil alkyd coating material with a minimum solids content of 49 percent by volume. Primer shall be an alkyd primer as recommended by the manufacturer.

1. Prime coat DFT = 3 mils.

2. Finish coats (two or more, Total DFT = 3 mils).

3. Total system DFT = 6 mils.

f. **System 210 – Acrylic-Wood:** Single component, water-based acrylic latex coating material with a fungicide additive and a minimum solids content of 35 percent by volume. Primer shall be an alkyd primer as recommended by the manufacturer.

1. Prime coat DFT = 2 mils.

2. Finish coats (two or more, Total DFT = 6 mils).

3. Total system DFT = 8 mils.

g. **System 211 – Acrylic-Drywall:** Single component, water-based acrylic latex coating material with a fungicide additive and a minimum solids content of 35 percent by volume. Primer shall be a PVA sealer as recommended by the manufacturer.

1. Prime coat DFT = 1.5 mils.

2. Finish coats (two or more, Total DFT = 6 mils).

3. Total system DFT = 7.5 mils.

822-6 EXECUTION:

822-6.1 Manufacturer's Services: The Contractor shall require the protective coating manufacturer to furnish a qualified technical representative to visit the project site for technical support as may be necessary to resolve field problems attributable or associated with the manufacturer's products.

a. Coating manufacturer's representative shall be present at site for each structure to be coated as follows:

   1. Manufacturer's representative shall attend the Pre-job Conference.

   2. All required inspection hold points as described in subsection 822-6.15(c)(5).

   3. To verify full cure of coating prior to coated surfaces being placed into immersion service.

   4. As required to resolve field problems attributable to or associated with manufacturer's product.

b. Manufacturer's representative shall provide the Contractor and Engineer with documentation of site visit listing observations made and deficiencies, if any, that are to be corrected. Contractor shall submit documentation to Engineer.

c. Contractor shall provide Manufacturer's representative with ample prior notic before being required on site.

822-6.2 Workmanship:

a. Skilled craftsmen and experienced supervision shall be used on all Work.

b. Coating materials shall be applied evenly in strict accordance with manufacturer's recommendations.

c. Coating shall be done in a workmanlike manner so as to produce an even film of uniform thickness. Edges, corners, crevices, and joints shall receive special attention to insure thorough cleaning and an adequate thickness of coating material. The finished surfaces shall be free from runs, drops, ridges, waves, laps, brush marks, and variations in color, texture, and finish. The hiding shall be so complete that the addition of another coat would not increase the hiding. Special attention shall be given to insure that edges, corners, crevices, welds, and similar areas receive a film thickness equivalent to adjacent areas, and installations shall be protected by the use of drop cloths or other precautionary measures.

d. The Contractor shall protect the public and the Work against disfigurement by paint materials and damage caused by surface preparation. The Contractor shall be responsible for damage caused by the Contractor's operations to vehicles, persons or property, including plants and animals, and shall provide protective measures to

prevent such damage. Paint stains that result in an unsightly appearance shall be removed or obliterated by the Contractor. All damage to surfaces resulting from the Work shall be cleaned, repaired, and refinished to original condition.

e. All Work shall be subject to final acceptance by the Owner. The Contractor shall correct Work that does not comply with the Contract Documents. Acceptance is based on Contractor's documented evidence of compliance and successful field performance tests approved by the Engineer.

822-6.3 Storage, Mixing, and Thinning of Materials:

a. Manufacturer's Recommendations: Unless otherwise indicated, the coating manufacturer's printed recommendations and instructions for thinning, mixing, handling, applying, and protecting its coating materials, for preparation of surfaces for coating, and for all other procedures relative to coating shall be strictly observed.

b. Shelf Life: All protective coating materials shall be used within the manufacturer's recommended shelf life.

c. Storage and Mixing: Coating materials shall be stored under the conditions recommended by the Material Safety Data Sheets, and shall be thoroughly stirred, strained, and kept at a uniform consistency during application. Coatings of different manufacturers shall not be mixed together.

822-6.4 Preparation for Coating:

a. **General:** All surfaces to receive protective coatings shall be cleaned as indicated prior to application of coatings. The Contractor shall examine all surfaces to be coated, and shall correct all surface defects before application of any coating material. All marred or abraded spots on shop-primed and on factory-finished surfaces shall receive touch-up restoration prior to any coating application. Surfaces to be coated shall be dry and free of visible dust.

b. **Protection of Surfaces not to be Coated:** Surfaces which are not to receive protective coatings shall be protected during surface preparation, cleaning, and coating operations. All hardware, lighting fixtures, switchplates, machined surfaces, couplings, shafts, bearings, nameplates on machinery, and other surfaces not to be painted shall be removed, masked or otherwise protected. Drop cloths shall be provided to prevent coating materials from falling on or marring adjacent surfaces. The working parts of all mechanical and electrical equipment shall be protected from damage during surface preparation and coating operations. Openings in motors shall be masked to prevent entry of coating or other materials. Care shall be exercised not to damage adjacent work during blast cleaning operations. Spray painting shall be conducted under carefully controlled conditions. The Contractor shall be fully responsible for and shall promptly repair any and all damage to adjacent work or adjoining property occurring from blast cleaning or coating operations.

c. **Protection of Painted Surfaces:** Cleaning and coating shall be coordinated so that dust and other contaminants from the cleaning process will not fall on wet, newly coated surfaces.

822-6.5 Surface Preparation Standards:

a. The following referenced surface preparation specifications of the Steel Structures

Painting Council shall form a part of this specification:

1. Solvent Cleaning (SSPC-SP1): Removal of oil, grease, soil, salts, and other soluble contaminants by cleaning with solvent, vapor, alkali, emulsion, or steam.

2. Hand Tool Cleaning (SSPC-SP2): Removal of loose rust, loose mill scale, loose paint, and other loose detrimental foreign matter, by hand chipping, scraping, sanding, and wire brushing.

3. Power Tool Cleaning (SSPC-SP3): Removal of loose rust, loose mill scale, loose paint, and other loose detrimental foreign matter, by power tool chipping, descaling, sanding, wire brushing, and grinding.

4. White Metal Blast Cleaning (SSPC-SP5): Removal of all visible rust, oil, grease, soil, dust, mill scale, paint, oxides, corrosion products and foreign matter by blast cleaning.

5. Commercial Blast Cleaning (SSPC-SP6): Removal of all visible oil, grease, soil, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except that staining shall be limited to no more than 33 percent of each square inch of surface area.

6. Brush-Off Blast Cleaning (SSPC-SP7): Removal of all visible oil, grease, soil, dust, loose mill scale, loose rust, and loose paint.

7. Near-White Blast Cleaning (SSPC-SP10): Removal of all visible oil, grease, soil, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except that staining shall be limited to no more than 5 percent of each square inch of surface area.

8. Power Tool Cleaning to Bare Metal (SSPC-SP11): Removal of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter. Slight residues of rust and paint may be left in the lower portion of pits if the original surface is pitted. The surface profile shall not be less than 1 mil (25 microns).

822-6.6 Metal Surface Preparation (Ungalvanized):

a. The minimum abrasive blasting surface preparation shall be as indicated in the coating system schedules included at the end of this Section. Where there is a conflict between these specifications and the coating manufacturer's printed recommendations for the intended service, the higher degree of cleaning shall apply.

b. Workmanship for metal surface preparation shall be in conformance with the current SSPC Standards and this Section. Blast cleaned surfaces shall match the standard samples available from the National Association of Corrosion Engineers, NACE Standard TM-01-70 - Visual Standard for Surfaces of New Steel Airblast Cleaned with Sand Abrasive and TM-01-75 - Visual Standard for Surfaces of New Steel Centrifugally Blast Cleaned with Steel Grit.

c. All oil, grease, welding fluxes, and other surface contaminants shall be removed by solvent cleaning per SSPC-SP1 - Solvent Cleaning prior to blast cleaning.

d. All sharp edges shall be rounded or chamfered and all burrs, and surface defects and weld splatter shall be ground smooth prior to blast cleaning.

e. The type and size of abrasive shall be selected to produce a surface profile that meets the coating manufacturer's recommendation for the particular coating and service conditions. Abrasives for submerged and severe service coating systems shall be clean, hard, sharp cutting crushed slag. Automated blasting systems shall not be used for surfaces that will be in submerged service. Metal shot or grit shall not be used for surfaces that will be in submerged service, even if subsequent abrasive blasting is planned to be one with hard, sharp cutting crushed slag.

f. The abrasive shall not be reused unless an automated blasting system is used for surfaces that will be in non-submerged service. For automated blasting systems, clean oil-free abrasives shall be maintained. The abrasive mix shall include at least 50 percent grit.

g. The Contractor shall comply with the applicable federal, state, and local air pollution control regulations for blast cleaning.

h. Compressed air for air blast cleaning shall be supplied at adequate pressure from well-maintained compressors equipped with oil and moisture separators that remove at least 95 percent of the contaminants.

i. Surfaces shall be cleaned of all dust and residual particles of the cleaning operation by dry air blast cleaning, vacuuming, or another approved method prior to painting.

j. Enclosed areas and other areas where dust settling is a problem shall be vacuum cleaned and wiped with a tack cloth.

k. Damaged or defective coating shall be removed by the specified blast cleaning to meet the clean surface requirements before recoating.

l. If the specified abrasive blast cleaning will damage adjacent work, the area to be cleaned is less than 100 square feet, and the coated surface will not be submerged in service, then SSPC-SP2 or SSPC-SP3 be used.

m. Shop applied coatings of unknown composition shall be completely removed before the indicated coatings are applied. Valves, castings, ductile or cast iron pipe, and fabricated pipe or equipment shall be examined for the presence of shop-applied temporary coatings. Temporary coatings shall be completely removed by solvent cleaning per SSPC-SP1 before the abrasive blast cleaning work has been started.

n. Shop primed equipment shall be solvent cleaned in the field before finish coats are applied.

822-6.7 Surface Preparation for Galvanized Ferrous Metal:

a. Remove all soluble and insoluble contaminants and corrosion. Remove all storage stains per Section 6.2 of ASTM D6386. Abrasive blasting all surfaces per ASTM D 6386 to achieve a uniform anchor profile of 1.0 - 2.0 mils.

b. Pretreatment coatings of surfaces shall be in accordance with the printed recommendations of the coating manufacturer.

822-6.8 Surface Preparation of Ferrous Surfaces with Existing Coating, Excluding Steel Reservoir Interiors:

a. **General:** All grease, oil, heavy chalk, dirt, or other contaminants shall be removed by solvent or detergent cleaning prior to abrasive blast cleaning. The generic type of the existing coatings shall be determined by laboratory testing.

b. **Abrasive Blast Cleaning:** The Contractor shall provide the degree of cleaning specified in the coating system schedule for the entire surface to be coated. If the degree of cleaning is not indicated in the schedule, deteriorated coatings shall be removed by abrasive blast cleaning to SSPC-SP6. Areas of tightly adhering coatings shall be cleaned to SSPC-SP7, with the remaining thickness of existing coating not to exceed 3 mils.

c. **Incompatible Coatings:** If coatings to be applied are not compatible with existing coatings the Contractor shall apply intermediate coatings per the paint manufacturer's recommendation for the indicated coating system or shall completely remove the existing coating prior to abrasive blast cleaning. A small trial application shall be conducted for compatibility prior to painting large areas.

d. **Unknown Coatings:** Coatings of unknown composition shall be completely removed prior to application of new coatings.

e. **Water Abrasive or Wet Abrasive Blast Cleaning:** Where specified or where job site conditions do not permit dry abrasive blasting for industrial coating systems due to dust or air pollution considerations, water abrasive blasting or wet abrasive blasting may be used. In both methods, paint-compatible corrosion inhibitors shall be used, and coating application shall begin as soon as the surfaces are dry. Water abrasive blasting shall be done using high-pressure water with sand injection. In both methods, the equipment used shall be commercially produced equipment with a successful service record. Wet blasting methods shall not be used for submerged and severe service coating systems unless indicated.

822-6.9 Concrete and Concrete Block Masonry Surface Preparation:

a. Surface preparation shall not begin until at least 30 days after the concrete or masonry has been placed.

b. All oil, grease, and form release and curing compounds shall be removed by detergent cleaning per SSPC-SP1 before abrasive blast cleaning.

c. Concrete, concrete block masonry surfaces and deteriorated concrete surfaces to be coated shall be abrasive blast cleaned to remove existing coatings, laitance, deteriorated concrete, and to roughen the surface equivalent to the surface of the No. 80 grit flint sandpaper.

d. If acid etching is required by the coating application instructions, the treatment shall be made after abrasive blasting. After etching, rinse surfaces with water and test the pH. The pH shall be between neutral and 8.

e. Surfaces shall be clean and as recommended by the coating manufacturer before coating is started.

f. Unless required for proper adhesion, surfaces shall be dry prior to coating. The

presence of moisture shall be determined with a moisture detection device.

822-6.10 Plastic, Fiber Glass and Non-ferrous Metals Surface Preparation:

a. Plastic and fiber glass surfaces shall be sanded or brush off blast cleaned prior to solvent cleaning with a chemical compatible with the coating system primer.

b. Non-ferrous metal surfaces shall be solvent-cleaned SSPC-SP1 followed by sanding or brush-off blast cleaning SSPC-SP7.

c. All surfaces shall be clean and dry prior to coating application.

822-6.11 Architectural Concrete Block Masonry:

a. The mortar surfaces shall be cured at least 14 days before surface preparation work is started.

b. Dust, dirt, grease, and other foreign matter shall be removed prior to abrasive blasting.

c. The masonry surfaces shall be prepared in accordance with the material manufacturer's printed instructions.

822-6.12 Shop Coating Requirements:

a. Unless otherwise indicated, all items of equipment, or parts of equipment which are not submerged in service, shall be shop primed and then finish coated in the field after installation with the indicated or selected color. The methods, materials, application equipment and all other details of shop painting shall comply with this section. If the shop primer requires topcoating within a specified period of time, the equipment shall be finish coated in the shop and then touch-up painted after installation.

b. All items of equipment, or parts and surfaces of equipment which are submerged or inside an enclosed hydraulic structure when in service, with the exception of pumps and valves, shall have all surface preparation and coating work performed in the field.

c. For certain pieces of equipment it may be undesirable or impractical to apply finish coatings in the field. Such equipment may include engine generator sets, equipment such as electrical control panels, switchgear or main control boards, submerged parts of pumps, ferrous metal passages in valves, or other items where it is not possible to obtain the indicated quality in the field. Such equipment shall be primed and finish coated in the shop and touched up in the field with the identical material after installation. The Contractor shall require the manufacturer of each such piece of equipment to certify as part of its shop drawings that the surface preparation is in accordance with these specifications. The coating material data sheet shall be submitted with the shop drawings for the equipment.

d. For certain small pieces of equipment the manufacturer may have a standard coating system which is suitable for the intended service conditions. In such cases, the final determination of suitability will be made during review of the shop drawing submittals. Equipment of this type generally includes only indoor equipment such as instruments, small compressors, and chemical metering pumps.

e. Shop painted surfaces shall be protected during shipment and handling by suitable provisions including padding, blocking, and the use of canvas or nylon slings. Primed

surfaces shall not be exposed to the weather for more than 2 months before being topcoated, or less time if recommended by the coating manufacturer.

f. Damage to shop-applied coatings shall be repaired in accordance with this Section and the coating manufacturer's printed instructions.

g. The Contractor shall make certain that the shop primers and field topcoats are compatible and meet the requirements of this Section. Copies of applicable coating manufacturer's data sheets shall be submitted with equipment shop drawings.

822-6.13 Application of Coatings:

a. The application of protective coatings to steel substrates shall be in accordance with SSPC-PA1 - Paint Application Specification No. 1.

b. Cleaned surfaces and all coats shall be inspected prior to each succeeding coat. The Contractor shall schedule such inspection with the Engineer in advance.

c. Blast cleaned ferrous metal surfaces shall be painted before any rusting or other deterioration of the surface occurs. Blast cleaning shall be limited to only those surfaces that can be coated in the same working day.

d. Coatings shall be applied in accordance with the manufacturer's instructions and recommendations, and this Section, whichever has the most stringent requirements.

e. Special attention shall be given to edges, angles, weld seams, flanges, nuts and bolts, and other places where insufficient film thicknesses are likely to be present. Use stripe painting for these areas.

f. Special attention shall be given to materials which will be joined so closely that proper surface preparation and application are not possible. Such contact surfaces shall be coated prior to assembly or installation.

g. Finish coats, including touch-up and damage repair coats shall be applied in a manner which will present a uniform texture and color matched appearance.

h. Coatings shall not be applied under the following conditions:

1. Temperature exceeding the manufacturer's recommended maximum and minimum allowable.

2. Dust or smoke laden atmosphere.

3. Damp or humid weather.

4. When the substrate or air temperature is less than 5 degrees F above dewpoint.

5. When air temperature is expected to drop below 40 degrees F or less than 5 degrees F above the dewpoint within 8 hours after application of coating.

6. When wind conditions are not calm.

i. Dewpoint shall be determined by use of a sling psychrometer in conjunction with U.S.

Dept. of Commerce, Weather Bureau psychometric tables.

j. Unburied steel piping shall be abrasive blast cleaned and primed before installation.

k. Sealing cut ends of coated or lined pipe and/or coating field repairs to pipe and fittings shall be performed in accordance with the manufacturer's recommendations.

l. The finish coat on all work shall be applied after all concrete, masonry, and equipment installation is complete and the work areas are clean and dust free.

822-6.14 Curing of Coatings:

a. General: The Contractor shall maintain curing conditions in accordance with the conditions recommended by the coating material manufacturer or by this Section; whichever is the most stringent, prior to placing the completed coating system into service.

b. Ventilation: In the case of enclosed areas, forced air ventilation, using heated air if necessary, may be required until the coatings have fully cured.

c. Forced Air Ventilation of Steel Reservoirs and Enclosed Hydraulic Structures: Forced air ventilation is required for the application and curing of coatings on the interior surfaces of steel reservoirs and enclosed hydraulic structures. During application and curing periods, continuously exhaust air from a manhole in the lowest shell ring, or in the case of an enclosed hydraulic structure, from the lowest level of the structure using portable ducting. After all interior coating operations have been completed, provide a final curing period for a minimum of 10 days, during which the forced ventilation system shall operate continuously. For additional requirements, refer to the specific coating system requirements in Section 822-5 above.

822-6.15 Shop and Field Inspection and Testing:

a. General: The Contractor shall give the Engineer a minimum of 3 days advance notice of the start of any field surface preparation work or coating application work, and a minimum of 7 days advance notice of the start of any shop surface preparation work.

b. All such work shall be performed only in the presence of the Engineer, unless the Engineer has granted prior approval to perform such work in its absence.

c. Inspection: Inspection by the Engineer, or the waiver of inspection of any particular portion of the Work, shall not relieve the Contractor of its responsibility to perform the Work in accordance with these Specifications.

    1. Applicator shall be responsible for and maintain an active site specific quality control program, monitored by the applicators inspector who shall be knowledgeable of coating inspection methods, test procedures and corrective measures for items found to be in nonconformance. The site specific quality control program shall insure and document compliance with the job specifications in all facets of surface preparation, coating/lining application, cure and final inspection.

    2. The applicator shall provide the Engineer with documentation of inspections and testing performed. The documentation shall include weather conditions

at the start and end of each application, test results and specific locations examined to confirm.

3. Audits may be performed by the Engineer or a third party designated by the Engineer to confirm that inspections have been performed in a thorough and proper manner.

4. Applicator shall correct work that is not acceptable, verify corrective actions have been completed and submit documentation of such inspection prior to requesting a follow-up audit.

5. Contractor's Inspector Responsibilities:

    i. Verify that surface preparation and application of coatings or coating systems are as specified at all specific inspection hold points as outlined below and other points as directed by the Engineer:

        A. Completion of Surface preparation.
        B. Completion of first coat.
        C. Completion of second coat.
        D. Completion of each subsequent coat.

        Note1: Nonconformance discovered during quality control inspection may at the Engineer's discretion require additional coating performance inspection hold points and/or testing to establish compliance.

        Note 2: Applicator shall notify the Engineer in writing 48 hours prior to the required inspection hold point.

        Note 3: Staging and/or scaffolding used for the work shall not be removed before the work has been examined and approved by all parties.

    ii. Verify coatings and other materials are as specified.

    iii. Verify compressor air supply is clean and free of contaminants prior to start of blast cleaning per ASTM D4285 blotter test.

    iv. Verify Dry Film Thickness (DFT) of each coat and total DFT of each coating system are as specified using wet film and dry film gauges. DFT measurements shall be performed per SSPC PA-2 including gage calibration to compensate for surface profile. DFT is the thickness of record. Destructive testing may be required to measure DFT.

    v. Verify each coating is properly cured in accordance with manufacturer's instructions.

    vi. Coating Defects: Visually examine coatings for film characteristics or defects that would adversely affect performance or appearance of coating including dust, dirt or overspray inclusions, runs, sags, pinholes, blisters, finish coat overspray, mud cracks, and even in color and appearance.

vii. Daily Reports: The Contractor is required to maintain typed daily activity reports that are to be submitted to the Engineer on a weekly basis in accordance with subsection 822-4.

d. Scaffolding shall be erected and moved to locations where requested by the Engineer to facilitate inspection. Additional illumination shall be furnished to cover all areas to be inspected.

e. The Contractor shall furnish, until final acceptance of such coatings, inspection devices in good working condition for the detection of holidays and measurement of dry-film thicknesses of protective coatings. Dry-film thickness gages shall be made available for the Owner's use at all times while coating is being done, until final acceptance of such coatings. The Contractor shall furnish the services of a trained operator of the holiday detection devices until the final acceptance of such coatings. Holiday detection devices shall be operated only in the presence of the Engineer.

f. Testing Equipment:

1. Provide magnetic type dry film thickness gauge to test coating thickness specified in mils.

2. Provide low-voltage wet sponge electrical holiday detector to test completed coating systems, 20 mils dry film thickness or less, except zinc primer, high-build elastomeric coatings, and galvanizing, for pinholes, holidays, and discontinuities.

3. Provide high-voltage spark tester to test completed coating systems in excess of 20 mils dry film thickness.

g. Testing:

1. Evaluation of blast cleaned surface preparation work will be based upon visual comparison of the blasted surfaces with SSPC-Vis1 photographic standard samples available from SSPC.

2. Measure coating thickness specified in mils with a magnetic type, dry film thickness gauge, in accordance with SSPC PA 2. Check each coat for correct millage. Do not make measurement before a minimum of 8 hours after application of coating.

3. Holiday detect coatings 20 mils thick or less, except zinc primer and galvanizing, with low voltage wet sponge electrical holiday detector in accordance with NACE RP0188.

4. Holiday detect coatings in excess of 20 mils dry with high voltage spark tester as recommended by coating manufacturer and in accordance with NACE RP0188.

5. All other approved applicable field performance testing.

6. After repaired and recoated areas have dried sufficiently, retest each repaired area. Final tests may also be conducted by Engineer.

h. Unsatisfactory Application:

1. If the item has an improper finish color or insufficient film thickness, clean surface and topcoat with specified paint material to obtain specified color and coverage. Obtain specific surface preparation information from coating manufacturer.

2. Evidence of runs, bridges, shiners, laps, or other imperfections is cause for rejection.

3. Repair defects in accordance with written recommendations of coating manufacturer.

4. Damaged Coatings, Pinholes, and Holidays:

i. Feather edges and repair in accordance with recommendations of paint manufacturer.

ii. Hand or power sand visible areas of chipped, peeled, or abraded paint, and feather the edges. Follow with primer and finish coat. Depending on extent of repair and appearance, a finish sanding and topcoat may be required.

iii. Apply finish coats, including touchup and damage-repair coats in a manner that will present a uniform texture and color-matched appearance.

822-6.16 Coating System Schedules – Ferrous Metals:

a. **Coating System Schedule, Ferrous Metal - Not Galvanized:**

	Item	**Surface Prep.**	**System No.**
FM-1	All indoor surfaces, except those included below.	<u>For Ferrous Metal</u>: Commercial blast cleaning SSPC-SP6 <u>For ductile pipe</u>: Clean as required to remove all soluble surface contaminants. Abrasive blast all surfaces to be coated in accordance with NAPF 500-03-04 to remove all insoluble surface contaminants and to achieve a minimum surface profile of 1.5 mils.	(8) Epoxy

FM-2	All outdoor surfaces, except those included below.	For Ferrous Metal: Commercial blast cleaning SSPC-SP6 For ductile pipe: Clean as required to remove all soluble surface contaminants. Abrasive blast all surfaces to be coated in accordance with NAPF 500-03-04 to remove all insoluble surface contaminants and to achieve a minimum surface profile of 1.5 mils.	(9) Epoxy plus polyurethane topcoat
FM-3	Surfaces of equipment and ferrous surfaces submerged or intermittently submerged in utility water or wastewater including all surfaces lower than 2 feet above high water level in hydraulic structures, and all surfaces inside enclosed hydraulic structures and vents (excluding shop-coated valves, couplings, pumps).	For Ferrous Metal: White metal blast cleaning SSPC-SP5. For ductile pipe: Clean as required to remove all soluble surface contaminants. Abrasive blast all surfaces to be coated in accordance with NAPF 500-03-04 to remove all insoluble surface contaminants and to achieve a minimum surface profile of 1.5 mils.	(100) amine-cured epoxy
FM-6	Buried small steel pipe.	Removal of dirt, grease, oil	(200) PVC tape
FM-7	Ferrous surfaces in water passages of all valves 4-inch size and larger, exterior surfaces of submerged valves.	White metal blast cleaning SSPC-SP5	(100) amine-cured epoxy
FM-8	Ferrous surfaces in water passages and submerged surfaces of all pumps which have discharge size of 4 inches or larger.	White metal blast cleaning SSPC-SP5	(100) amine-cured epoxy
FM-9	Ferrous surfaces of sleeve-couplings.	Solvent cleaning SSPC-SP1, followed by white metal blast cleaning SSPC-SP10	(106) fusion-bonded epoxy
FM-10	All ferrous surfaces of sluice gates, flap gates, and shear gates, including wall thimbles.	White metal blast cleaning SSPC-SP5	(100) amine-cured epoxy

FM-11	Buried surfaces that are not indicated to be coated elsewhere.	Near white metal blast cleaning SSPC-SP10	(100) amine-cured epoxy
FM-19	Buried pipe couplings, valves, and flanged joints (where piping is ductile or cast iron, not tape-coated), including epoxy-coated surfaces.	Brush-off blast cleaning SSPC-SP7	(205) polyethylene encasement

b. **Coating System Schedule, Ferrous Metal - Galvanized:** Pretreatment coatings, barrier coatings, or washes shall be applied as recommended by the coating manufacturer. All galvanized surfaces shall be coated, except for chain link fencing.

	Item	**Surface Prep.**	**System No.**
FMG-1	All exposed surfaces indoors and outdoors, except those included below.	Solvent cleaning SSPC-SP1 Followed by SSPC-SP7	(7) Acrylic latex

822-6.17 Coating System Schedule, Non-ferrous Metal, Plastic, Fiber Glass:

a. Where isolated non-ferrous parts are associated with equipment or piping, the Contractor shall use the coating system for the adjacent connected surfaces. Do not coat handrails, gratings, frames or hatches. Only primers recommended by the coating manufacturer shall be used.

	Item	**Surface Prep.**	**System No.**
NFM-1	All exposed surfaces, indoors and outdoors, except those included below.	Solvent cleaned SSPC-SP1	(7) Acrylic latex
NFM-3	Aluminum surfaces in contact with concrete, or with any other metal except galvanized ferrous metal.	Solvent cleaned SSPC-SP1	(208) aluminum metal isolation
NFM-6	Buried non-ferrous metal pipe.	Removal of dirt, grease, oil	(200) PVC tape

822-6.18 Coating System Schedule – Concrete:

Item	**Surface Prep.**	**System No.**

C-1	All indoor surfaces where indicated in Contract Documents.	Per Section 822-6.9	(10) acrylic,concrete
C-2	Interior surfaces of pump station wet wells, and various wastewater treatment plant structures as indicated in Contract Documents. **Note:** The floors and the bottom six (6) inches of the interior wet well walls only are not required to be coated.	Per Section 822-6.9	(108) epoxy, concrete
C-3	Interior surfaces of new wastewater manholes and as indicated in Contract Documents.	Per Section 822-6.9	(108) epoxy, concrete
C-4	Buried exterior surfaces of various wastewater treatment plant structures as indicated in Contract Documents.	Per Section 822-6.9	(109) coal tar epoxy, concrete
C-5	Buried exterior surfaces of as indicated in Contract Documents.	Per Section 822-6.9	(109) coal tar epoxy, concrete

822-6.19 Coating System Schedule – Concrete Block Masonry:

	Item	Surface Prep.	System No.
CBM-1	All surfaces, indoors and outdoors, where indicated in Contract Documents.	Per Section 822-6.9	(10) acrylic, concrete

822-6.20 Coating System Schedule – Miscellaneous Surfaces:

	Item	Surface Prep.	System No.
MS-1	Wood, indoors and outdoors.	Per manufacturer's printed instructions	(209) alkyd-wood

822-7 SPECIAL CORRECTION OF DEFECTS REQUIREMENTS:

a. **Warranty Inspection:** A warranty inspection may be conducted during the eleventh month following completion of all coating and painting work. All personnel present at the Pre-job Conference shall attend this inspection. All defective work shall be repaired in accordance with these specifications and to the satisfaction of the Engineer. The Engineer may, by written notice to the Contractor, reschedule the warranty inspection to another date within the one-year correction period, or may cancel the warranty inspection altogether. If a warranty inspection is not held, the Contractor is not relieved of its responsibilities under the Contract Documents.

822-8 MEASUREMENT AND PAYMENT: No measurement or direct payment will be made for protective coatings.

PART IX MISCELLANEOUS CONSTRUCTION

SECTION 902 FENCING

902-3 CONSTRUCTION: Add the following paragraph at the end of this subsection:

In situations where existing fencing, located in public servitudes or rights-of-way, must be removed to access and/or perform Work to public facilities the Contractor shall investigate all options to access the Work in order to minimize the amount of removal and replacement of the fence. Contractor shall coordinate the routing with the Engineer prior to removing any fencing. Existing fencing removed or damaged by the Contractor outside the limits of the public servitude or right-of-way shall be replaced at the Contractor's expense.

902-3.2 Rebuilt Fence: Add "at the direction of the Engineer" at the end of the first sentence of this subsection.

902-4 MEASUREMENT: Delete the word "exclusive" and replace it with "inclusive" in item (a).

902-5 PAYMENT: Add the following paragraph to this subsection:

Payment for Remove Existing Fence and Replace with New Fence will only be allowed when the existing fence is unable to be salvaged as approved by the Engineer prior to removal.

902-6 PAY ITEMS: Add the following at the end of the pay items list:

Item No.	Item	Unit
9020101	Remove Existing Fence and Replace with New Fence	Linear Foot

SECTION 903 EROSION CONTROL

Delete this Section in its entirety and replace with the following:

SECTION 903
EROSION CONTROL

903-1 DESCRIPTION: This work consists of providing all; administrative, labor, materials, equipment, and accessories required to permit, install, monitor, maintain, and remove where required, temporary and permanent sedimentation and erosion control measures.

903-2 MATERIALS: Materials shall comply with the following Sections and Subsections.

Topsoil	1022-1
Fertilizer	1022-2
Seed	1022-3
Straw Mulch & Fiber Mulch	1022-5
Straw Mat	1022-7.1
Excelsior Mat	1022-7.2
Slab Sod	1022-9

Materials not covered by project specifications shall meet commercial grade standards and shall be approved before being incorporated into the project. No testing of materials used in temporary erosion control features will be required. Acceptance of temporary erosion control materials will be by visual inspection.

903-3 CONSTRUCTION: Installation of temporary erosion control features shall be coordinated with construction of permanent erosion control features to ensure effective erosion control at all times. The contractor shall install or construct temporary erosion control features prior to initiation of land disturbance activities.

903-3.1 Temporary Erosion Control and Storm Water Pollution Prevention Plan: In accordance with Section 7-7 the contractor will abide by the terms and conditions of the appropriate LPDES General Permit. The Contractor shall prevent to the maximum extent practicable the transmission of soil particles into streams, canals, lakes, reservoirs or other waterways. Except as necessary for construction, excavated material shall not be deposited in streams or impoundments, or in a position close enough to be washed into waterways by high water or runoff. Lands or waters outside construction limits shall not be disturbed, except as authorized. The contractor shall not unnecessarily strip vegetation near stream banks.

The engineer may limit exposure of unprotected earth and may direct the contractor to provide immediate permanent or temporary erosion or pollution control measures to prevent contamination of streams, lakes, reservoirs, canals or other impoundments or prevent detrimental effects on property outside the right-of-way.

For projects with a total cumulative disturbed area greater than 1 acre including but not limited to: project construction limits, staging and disposal areas, temporary access roads, detours, and borrow areas, the contractor shall be required to develop a SWPPP (Storm Water Pollution Prevention Plan) by completing the current EPA SWPPP template. The contractor shall contact LADEQ for the latest specific requirements regarding the appropriate LADEQ Storm Water General Permit, Notice of Intent, and Notice of Termination forms.

As required by the contract documents and as detailed in the contractors SWPPP, the contractor shall place, monitor, and maintain; temporary seed, fertilizer, mulch, sandbags, hay bales, silt fences, slope drains, sediment check dams, sediment basins, and other best management practices/stormwater containment measures. Earth berms shall be constructed as needed to direct

water away from slopes.

The use of erosion control features or methods other than those in the contract shall be as contained in the Contractors SWPPP and shall be considered included in the lump sum cost for the development and maintenance of the SWPPP.

a. **Temporary Seeding, Fertilizing and Mulching:** Seeding, fertilizing and mulching shall be performed in accordance with Subsection 903-3.2, modified as follows. Ground preparation shall be limited to blading the area; grass seed shall be a fast-growing species suitable to the area; application rates of seed, fertilizer and mulch may be reduced when directed.

b. **Sandbags and Hay Bales:** Sandbags shall be 1 cubic foot burlap bags, filled at least 3/4 full with sand. Hay bales shall be standard size bales and shall be secured by stakes.

c. **Slope Drains:** Slope drains shall be constructed of pipe, riprap or other suitable material, with riprap protection at the discharge end.

d. **Sediment Basins:** Sediment basins shall be excavated to collect silt, and shall be cleaned out as necessary to maintain their effectiveness. Basin outfall shall be riprap protected.

e. **Sediment Check Dams:** Check dams shall be constructed in ditches, and shall consist of logs and brush or fencing.

f. **Silt Fencing:** Silt fencing shall be geotextile fabric, either wire-supported or self-supported, attached to posts. Silt fencing shall be trenched in to ensure effectiveness.

g. **Curb Inlet Protection**: Temporary sediment control device or measure to prevent silt, sediment and debris from entering storm drain curb inlets. Inlet protection is to be implemented at existing curb inlets prior to construction. The device shall be centered against the curb inlet with a minimum of 12 inches of the device overhanging on each side of the inlet opening. No part of the device, or ponding created by the device, shall interfere with the flow of traffic, create a safety hazard, or cause property damage. Effective curb inlet protection must be provided throughout the project until all sources with potential for discharging into inlets have been paved or stabilized. Contractor shall remove curb inlet protection once surface restoration in the contributing drainage area is complete. Due care shall be taken to ensure sediment does not fall into the inlet and impede the intended function of the device. Any material falling into the inlet shall be removed. Contractor shall maintain devices and remove all accumulated sediment and debris from surface and vicinity of unit after each rain event or as directed by Engineer in order to provide adequate sediment holding capacity and performance of device.

h. **Maintenance of Erosion Control Features:** Temporary erosion control features shall be inspected at least once every 14 calendar days, in advance of any anticipated rain events, and within 24 hours after a rainfall event of 0.5 inches or greater. The features are to be maintained as described below or replaced as directed at no direct pay.

    1. **Temporary Seeding**: The seeded areas showing erosion after inspection shall be reseeded if necessary.

2. **Mulches:** Mulched areas showing erosion shall be repaired and the mulch reapplied if necessary.

3. **Straw or Hay Bale Barriers:** The bale barriers shall be inspected after each rainfall and time frame as defined above and at least daily during prolonged rainfall. Close attention shall be paid to the repair of damaged bales, "end runs" and undercutting beneath bales.

4. **Slope Drains:** Slope drains shall be inspected weekly and after each rainfall as defined above, and repairs made if necessary. The contractor shall avoid the placement of any material on and prevent construction traffic across the slope drain.

5. **Sediment Check Dams:** Sediment deposits shall be removed when the deposits reach one-half the height of the check dam. Inspections shall be made to insure that the center of the dam is lower than the edges. Erosion around the edges shall be corrected immediately.

6. **Silt Fencing:** Sediment deposits shall be removed when the deposits reach one-half the height of the fence. If the fabric on the silt fence decomposes or becomes ineffective, the fabric shall be replaced promptly.

7. **Temporary Stone Construction Entrance and/or Wash Racks:** The construction entrance shall be maintained to allow for removal of mud from the tires. The sediment from the wash rack runoff shall be removed once the wash rack is no longer performing as intended.

i. **Removal of Temporary Erosion Control Features:** Temporary erosion control features existing at the time of construction of permanent erosion control features shall be removed or incorporated into the soil in such manner that no detrimental effect will result. The engineer may direct that temporary features be left in place.

903-3.2 Permanent Erosion Control:

903-3.2.1 Seeding and Fertilizing: Seed beds shall be disked and pulverized at least 3" deep; then leveled and lightly rolled prior to seeding. Seed shall be applied by one of the following methods:

a. **Broadcast:** Seed and fertilizer shall be uniformly spread by hand or mechanical methods. If hand spreading is used, seed and fertilizer shall be sown in 2 directions at right angles to each other.

1. **Fertilizer:** Fertilizer shall be applied at the following rate:

Type	Pounds Per Acre
8-8-8	1,000
12-12-12	667
13-13-13	615
16-16-16	500

2. **Seed:** Seed shall be sown at the following rate:

	Seed Mixture and Rate/1000 SF

March-September	1 Lb Hulled Bermuda
October-February	1 Lb Unhulled Bermuda and 2 Lb Winter Rye

b. **Hydroseeding:** Seed, fertilizer, mulch and tackifier shall be placed in a single mechanical operation at the following rates:

Planting Mixture and Rate (Lb/1000 SF)

	Hulled Bermuda Seed	Unhulled Bermuda Seed	Winter Rye Seed	Water Soluble Fertilizer	Fiber Mulch	Soil Tackifier
March-September	1	-	-	30	35	1.5
October-February	-	1	2	30	35	1.5

903-3.2.2 Watering: Seeded and sodded areas shall be watered at a rate of 5 gal/sy immediately after seed is broadcast or sod is placed. When necessary, additional water shall be applied to seeded or sodded areas to supplement natural rainfall until the Owner accepts the work. Water shall be applied with approved sprinkling equipment what will spread the water evenly and in a manner that will not cause erosion of the soil surface.

903-3.2.3 Mulching:

903-3.2.3.1 Straw Mulch: Straw mulch shall be spread on seeded areas at rate of 2 ton/acre.

903-3.2.3.2 Fiber Mulch: Fiber mulch shall be spread on seeded areas at rate of 1-1½ tons/acre.

903-3.2.4 Erosion Blanket: Erosion control blankets shall be straw or excelsior mats and shall be placed on seeded areas.

On slopes, blanket strips shall be placed either transverse or parallel to slope. Blanket shall be turned down into 6" anchor slots at top and bottom of slope. Mats shall be stapled to ground at maximum 6-foot intervals staggered on adjacent rows. Straw mats shall be overlapped 6" on ends and sides; excelsior blanket strips shall be tightly butted with adjacent strips at ends and sides.

In ditches, blanket strips shall be placed parallel to ditch, beginning at downstream end. Sides and ends of excelsior strips shall be tightly butted with adjacent strips; sides and ends of straw mats shall be turned down into 6" deep anchor slots at ends and sides. Mats shall be stapled to ground at maximum 4-foot intervals, staggered on adjacent rows.

903-3.2.5 Slab Sod: When the trench backfill has stabilized sufficiently and for a period of time not to exceed fourteen (14) days from the completion of the repair, the Contractor shall commence work on lawns and grassed areas. Prior to slab sodding, topsoil shall be uniformly spread over areas and lightly compacted. Areas to be sodded shall be finish graded, tilled, raked and debris removed. The Engineer shall approve the finish grade of all areas prior to application of sod. The Contractor shall furnish sod equal to and similar in type as the surrounding area.

Approximately 90% of the required fertilizer shall be placed on the area prior to placing sod, and the remainder of the fertilizer shall be broadcast after the sod is placed. Sod shall be rolled or tamped after placement.

Upon completion of sodding operations, all excess soil, stones, and debris remaining shall be removed from the construction area. Sodded areas shall be protected against traffic or other use by placing warning signs or erecting barricades as necessary. The Contractor, at no additional cost, shall repair any areas damaged prior to actual acceptance by the Owner.

The sodded area will not be accepted until a satisfactory stand of grass has been established. A satisfactory stand of grass is defined as a full lawn cover of the predominant vegetative species existing prior to the beginning of the Work over the disturbed areas, with grass free of weeds, alive and growing, leaving no bare spots larger that ¾ square yard within a radius of ten (10) feet. If a satisfactory stand of grass has not been obtained within a reasonable period of time, the Engineer shall instruct the Contractor in writing that the vegetative cover is not adequate and that additional measures shall be undertaken by the Contractor to establish the required satisfactory stand of grass.

903-4 MEASUREMENT:

a. **Temporary Erosion Control:** When temporary erosion and pollution control measures are required due to the contractor's negligence or failure to install permanent controls, such work shall be performed by the contractor at no direct pay. Required temporary erosion and pollution control work which is not due to the contractor's negligence will be measured as follows:

    1. **Seed, Fertilizer and Mulch:** Measurement will be made in accordance with Heading (b) below.

    2. **Sandbags, Hay Bales, Sediment Basins and Sediment Check Dams:** Measurement will be made per each.

    3. **Silt Fencing and Slope Drains:** Measurement will be made by the linear foot.

    4. **Temporary Curb Inlet Protection:** Measurement shall be made by the linear foot.

    When temporary erosion control work is ordered and is not covered by contract items, the work shall be performed as extra work in accordance with Sections 4-2 and 10-4 except that no extra work order will be required prior to starting work.

    The construction of temporary earth berms along edges of the roadway to prevent erosion during grading and subsequent operations will not be measured for payment.

    In case of failure of the contractor to control erosion, or siltation, the engineer may employ outside assistance or use his own forces to provide the necessary corrective measures, and the cost thereof will be deducted from payments for the work. Partial payments will be withheld until satisfactory temporary erosion control is established.

b. **Permanent Erosion Control:**

    1. **Seed:** Seed will be measured by the pound.

    2. **Fertilizer:** Fertilizer will be measured by the pound. The estimated quantity shown in the plans is based on Type 8-8-8 fertilizer. If other types are used, the measured quantities will be multiplied by the following

factors to determine pay quantities:

Type	Factor
12-12-12	1.5
13-13-13	1.625
16-16-16	2.0

3. **Water:** Water will be measured in units of 1,000 gallons; however, water used in hydroseeding slurry will not be measured for payment.

c. **Slab Sod:** This item shall be measured per square yard of sod installed within the pay limits and as approved by the Engineer. The pay limits shall be in accordance with the standard trench details and as shown on the drawings or as directed by the Engineer. When the Work falls within a right-of-way or servitude wider than 25 feet, the pay limit width shall be limited up to a maximum 12.5 feet measured from centerline of existing or proposed pipe on both sides (up to right-of-way or servitude limit) for a maximum 25 feet total. In the case of parallel pipes, overlapping areas will not be double paid. Payment shall not be made for sod placed outside of the pay limits in areas damaged by the Contractor.

d. **Mulch and Erosion Control Mats:** Quantities of mulch and erosion control mats for payment will be the contract quantities, adjusted as necessary if the engineer makes changes to fit field conditions, if plan errors are proven, or if design changes are made.

e. **Stormwater Pollution Prevention Plan:** Other than the contract items and items directed to be installed by the engineer, no measurement will be made for the development, administration, permitting, install, monitoring, maintenance, and removal where required, of the stormwater control measures required in the Contractor's SWPPP.

903-5 PAYMENT: Payment for temporary and permanent erosion control items that are included as contract items will be made at the contract unit prices.

Payment for devices used to correct unforeseen conditions will be made at the contract unit price for similar devices shown on the plans, or as extra work if plan details are not applicable.

Payment for sod will be full compensation for topsoil, finish grading, tilling, raking, debris removal, sod, water, fertilizer, rolling or tamping, and protection.

Payment for obtaining and maintaining the necessary permits; development of a complete Storm Water Pollution Prevention Plan (SWPPP) and associated documentation (to include but not limited to the NOI and the NOT if necessary), and all labor, equipment or materials required for the implementation of the SWPPP, except for the installation and maintenance of those erosion control pay items already included in the plan, shall be made under Item 9031600. Partial payments for the Storm Water Pollution Prevention Plan items will be made in accordance with the following schedule.

% of Total Contract Amount Earned	% of SWPPP Price to be Paid
1st Partial Estimate	15
10	25
25	30
50	50
75	75
100	100

903-6 PAY ITEMS:

Item No.	Item	Unit
9030100	Temporary Sand Bags	Each
9030200	Temporary Hay Bales	Each
9030300	Temporary Sediment Basins	Each
9030400	Temporary Sediment Check Dams	Each
9030500	Temporary Silt Fencing	Linear Foot
9030600	Temporary Slope Drains	Linear Foot
9030610	Temporary Curb Inlet Protection	Linear Foot
9030700	Topsoil	Cubic Yard
9030800	Seed	Pound
9030900	Fertilizer	Pound
9031000	Water	M-Gallons
9031100	Straw Mulch	Square Yard
9031200	Asphalt Mulch	Square Yard
9031300	Fiber Mulch	Square Yard
9031400	Erosion Control Mat	Square Yard
9031500	Slab Sod	Square Yard
9031600	Storm Water Pollution Prevention Plan	Lump Sum

SECTION 905 TRAFFIC SIGNS, STRIPING AND RAISED MARKERS

Delete this Section in its entirety and replace with the following:

SECTION 905
TRAFFIC SIGNS, STRIPING AND RAISED MARKERS

905-1 DESCRIPTION: This work consists of furnishing, installing, maintaining and removing traffic signs, barricades, channelizing devices, striping and raised markers in accordance with the MUTCD; providing flaggers; and complying with all other requirements regarding the protection of the work, workers and safety of the public.

905-2 MATERIALS: Materials shall conform to the following Sections and Subsections.

Sign Backing (Blanks)	1020-1
Reflective Sign Sheeting	1020-1
Sign Posts	1020-1
Barricade Warning Lights	1020-1.1
Structural Aluminum	1020-1.2
Timber	1013
Hardware	1020-1.2(e)
Pavement Striping Tape	1020-2.1(a)
Traffic Paint	1020-2.2.3
Thermoplastic Pavement Markings	1020-2.2.1
Preformed Plastic Pavement Markings	1020-2.2.2
Raised Pavement Markers and Adhesives	1020-3

905-3 CONSTRUCTION:

905-3.1 Signs:

905-3.1.1 Temporary Signs and Barricades: The contractor shall furnish and install temporary construction signs and barricades before construction begins. When construction signs are in place and approved, existing permanent signs that are in conflict with construction signs shall be covered or removed. The Contractor shall furnish and install additional signs as necessary during construction, relocate signs on the project when required, maintain signs by cleaning or replacing as necessary, and remove construction signs upon completion of the work.

Contractor shall provide and maintain project signs for the duration of the project. Two (2) project signs shall be constructed, painted, lettered and erected in accordance with the details shown at the end of this Section. If paint or lettering is damaged it shall be touched up after erection. The project signs shall be installed at each end of the project at locations satisfactory to the Engineer and so not to cause a sight or safety problem. Upon completion of the project, the signs shall be removed by the Contractor.

905-3.1.2 Permanent Roadside Signs: Removal of existing signs shall be coordinated with new sign construction to provide adequate signing at all times.

a. **Posts:** The Contractor shall determine length of post required at each sign location. Posts shall be driven vertical by methods that will not damage posts. Minimum ground penetration shall be 2 feet for delineator and object marker signs, and 3 feet for other signs.

b. **Sign Faces:** Signs shall be mounted 7 feet above pavement edge to bottom of sign, except that a secondary sign below another sign shall be mounted 4 feet from pavement edge to bottom of sign. Signs shall have a lateral clearance of 2 feet from

pavement edge (or face of curb) to edge of sign, except that delineators and object markers on open ditch sections shall have a lateral clearance of 2 feet from shoulder edge to sign. Sign shall be oriented at a 93° angle from roadway centerline to avoid specular glare.

c. **Dead End Installations:** Timber barricades shall be constructed in accordance with Section 603. Beam guardrail shall be installed in accordance with Section 901.

905-3.2 Pavement Striping:

905-3.2.1 Temporary Striping: Temporary centerline and lane line striping shall be placed at end of each day's asphalt pavement removal or surfacing operations on all lanes that are open to traffic. Centerlines and lane lines shall be marked with 4-foot long stripes on 40-foot centers.

Temporary striping for surfaces other than final surface may be made with striping tape, traffic paint or plastic markings. Temporary striping for final surface shall be striping tape placed to avoid conflict with permanent striping. Temporary striping shall be removed after completion of permanent striping (when specified).

905-3.2.2 Permanent Striping: This subsection is hereby deleted and Section 1195 Pavement Markings substituted therefore.

905-3.3 Raised Pavement Markers:

a. **Surface Preparation:** Surfaces on which markers are to be applied shall be cleaned of materials that may reduce bond of adhesive. Surfaces shall be cleaned by blast cleaning or other methods which do not damage surface; however, blast cleaning equipment shall be provided with positive cutoff controls. Surfaces shall be blown dry immediately prior to marker placement.

b. **Weather Limitations:** Markers shall not be applied when air temperature is below 50° F.

c. **Marker Application:** Markers shall be placed with bituminous adhesive on asphalt surfaces and epoxy adhesive on concrete surfaces.

1. **Bituminous Adhesive:** Adhesive shall be applied to surface at approximately 400°F and marker immediately embedded in adhesive.

2. **Epoxy Adhesive:** Adhesive shall be applied to surface at approximately 95°F and marker immediately embedded in adhesive. Voids in bottom of marker shall be filled with adhesive just before marker placement.

Adhesive bed area shall be equal to the bottom area of markers, and adhesive shall be applied in sufficient quantity to cause excess adhesive to be forced out around the perimeter of the marker. Voids in markers with an open grid pattern on bottom shall be filled with adhesive during placement.

Unless otherwise directed, the raised pavement markers shall be installed prior to the placement of the thermoplastic striping.

d. **Blue Markers:** Blue raised reflective markers shall be placed at the locations of the existing markers or as directed. Unless otherwise directed, a blue marker shall be placed in the center of the closest lane opposite each fire hydrant.

905-3.4 Traffic Control Management: The Contractor shall assign one or more authorized Traffic

Control Supervisors (TCS) to provide traffic control management for the project. If more than one TCS is assigned, then a weekly schedule identifying who will be in charge of providing traffic control management on a daily basis shall be submitted to the Engineer. The TCS shall have a set of all contract documents relating to traffic control or traffic staging and a current copy of the MUTCD and a current copy of Louisiana Work Zone Traffic Control Details readily available at all times.

If the Contractor utilizes a subcontractor to provide traffic control management, the subcontractor's TCS shall meet all the requirements set forth herein. The Contractor may assign one or more Traffic Control Technicians (TCT) to assist the TCS in inspection and maintenance of Traffic Control Devices.

905-4 TRAFFIC CONTROL MAINTENANCE:

905-4.1 Traffic Control Supervisor:

a. **Authorization:** Prior to commencing work requiring traffic control management, the Contractor shall submit to the Engineer proof of the Traffic Control Supervisor's (TCS) and Traffic Control Technician's (TCT) current authorizations.

   1. The following minimum requirements must be met for approved TCS authorization:

      i. Successful completion of a work zone traffic control supervisor course approved by the LaDOTD.

      ii. Passing a written examination on the work zone traffic control supervisor course.

      iii. A minimum of one year full-time field experience, verified by the agency or firm, in work zone traffic control. This experience may be verified by the Owner at its discretion.

      iv. A TCS refresher course is required every 4 years.

   2. The following minimum requirements must be met for approved TCT authorization:

      i. Successful completion of a work zone traffic control technician course approved by LaDOTD.

      ii. Passing a written examination on the work zone traffic control technician course.

      iii. A TCS refresher course is required every 4 years.

b. **Traffic Control Supervisor (TCS) Duties:** The TCS's responsibility shall be traffic control management, and the TCS shall be available to the Engineer to address traffic control management issues as needed. The following is a listing of the TCS's primary duties:

   1. The TCS shall personally provide traffic control management and supervision services at the project site. The TCS may have other assigned duties, but shall be readily available at all times to perform TCS duties as required in the contract. A minimum of one TCT shall be required on site during working hours.

2. The TCS shall be responsible for observing and evaluating both the day and night time performance of all traffic control devices installed on the Project to ensure that the devices are performing effectively as planned for both safety and traffic operations. This shall be done upon the initial installation of the devices and when any modifications and/or changes are made, in addition to the inspection of traffic control required in Subsection 905-4.1e.

3. The TCS shall be responsible for revisions requested by the Contractor to the traffic control plan established in the contract and shall submit the new traffic control plan in accordance with Subsection 905-4.1c.

4. The TCS shall be responsible for the training of flagging personnel. This training will ensure that all flagging done on the project is in compliance with the MUTCD Part VI and Louisiana Work Zone Traffic Control Details.

5. The TCS shall coordinate all traffic control operations for the duration of the contract, including those of subcontractors, utility companies, and suppliers, to ensure that all traffic control is in place and fully operational prior to the commencement of any work. The Owner recognizes that the Contractor does not have direct control over the traffic control operations of the utility companies. The coordination provided by the TCS when dealing with utility companies is specifically for the purpose of coordinating concurrent utility traffic control with any other construction traffic control to avoid conflicts.

6. The TCS shall coordinate, in writing, all project activities with the appropriate law enforcement, fire control agencies, and other appropriate public agencies as determined at the pre-construction conference by the Engineer.

7. The TCS shall prepare and submit statements concerning road closures, delays, and other project activities to the Engineer on a weekly basis or more often as needed. News releases shall be submitted to the Engineer for review and approval prior to the Owner's submittal to the news media.

8. The TCS shall be responsible for notifying the Engineer, immediately of all vehicular accidents and/or incidents related to the project traffic control. The time and date of notification shall be documented in the traffic control diary. The TCS shall also monitor and document queues that occur as necessary.

9. The TCS assigned to the project shall attend the pre-construction conference and all project meetings.

10. The TCS shall be responsible for the maintenance, cleanliness, replacement and removal of traffic control devices of the existing traffic control plan during working and non-working hours.

c. **Traffic Control Plan Revisions:** Requests for revision in the traffic control plan must be made in writing to the Engineer a minimum of 14 calendar days in advance of the needed revision. If the requested revision falls within the scope of the existing Contract Documents, the Engineer may approve the revision. If the Engineer determines that the requested revision is outside the scope of the Contract Documents, the Contractor will be required to submit a change order. The change order drawings shall conform to the following:

1. Letter size original contract drawings --The change order drawings shall be submitted on high quality white 8 1/2 x 11 inch letter size paper. The drawings

may be hand drafted or computer drafted and arranged in landscape format on the page. The text and drawings must be legible after reproduction on standard reproduction equipment. Left, bottom and right hand margins shall be at least 1/2 inch and the top margin shall be 1 inch.

2. Full size original contract drawings -- The change order drawings shall be submitted on high-quality, 4-mil, double-matte film using a plotting or reproduction process that fuses the graphics to ensure durability. Repeated handling and friction due to stacking of plans shall not smear, flake or rub off the graphics. Improper plotter settings and plotter wear may cause inconsistent durability of the drawings. The Contractor shall test samples of the submitted drawings for durability. Advance samples of matte films may be submitted for approval; however, the contract plans will be tested separately. Failures will result in rejection of the submittal.
   Lettering on change order drawings shall be of adequate size to facilitate a 50 percent reduction of plans. Additions or changes shall be made with a permanent type of waterproof ink made for this purpose.

   Regardless of size, all change order drawings and documents required shall be identified with the DPW project title and project number. All plans and calculations shall be signed and sealed by a professional civil engineer currently registered to practice in Louisiana.

   All plans submitted by the Contractor shall conform to these specifications and standards. The Engineer may reject any plans not conforming to these standards.

   Revisions to the TCP that are determined to be outside the scope of the original contract drawings must be approved by the DPW Traffic Engineer or LaDOTD District Traffic Engineering Division (depending on governering agency) prior to implementation of the requested revision. In some cases on high traffic state routes, the revisions must be approved by the LaDOTD HQ Traffic Operations Engineer.

d. **Traffic Control Diary:** The TCS shall maintain a project traffic control diary in a bound book. The Contractor shall obtain a sufficient number of the diaries from the Louisiana Associated General Contractors (LAGC). The TCS shall keep the traffic control diary current on a daily basis, and shall sign each daily entry. Entries shall be made in ink and there shall be no erasures or white-outs. Incorrect entries shall be struck out and then replaced with the correct entry. Approval of the daily diaries in accordance with the plans and specifications is subject to the La. R.S. “Filing or Maintaining False Public Records.” Photographs and videotapes may be used to supplement the written text.

   The traffic control diary shall be available at all times for inspection by the Engineer; and the diary shall be reviewed with the Engineer on a weekly basis and a copy submitted to the Engineer on a monthly basis. Failure to complete the diary on a daily basis or make the diary available for review shall result in a deduction from payments for the work of $150.00 per calendar day, not as a penalty, but as stipulated damages for each day the diary is not maintained or is not available for review. Failure to submit the monthly copy of the diary to the engineer shall result in the withholding of the next partial payment until the past due copies of the diary are submitted. Submitted diaries that indicate that contemporary daily record keeping has not been maintained, as determined by the Engineer, shall result in a deduction of $150.00 for each such deficiency as stipulated damages from for the work. The lack of a weekly review by the engineer shall not relieve the Contractor from the assessment of stipulated damages for its failure to maintain a daily traffic control

diary. The traffic control diary shall become the property of the Department at the completion of the project.

e. **Inspection of Traffic Control:** The TCS shall be responsible for the inspection of all traffic control devices every calendar day that traffic control devices are in use. This inspection may be delegated to the TCT. The "Quality Guidelines for Work Zone Traffic Control Devices" standard by the American Traffic Safety Services Association (ATSSA) shall be used to evaluate the condition of the traffic control devices to determine if acceptable for use. The TCS shall provide for the immediate repair, cleaning, or replacement of any traffic control devices not functioning as required to ensure the safety of the motorist and construction personnel and/or not meeting the ATSSA standard.

f. Inspection of the traffic control devices shall be conducted by the TCS at the beginning and end of each workday, and as scheduled or directed by the Engineer during the workday. The traffic control devices shall be inspected by the TCS on weekends, holidays, or other non-work days at least once per day. Traffic control devices shall be inspected by the TCS at least once a week during nighttime periods and the same night after any modifications or changes have been made in the traffic control devices.

g. **Failure to Comply:** The Engineer may suspend all or part of the Contractor's operation(s) for failure to comply with the approved "Traffic Control Plan" or failure to correct unsafe traffic conditions within a reasonable period of time after such notification is given to the Contractor in writing. If there are major traffic control deficiencies that require immediate corrective action for the safety of the travelling public, the Engineer may completely suspend the Contractor's operations. This suspension can either be verbal or written, but shall be followed up in writing as soon as practical.

   In the event that the Contractor does not take appropriate action to bring the deficient traffic control into compliance with the approved traffic control plan or to correct the unsafe traffic conditions, the Department may proceed with the corrective action using its own forces, and such costs will be deducted from payments owed to the Contractor.

   If the Contractor's operations are suspended, the normal assessment of contract time will not cease for the period required to correct these unsafe conditions and traffic control deficiencies. The Contractor shall not be relieved of the responsibility to provide traffic control safety to the traveling public when a project is under full or partial project suspension. When a project is under suspension due to the Contractor's failure to comply with this section, or when the contract is under stipulated damages, the Contractor shall continue to provide traffic control management and no additional measurement or payment will be made. If suspensions or partial suspensions are requested by the Contractor, the additional traffic control management costs will be at the Contractor's expense.

905-4.2 Traffic Control Officer: With the agreement of the Engineer, a Traffic Control Officer (TCO) may be utilized onsite where equipment is in or near to a roadway to assist in alerting or directing traffic near the work area. In certain cases the DPW Traffic Division, LaDOTD, or other agency having jurisdiction may require a TCO.

905-5 MEASUREMENT:

a. **Signing:**

1. **Temporary Signs and Barricades:** When the contract does not include a pay item for "Temporary Signs and Barricades," the providing of temporary construction signs and barricades will not be measured for payment.

   When a pay item for "Temporary Signs and Barricades" is included in the contract, the furnishing, erecting, maintaining and removing of temporary construction signs and barricades will be measured on a lump sum basis.

2. **Permanent Signs:** Signs will be measured by the square foot. No measurement will be made for posts.

3. **Delineators and Object Markers:** Delineators and object markers will be measured per each, including post.

4. **Dead End Installations:** Dead end road installations will be measured per each, including piling, posts, sign materials, reflectors, barricades and guardrail.

b. **Striping:**

   1. **Temporary Traffic Striping:** When the contract does not include a pay item for "Temporary Traffic Striping"' the providing of these markings will not be measured for payment.

      When the contract includes an item for "Temporary Traffic Striping", the furnishing, placing, maintaining and removing these markings will be measured on a lump sum basis.

   2. **Permanent Markings:** Striping will be measured by the linear foot, exclusive of gaps. Legends and symbols will be measured per each.

c. **Raised Pavement Markers:** Raised pavement markers will be measured per each.

d. **Traffic Control Officer:** The Traffic Control Officer (TCO) shall be one or more uniformed law enforcement officer(s). The TCO will work on an hourly basis for only those times that their services are required. The number of TCOs necessary will be determined by joint agreement of the Contractor, Engineer and the law enforcement agency involved as indicated in the Traffic Control Plan.

905-6 PAYMENT: Payment for traffic signs, striping and raised markers will be made at the contract prices.

Partial payments for temporary signs and barricades will be made in accordance with the following schedule;

% of Total Contract Amount Earned	Allowable % of Lump Sum Price for Item
1st Partial Estimate	20
25	40
50	60
75	80
100	100

Traffic Control Officer: This item is shown as a Lump Sum Unit Item, but will included in the bid form as an allowance to be applied to all costs associated with this item. Contractor will be required to provide detailed documentation for all costs associated with this item, which shall be reviewed and approved prior to authorization by the Owner to proceed with the Work.

Payment of the allowance for this item will be on the basis of documented and approved expenses plus ten percent (10%). Should the final cost of this item exceed the amount of the allowance, additional payments will only be authorized by a properly executed change order.

No direct payment will be made for removing existing pavement markings, project signs, Traffic Control Supervisors, or Traffic Control Technicians.

905-7 PAY ITEMS:

Item No.	Item	Unit
9050100	Temporary Signs and Barricades	Lump Sum
9050200	Traffic Signs	Square Foot
9050300	Delineator	Each
9050400	Object Marker	Each
90505--	(Type) Dead End Installation	Each
9050600	Temporary Traffic Striping	Lump Sum
90507--	Painted Traffic Striping (__" Width)	Linear Foot
90508--	Plastic Traffic Striping (__" Width)	Linear Foot
90509--	Painted Legends and Symbols (Type)	Each
90510--	Plastic Legends and Symbols (Type)	Each
9051100	Raised Pavement Markers	Each
9059000	Traffic Control Officer	Lump Sum

SECTION 909 MOBILIZATION

909-2 PAYMENT: This subsection is deleted and replaced by the following:

a. When the contract does not include a pay item for mobilization, no direct payment will be made for mobilization.

b. When the contract contains a pay item for mobilization, payment will be made at the contract lump sum price, subject to the following provisions:

The lump sum price bid for mobilization shall be limited to not more than five percent (5%) of the total contract price, including this item. Partial payments for mobilization will be made in accordance with the following schedule. Payment of any remaining amount will be made upon completion of all work under the contract.

% of Contract Time Elapsed	Max Total % of Mobilization to be Paid
1st Partial Estimate	15
25	30
50	60
75	90

No payment adjustment will be made for this item due to changes in the work in accordance with Section 10.

SECTION 914
PRE-CONSTRUCTION VIDEO

914-1 SCOPE OF WORK: The Contractor shall furnish all labor, materials and equipment to perform color audio-video recording of the project site surfaces as specified herein. Contractor shall furnish to the Owner an original and three (3) copies of a continuous color and audio-video DVD recording of the project sites.

The Owner reserves the right to reject the audio-video DVD because of poor quality, unintelligible audio or uncontrolled pan or zoom. Any video rejected by the Owner shall be re-videoed at no additional cost to the Owner. The contractor shall submit one (1) DVD to the Owner for format and content approval prior to the start of any work.

914-2 QUALIFICATIONS:

a. The video recording shall be performed by a qualified audio-video taping firm or individual knowledgeable in construction practices and experienced in the implementation of established inspection procedures.

b. Photographer's Qualifications: Photographer shall be a firm or an individual of established reputation who has been regularly engaged as professional photographer for not less than three (3) years. The photographer must have had previous experience video documenting a minimum of ten (10) miles of preconstruction work.

c. Any apprentice photographer must be continuously supervised by an above-described experienced photographer.

914-3 EXECUTION: Prior to the commencement of any construction, equipment or material mobilization, the Contractor shall perform an audio-video survey of each project site area which will be excavated or which has the potential to be disturbed by the Contractor's operations. Specific areas of this project include, but are not limited to:

a. All areas to be entered by vehicles or equipment, including construction areas for both internal and excavated improvements.

b. Areas requiring manhole work.

c. Paved and unpaved areas which will be entered by vehicles or equipment.

d. Other areas that may be impacted by the Work, including work staging areas and field offices, as directed by the Owner.

The Contractor shall be responsible for the timely execution of the preconstruction audio-video survey, its vantage points, and quality. The Contractor shall cooperate with the photographer's work and provide reasonable auxiliary services as requested, including access and use of temporary facilities including temporary lighting.

Submitted DVD's shall be reviewed and approved by the Owner within five (5) days of submittal of a satisfactory survey. Should the DVD not provide adequate coverage to fully illustrate the physical condition of the work area or not be in compliance with the specifications, project areas shall be re-surveyed prior to the initiation of construction at the project sites, with no additional cost to the Owner.

The Contractor shall provide four (4) copies; labeled on the DVD and jewel case cover as

follows: Face of DVD & Case Cover

PRECONSTRUCTION AUDIO-VIDEO SURVEY

Contract No._____ Project Title:_____

Contractor:_____ DVD No._____

Date Televised (MM/YY):_____ Date Submitted _____

Inside of Case Cover

Work Area	**Street, Address/Location**	**Starting Video Counter No.**

Note: The Contractor may record the surface videos of as many line segments as possible on a single DVD.

A cumulative index correlating the various segments of video coverage to the corresponding DVD's shall be supplied to the Owner. This index shall identify each segment in the video by location, engineering stationing corresponding to the stationing on the contract documents, video counter number, viewing side, point starting from, traveling direction, and ending point. Written documentation must coincide with the information on the tape so as to make easy retrieval of locations sought for at a later date.

The video portion of the recording shall produce bright, sharp, clear pictures with accurate colors and shall be free from distortion, tearing, rolls, or any other form of picture imperfection. The audio portion of the recording shall reproduce precise and concise explanatory notes by the camera operator with proper volume, clarity and freedom from distortion.

The recorder shall record the color signal with a minimum horizontal resolution of 400 lines. The color video camera shall have a minimum horizontal resolution of 700 lines at the center.

To preclude the possibility of tampering or editing, the DVD shall display continuous digital information including the following:

a. Date and time of the recording; date information will contain the month, day and year; time information will contain hours, minutes and seconds, separated by colons.

b. The engineering stationing corresponding to the stationing on the contract documents, or as directed by the Owner.

Digital information shall appear at the bottom of the viewing screen and in no way interfere with the video portion of the recording.

At the start of each video recording segment, an identification summary shall be read into the record simultaneously with a wide-angle view with digital information. The identification summary shall include the following:

a. DVD number
b. The Contractor shall identify EBROSCO
c. Contract number and name
d. Contractor's name
e. Date and time
f. Manhole numbers
g. General location and name of street
h. Weather
i. Direction of travel and viewing direction

The recording shall include the coverage of all surface and other site features located in areas to be affected by the Work, extending to a minimum of 15 feet outside the actual right of way (street, construction, etc.). The surface features recorded shall include, but not be limited to, roadways, driveways, sidewalks, curbs, culverts, headwalls, retaining walls, buildings, above-ground utilities, parks, lawns, landscaping, trees, tree canopies, shrubbery and fences. The area of coverage shall extend to 50 feet from the proposed work site but shall also include all unpaved areas and access routes where vehicles or equipment will pass.

Video recording may be ordered outside of the area of coverage in order to establish those features deemed necessary by the Owner.

Video recording coverage shall include documentation of the condition of the surface and other site features located within the area of coverage and shall be supported by appropriate audio description. Audio description shall be made simultaneously with the video recording.

Houses and buildings shall be identified visually and verbally by house number in such a manner that structures of the proposed system (i.e., manholes on a sewer system) can be located by reference.

The coverage shall be continuous (i.e., the camera shall not be turned off once recording has begun) to the greatest extent possible.

The rate of travel for video recording shall be determined by the number, size and value of the surface and other site features within the construction area of coverage so as to produce a clear, detailed view of each feature. At no time shall the rate of travel exceed 44 feet per minute. Forward motion of the camera shall be halted when viewing objects or structures outside the limits of the street or easement being documented.

The photographer shall pan and zoom in and out at a reasonable rate so as to control sufficiently the clarity of objects being viewed.

When recording in rights-of-way, the camera shall be mounted on a steady base. Horizontal and vertical shots shall be made from the base, in order to insure proper perspective. The distance from the camera lens to the ground shall be not less than 12 feet. If not accessible by motorized vehicle, height shall be determined by the distance from ground to shoulder height of the camera operator. Contractor shall furnish all auxiliary lighting as required to produce a quality recording. At no time will the Contractor be allowed to use any electrical circuits within a building on private properties.

All video recording shall be performed during regular business hours, unless otherwise approved by

the Owner. No video recording shall be performed if the weather is not acceptable, such as rain, fog, or elongated shadows that distort perception and tend to prevent clear resolution.

The photographer shall retain the original unedited video DVD for five (5) years after the date of final acceptance. During this period, the photographer shall fill orders by the Engineer for extra copies of DVD's priced at prevailing local commercial rates.

914-4 MEASUREMENT AND PAYMENT: No measurement or direct payment will be made for pre-construction video.

PART X MATERIALS

SECTION 1001 AGGREGATES

Delete this Section in its entirety and replace with the following:

SECTION 1001
AGGREGATES

1001-1 GENERAL: Aggregates shall be from a source listed in the QPL.

1001-1.1 Abrasion Resistance and Soundness: Maximum soundness loss of aggregate shall be 15% when subjected to 5 cycles of magnesium sulfate soundness test by AASHTO T 104. Coarse aggregates for portland cement concrete and asphalt concrete shall show an abrasion loss of not more than 40% when tested by AASHTO T 96.

1001-1.2 Physical Properties: Physical properties shall be determined in accordance with test methods shown:

Property	Test Method
Deleterious Materials	DOTD TR 119
Unit Weight	AASHTO T 19
Specific Gravity & Absorption of Coarse Aggregate	AASHTO T 85
Specific Gravity & Absorption of Fine Aggregate	AASHTO T 84
Polish Value	AASHTO T 278 & T 279
Amount of Material Finer than No. 200 Sieve	DOTD TR 112
Sieve Analysis (Gradation)	DOTD TR 113
Liquid Limit	DOTD TR 428
Plasticity Index	DOTD TR 428

1001-2 AGGREGATES FOR PORTLAND CEMENT CONCRETE AND MORTAR:

1001-2.1 General: When tested in accordance with ASTM C 289, C 586 and C 1260, aggregates potentially reactive with cement alkalies will be restricted to use with cement containing 0.6% or less alkalies (sodium oxide equivalent).

1001-2.2 Fine Aggregate: Fine aggregate shall be sand in which deleterious substances do not exceed the following:

Property	Maximum %
Coal and Lignite	0.25
Clay Lumps	0.05
Clay Lumps & Friable Particles	3.00

Fine aggregate subjected to colorimetric test for organic impurities (AASHTO T 21) which produces a color darker than Organic Color No. 3 shall be subjected to mortar strength test (AASHTO T 71). Mortar shall show a minimum compressive strength of 95% of reference mortar.

Fine aggregate shall conform to the following gradations:

CONCRETE SAND

U. S. Sieve	% Passing
3/8"	100
No. 4	95-100

No. 16	45-90
No. 50	7-30
No. 100	0-7
No. 200	0-3

MORTAR SAND

U. S. Sieve	% Passing
No. 4	100
No. 8	95-100
No. 100	0-25
No. 200	0-10

1001-2.3 Coarse Aggregate: Coarse aggregate shall be gravel, stone or crushed concrete.

The amounts by weight of deleterious substances shall be as follows:

Property	Maximum %
Clay Lumps	0.05
Clay Lumps & Friable Particles	3.0
Iron Ore	2.0[1]
Coal & Lignite	1.0[1]
Sticks (Wet)	0.05
Total Clay Lumps & Friable Particles, Iron Ore, Coal & Lignite, and Wood	5.0

[1]Aggregate used in concrete railings shall be free from coal, lignite and iron ore.

Coarse aggregate shall conform to the following gradations:

% Passing U.S. Sieve	Grade A	Grade B	Grade D[1]	Grade F	Grade P[2]
2 1/2"	---	---	100	---	---
2"	---	100	90-100	---	---
1 1/2"	100	85-100	---	---	---
1"	90-100	---	35-70	---	---
3/4"	---	35-70	---	100	100
1/2"	25-60	---	10-30	90-100	90-100
3/8"	---	10-30	---	---	20-55
No. 4	0-10	0-5	0-5	15-60	0-10
No. 8	0-5	---	---	0-15	0-5
No. 16	---	---	---	0-5	---
No. 200	0-1	0-1	0-1	0-1	0-1

[1]Crushed stone only.

[2]For slip form of concrete curb if allowed by the project engineer.

If material finer than No. 200 sieve consists of dust from crushing, essentially free of clay, this percentage shall be 0-2. If total material passing No. 200 sieve from coarse and fine aggregates does not exceed 5%, material passing No. 200 sieve from crushed coarse aggregate may be increased to 3%.

1001-3 BASE AND SUBBASE AGGREGATES:

1001-3.1 Base Stone: This material shall consist of crushed stone or crushed concrete and shall conform to the following gradation:

U. S. Sieve	% Passing

1 1/2"	100
1"	90-100
3/4"	70-100
No. 4	35-65
No. 40	12-32
No. 200	5-12

Material passing No. 40 sieve shall conform to the following:

	Maximum
Liquid Limit	25
Plasticity Index	4

1001-3.2 Sub-base Stone: This material shall consist of crushed stone or crushed concrete and shall conform to the following gradation:

U. S. Sieve	% Passing
2"	100
1 1/2"	90-100
1"	20-55
3/4"	0-15
3/8"	0-5

1001-4 SURFACE COURSE AGGREGATES:

1001-4.1 Stone: This aggregate shall consist of crushed stone or crushed concrete and shall conform to the following gradation:

U. S. Sieve	% Passing
1 1/2"	100
3/4"	50-100
No. 4	35-65
No. 40	10-32
No. 200	3-15

Material passing No. 40 sieve shall conform to the following:

	Maximum
Liquid Limit	25
Plasticity Index	4

1001-4.2 Gravel: Gravel shall be free of sticks and other foreign material, and shall be graded as follows:

U. S. Sieve	% Passing
1 1/2"	95-100
No. 4	0-15
No. 200	0-2

1001-5 ASPHALT CONCRETE AGGREGATES:

These aggregates shall be assigned a Friction Rating as shown in Table 1001-1 and indicated in QPL 2.

Table 1001-1
Aggregate Friction Rating

Friction Rating	Description
I	Aggregates that have a Polish Value of greater than 37 or demonstrate the ability to retain acceptable friction numbers for the life of the pavement.
II	Aggregates that have a Polish Value of 35 to 37 or demonstrate the ability to retain acceptable friction numbers for the life of the pavement.
III	Aggregates that have a Polish Value of 30 to 34 or demonstrate the ability to retain acceptable friction numbers for the life of the pavement.
IV	Aggregates with a Polish Value of 20 to 29.

1001-5.1 Gravel, Stone, Slag and Crushed Concrete: The amount of clay lumps and friable particles shall not exceed 5% by weight.

1001-5.2 Coarse Sand: Coarse sand shall be free from vegetative and other foreign matter.

1001-5.3 Fine Sand: Fine sand shall be free from vegetative and other foreign matter. Fine sand shall be nonplastic with a maximum of 25% passing No. 200 sieve.

1001-5.4 Screenings: Screenings shall be made by crushing aggregates which conform to requirements for coarse aggregates in Subsection 1001-1. Screenings shall meet the following gradation requirements.

U. S. Sieve	% Passing
3/8"	100
No. 4	85-100

1001-5.5 Reclaimed Asphalt Concrete: Stockpiles of reclaimed asphalt concrete shall be approved prior to use. Stockpiles shall be uniform and free of soil, debris, foreign matter and other contaminants. Reclaimed material shall pass a 2" sieve.

1001-5.6 Mineral Filler: Mineral filler shall be limestone dust, pulverized hydrated lime, portland cement, or cement stack dust. Mineral dust collected in bag houses or by other dust collectors at asphalt concrete plants is not classified as mineral filler. Cement stack dust shall be material collected from waste gases discharged through a collector of a cement plant. Mineral filler shall conform to the following gradation:

U. S. Sieve	% Passing
No. 30	100
No. 80	95-100
No. 200	70-100
No. 270	60-100

1001-6 BEDDING MATERIAL: Bedding materials shall be a sand-aggregate mixture. Aggregate in the mixture shall be gravel, stone or crushed concrete. The mixture shall be free of foreign matter

and shall be graded as follows:

U. S. Sieve	% Passing
1 ½"	95-100
No. 4	30-50
No. 10	20-45
No. 200	0-10

1001-7 BACKFILL SAND: Sand for backfilling trenches and structures shall be non-plastic siliceous material, graded as follows:

U. S. Sieve	% Passing
½"	100
No. 10	75-100
No. 200	0-10

1001-8 RIPRAP: Riprap shall be crushed stone or crushed concrete. The smallest dimension shall be at least 1/3 the largest dimension. Crushed concrete shall be free of protruding steel reinforcement.

Riprap shall be graded as follows:

Table 1001-2
Riprap Gradation

Riprap Class [1]	Stone Size lb	Spherical Diameter [2] ft	Percent of Stone Smaller Than
2 lb	10 4 2 0.75	0.51 0.38 0.30 0.22	100 40-100 15-50 0-15
10 lb	50 20 10 5	0.88 0.65 0.51 0.41	100 50-100 15-50 0-15
30 lb	140 60 30 10	1.24 0.94 0.74 0.51	100 42-100 15-50 0-15
55 lb [3]	275 110 55 20	1.50 1.11 0.88 0.63	100 42-100 15-50 0-15
130 lb [3]	650 260 130 40	2.00 1.46 1.17 0.79	100 45-100 15-50 0-15

Riprap Class [1]	Stone Size lb	Spherical Diameter [2] ft	Percent of Stone Smaller Than
250 lb [3]	1250 500 250 80	2.50 1.83 1.46 1.00	100 45-100 15-50 0-15
440 lb [3]	2200 900 440 130	3.00 2.23 1.76 1.17	100 40-100 14-50 0-15
1000 lb [3]	5000 2000 1000 300	4.00 2.91 2.31 1.55	100 45-100 10-50 0-15

[1]The stone size used to define the Riprap Class is the minimum median stone size for the stone class. The minimum thickness of a riprap layer shall be no less than 18 inches or the spherical diameter of the maximum stone size in the Riprap Class (D_{100}) if greater.

[2]Spherical diameters of riprap classes up to 30 lb are based on a solid weight of 140 lb/cu ft. Spherical diameters of riprap classes above 30 lb are based on a solid weight of 155 lb/cu ft.

[3]Recycled portland cement concrete may not be used in these riprap classes.

SECTION 1004 ASPHALT CONCRETE

Delete this Section in its entirety and replace with the following:

SECTION 1004
ASPHALT CONCRETE

1004-1 GENERAL: Asphalt concrete shall consist of aggregates and asphalt combined in a central plant and meeting requirements of Table 10-9. Mix types used shall be as specified.

1004-2 MATERIALS: Accurate records shall be kept, including proof of deliveries of materials for use in asphalt concrete. Copies of these records shall be furnished to the Engineer upon request. Materials shall conform to the following Subsections:

Asphalt	1003-1
Additives	1003-4
Aggregates	1001-5
Hydrated Lime	1002-3

a. **Asphalt:** Asphalt cement used in mixtures shall be polymer modified and as follows:

Table 1004-1: Asphalt Cement Usage

Road Type	Mixture Type	Structure Type	Grade of Asphalt Cement
Arterial	A	Wearing Course	PG 76-22m
	B	Binder Course	PG 76-22m
	B	Base Course	PG 64-22
Collector	B with Granite Fines	Wearing Course	PG 76-22m
	B	Binder Course	PG 76-22m
	B	Base Course	PG 64-22
Local	B with Granite Fines	Wearing Course	PG 70-22m
	B	Binder Course	PG 70-22m
Incidental Paving	C	Incidental Paving	PG 70-22m
Utility Trench Patching	As Required for Road Type[1]	Wearing Course	As Required for Road Type
	B	Base Course	PG 64-22[2]

1. Granite Fines are allowed but not required for wearing courses associated with Utility Trench Patching for Collector and Local Road Types.
2. Binder course Mixture Type and Asphalt Cement Grade for corresponding Road Type may be used as base course associated with Utility Trench Patching at no additional cost to the Owner.

When mixtures are used for bike paths, curbs, detour roads, driveways, guardrail widening, islands, joint repair, leveling, or parking lots, PG 64-22 asphalt cement may be used in lieu of the polymer modified asphalts. Unless otherwise noted on the plans, PG 64-22 asphalt cement may also be used on shoulders in lieu of the polymer modified asphalts.

Polymer modified asphalt cement shall consist of an asphalt cement to which a minimum of 3% by weight polymer has been added. The resulting material shall be homogeneous and smooth without detectable strands of polymer.

b. **Additives:**

1. **Anti-Strip:** An anti-strip additive shall be added at the minimum rate of 0.5% by weight of asphalt and mixed with asphalt cement at the plant. Additional anti-strip additive shall be added in accordance with Subsection 1004-4(b).

2. **Silicone:** Silicone additives, when needed, shall be dispersed into asphalt by methods and in concentrations given in the QPL.

3. **Hydrated Lime:** Hydrated lime may be incorporated into asphalt concrete mixtures at the rate specified in the approved job mix formula. Minimum rate shall be 1.5% by weight of total mixture. Hydrated lime shall be mixed with aggregates prior to mixing with asphalt.

c. **Aggregates:** Aggregate shall conform to Table 10-9. All aggregates shall have friction rating of I, II, or III in accordance with Table 1001-1.

1. **Crushed Concrete:** Crushed concrete may be used in mixtures up to 70% by weight of aggregates. Crushed concrete shall be stockpiled separate from other aggregates at the plant.

2. **Reclaimed Asphalt Concrete:** Whenever polymer modified asphalt is required and for all wearing course mixes, reclaimed asphaltic concrete shall not be used. Reclaimed asphalt concrete may be used in binder or base mixtures up to 20% by weight of aggregate. Reclaimed asphalt concrete shall contain no expanded clay aggregate and shall be stockpiled separate from other aggregates at the plant.

   A separate cold feed system shall be provided for reclaimed asphalt concrete, and new aggregates shall be heated to a sufficiently high temperature to produce a mix at required discharge temperature.

1004-3 EQUIPMENT: Plant and hauling equipment shall be LaDOTD certified. The central mixing plant shall be equipped with an asphalt working tank meeting LaDOTD specifications. In addition there shall be an asphalt storage tank of sufficient capacity to hold enough asphalt for one full day's operation of the plant. The storage tank shall have adequate heating and circulating equipment and insulation to maintain proper uniform temperature. Storage tanks shall be approved by the Engineer prior to use.

1004-4 MIX DESIGN AND CONTROL:

a. **General:** The contractor shall be responsible for design, production and hauling of mixtures, and shall constantly monitor equipment, materials and processes to ensure that mixtures are produced in accordance with specifications. If specifications are not being met and satisfactory control adjustments are not being made, operations shall be discontinued until proper adjustments and uniform operations are established.

   The contractor shall conduct tests as necessary, in addition to required tests, to produce mixtures within specifications.

When the plant is in operation, the contractor shall have a DOTD Certified Asphalt Concrete Technician at the plant or jobsite who is capable of designing asphalt concrete mixes, conducting any test or analysis necessary to put the plant into operation and producing a mix meeting specifications. Daily plant operations shall not begin unless the Certified Asphalt Concrete Technician is at the plant.

b. **Job Mix Formula:** The contractor shall design mixtures in accordance with DOTD TR 303, Method A; however, Method B may be used when approved. The job mix formula shall include the recommended formula and supporting design data. The recommended formula shall be submitted for approval to the engineer. No mixture shall be produced until the proposed job mix formula has been approved.

   The proposed job mix formula shall indicate a single anti-strip additive rate which is 0.1% greater than the percentage which will yield a minimum of 90% coating when tested by DOTD TR 317, but not more than 1.2% by weight of asphalt.

   The job mix formula shall indicate a single rate of hydrated lime additive when used. Hydrated lime additive shall not be less than 1.5% by weight of total mixture.

   The job mix formula shall produce a mixture with a minimum Tensile Strength Ratio (TSR) of 75% when tested by DOTD TR 322.

   The job mix formula shall indicate optimum mixing temperature. When aggregates with a water absorption value greater than 2%, determined by AASHTO T 84 for fine aggregate and AASHTO T 85 for coarse aggregate, or aggregates with an asphalt absorption value greater than 0.5%, determined by DOTD TR 320, are used, initial optimum asphalt content shall be increased to compensate for asphalt absorbed by aggregates.

1004-5 HANDLING OF AGGREGATES: Aggregates shall be stored at the plant so that no intermixing will occur. Material shall be stockpiled so that no detrimental degradation or segregation of aggregates will occur, no foreign material will be incorporated into aggregates, and there will be no intermingling of materials. Stockpiles shall be well drained.

Blending of aggregates shall be done from cold feed bins and not in stockpiles or on the ground.

Gradation and other properties of aggregate in stockpiles shall be such that when aggregates are combined in proper proportions, the combined gradation will conform to the approved job mix formula.

Proportioning of material at the cold feed shall be established to meet the approved job mix gradation requirements. Plants operating with only cold feed control shall not require additional manipulation to meet job mix requirements.

a. **Drying:** Aggregates shall be heated and dried to produce a mixture meeting specifications. Material fed through dryer shall be held to an amount which can be adequately heated and dried. When proper drying is not achieved and quality of the mix is impaired, production rate of dryer shall be adjusted to obtain satisfactory results. Burner fuel used shall be clean burning so there is no contamination of aggregates.

b. **Hot Aggregate Storage:** In batch plants, hot aggregate shall be so stored in bins as to minimize segregation and loss of temperature of aggregates. When plant operation is interrupted and material in storage cools to 25°F or more below specified mixing temperature, aggregate in bins shall be discarded. When a plant changes type of mix

that requires a change of materials, aggregate in bins shall be discarded.

1004-6 PROCESSING OF ASPHALT AND AGGREGATES: Aggregates shall be combined to meet the approved job mix formula.

The minimum discharge temperature of asphaltic concrete produced shall be 290 degrees Fahrenheit and the maximum discharge temperature shall be 325 Fahrenheit.

Aggregate Moisture Content: No mix shall be produced when the moisture content of a sample of combined aggregates, taken from the belt feeding the drum/dryer, is equal to or exceeds 8%.

Maximum moisture content of final mixture shall be 0.5% by weight when tested by DOTD TR 319.

When automatic adjustments or other critical control devices are not functioning, the plant shall not operate.

a. **Plants with Pugmills:** Combined aggregate shall be mixed dry, after which asphalt shall be sprayed over aggregates and mixed to produce a mixture in which aggregate particles are uniformly coated. Mixing times shall be in accordance with the approved job mix formula.

b. **Drum-mixer and Continuous Mix Plants:** The system shall provide positive weight control of cold aggregates fed by a belt scale or other device interlocked with the asphalt measuring system to maintain required proportions of combined aggregates and asphalt. Aggregates shall be heated, dried and mixed with asphalt to produce a mixture in which aggregate particles are uniformly coated. The first and last output of the plant shall be wasted after each interruption.

   The Certified Asphalt Concrete Plant Technician shall measure moisture content of cold feed aggregates daily when starting the plant. Adequate scheduled tests during plant operations and adjustments to the plant shall be made to correct for moisture in the aggregate.

   Provisions shall be made for introducing the latest moisture content of cold feed aggregates into belt weighing system, thereby correcting wet aggregate weight to dry aggregate weight. Dry weight of aggregate flow shall be displayed digitally in units of weight and time, and the quantity totaled. The rate of flow of asphalt anti-strip and lime (when used) shall also be digitally displayed and the quantity totaled.

   For mineral filler, a separate bin and feeder shall be furnished with its drive interlocked with aggregate feeders. Mineral filler shall be introduced into drum near asphalt discharge.

c. **Scales and Printer Systems:**

   1. **Scales:** To determine the total weight of mix loaded in trucks, springless dial scales or load cell scales for weigh hoppers shall be provided. When weigh hoppers are not used, truck platform scales shall be provided. When drum-mixer process is used, belt scales shall be provided for conveyors.

   2. **Printer System for Batch Plants:** An approved printer system shall be provided which will print separately the weight of aggregates and asphalt. These weights shall be used for calculating percent asphalt in the mixture. When a mixture is loaded directly into haul truck, these weights shall be used to determine pay weights for the

mix. Printing equipment shall also print zero weight for each batch and total weight of mixture loaded in trucks.

In case of a printing mechanism breakdown, the plant will be permitted to operate during the 48-hour period immediately following the breakdown, provided an accurate weight of mixture can be determined and repeated breakdowns do not occur.

3. **Printer System for Plants With Storage or Surge Bins:** When storage or surge bins are used, truck-platform scales or a weigh hopper shall be provided to determine pay weights for the mix. The weight hopper shall be equipped with an approved automatic printer system that will print zero weight, batch weight and total weight of mixture loaded into truck.

   Truck-platform scales shall be of sufficient length to weigh the entire unit transporting the mix. Scales shall be equipped with an approved automatic printer system that will print tare weight and total weight of unit and mix.

   Scales with electronic digital readout displays, that do not automatically reset to zero after tare weight is obtained, shall print tare weight, zero weight, and either total weight of mix loaded into unit or total weight of unit and mixture. Scales with electronic digital readout displays that automatically return to zero after tare weight is obtained shall print tare weight and either total weight of mix loaded into unit or total weight of unit and mixture.

   When scales are located so that a truck leaves the scales between empty weighing and loaded weighing, printer shall print tare weight, zero weight before loaded weighing, and total weight of unit and mix. In case of a printing mechanism breakdown, the plant will be permitted to operate during the 48-hour period immediately following the breakdown provided an accurate weight of mixture can be determined and repeated breakdowns do not occur.

1004-7 STORAGE SILOS AND SURGE BINS: Storage silos or surge bins for storing asphalt concrete mixtures may be used.

a. **Conditions of Use:** Use of silos or bins shall conform to specification limitations on retention time, type of mixture, heater operation, bin atmosphere, bin level or other characteristics.

   An indicator which is activated when material in bin drops below top of sloped portion shall be affixed to each bin and be visible to operator. Mixtures shall be maintained above this level during production.

b. **Heated Silos:** Storage silo heating system shall be capable of maintaining mix temperature without localized heating.

   Maximum allowable storage time for asphalt concrete mixtures is 18 hours unless test results and other data indicate that additional storage time is not detrimental to mix.

c. **Unheated Surge Bins:** Maximum allowable storage time for unheated surge bins is 2 hours unless test results and other data indicate that additional storage time is not detrimental to mix.

d. **Loading and Unloading Mixtures:** Mixtures shall be conveyed from plant to bin or silo

by an enclosed continuous system designed to prevent spillage and to remove mix from plant as fast as it is produced. Mixture in silo or surge bin shall remain within ±15°F of plant discharge temperature.

When mixture is placed in silo or bin through a surge device, an automatic warning system shall be provided to audibly warn operator of a gate malfunction.

Silo or bin unloading gates shall be of a type that will not cause segregation or be detrimental to mix.

TABLE 10-9

ASPHALT CONCRETE MIXTURES

U.S. SIEVE % PASSING	TYPE A[5]	TYPE B			TYPE C		
	Wearing Course	Wearing Course	Binder Course	Base Course	Wearing Course	Binder Course	
1½"	---	---	---	100	---	Same	S
1"	100	100	100	80-100	---	Gradation	A
3/4"	95-100	95-100	85-100	---	---	As Type B	
1/2"	80-95	90-100	70-100	---	100	Binder	
3/8"	70-88	70-100	60-95	---	90-100	Course	
No. 4[4]	50-75	50-75	40-70	35-70	55-85		
No. 10	28-55	32-55	28-50	---	30-65		
No. 40	14-30	16-33	16-33	16-40	14-30		
No. 80	8-20	8-20	8-20	---	8-20		
No. 200	3-10	3-10	3-10	3-15	3-8		
Extracted Asphalt	---	---	---	---	---		
Mixing Temperature[1]	---	---	---	---	---		
% Crushed, min. [2]	90min	90min	70min	As Needed	80	As Needed	
Marshall Stability, lb[6]							
No. of Blows	75	75	75	75	50	50	
Av. of 4 Tests:							
Design	2200	1700	1600	1200	1200	1200	
Minimum	1800	1500	1400	1000	1000	1000	
Individual Test, min.	1500	1300	1200	800	800	800	
Marshall Flow, 1/100"	6-15	6-15	5-15	15 Max.	8-18	8-15	
% Voids	3-5	3-5	3-5	3-5	2-4	3-5	
% VFA	70-85	70-85	70-80	70-80	75-85	70-80	

Notes for Table 10-9

1 Determined by Job Mix Formula.
2 Determined by DOTD TR 306.
3 Mix tolerance for mixing temperature for mixes with polymer modified asphalt cement is 0°F.
4 All mixes designated as “Granite Fines” (GF) shall conform to the following requirement: No more than 15% by weight of the total mixture shall be natural sand. Granite fines shall replace the remaining sand required to meet the specified gradation.
5 At least 30% of the total aggregates by weight for Type A mixes shall have a Skid Resistant Rating of 1, and not more than 10% by weight of this material shall pass No. 10 sieve.
6 Determined by DOTD TR 305.

SECTION 1011 STRUCTURAL METALS

1011-5 IRON CASTINGS: This subsection is deleted and replaced by the following:

1011-5 IRON CASTINGS: Iron castings to be true to pattern in form and dimensions and free form pouring faults, sponginess, cracks, blowholes and other defects in positions affecting their value for service intended. Castings shall be boldly filleted at angles, and rises shall be sharp and perfect. Castings shall be cleaned of scale and sanded to a smooth, clean, uniform surface.

a. Gray Iron Castings shall conform to the latest edition of AASHTO M 306.

b. Malleable Castings shall conform to ASTM A 47, Grade 32510.

c. Ductile Iron Castings shall conform to ASTM A 536, Grade 60-40-18.

SECTION 1016 SEWER PIPE

Delete this Section in its entirety and replace with the following:

SECTION 1016
SEWER PIPE

1016-1 GRAVITY SEWER PIPE: Contractor shall provide sewer pipes with the inside diameter shown on the Contract Documents. Diameters shown on the Drawings and listed in the pay items represent the required inside diameters, regardless of pipe material.

1016-1.1 Plastic Pipe: Pipe may be any of the following types:

1016-1.1.1 Polyvinyl Chloride (PVC) Pipe and Fittings:

a. Polyvinyl chloride sewer pipe shall be green in color.

1016-1.1.1.1 PVC for Direct Bury Application:

a. Solid Wall PVC

1. Pipe shall be of solid-wall construction and be available in laying lengths not exceeding 20 feet.

2. Pipe 15" diameter or smaller shall conform to ASTM D 3034; pipe larger than 15" diameter shall conform to ASTM F 679.

3. Material for PVC pipe from 4” to 15” shall conform to the requirements of ASTM D 1784 for cell classifications 12454. Material for PVC pipe from 18” to 27” shall conform to the requirements of ASTM D 1784 for cell classifications 12364 or 12454. Maximum filler content shall be 10 percent.

4. All pipe shall have an SDR of 35 and a minimum pipe stiffness of 46 psi when tested in accordance with ASTM D 2412. Where pipe depth is greater than 20 ft., provide pipe in SDR 26 with minimum pipe stiffness of 115 psi.

5. Joints shall be an integral bell and spigot-type with solid cross section elastomeric or rubber gasket ring conforming to ASTM D 3212. Gaskets shall meet the requirements of ASTM F 477. Use elastomeric factory installed gaskets to make joints flexible and watertight. Lubricant for rubber-gasketed joints shall be water soluble, non-toxic, non-supporting of bacteria growth, having no deteriorating effect on PVC or rubber gaskets. The manufacturer shall test a sample from each batch conforming to the requirements of ASTM D 2444.

6. All sewer fittings and accessories shall conform to the requirements of ASTM F 1336 and ASTM D 3034 or ASTM F 679 and shall have bell and/or spigot compatible with pipe. The stiffness of the fittings shall not be less than the stiffness of the adjoining pipe.

b. Large Diameter Closed Profile PVC (21” – 54” only)

1. PVC closed profile pipe shall be permitted for 21" through 54" direct bury gravity sewer pipe.

2. The pipe shall meet the requirements of ASTM F-1803, Closed Profile, and have a smooth interior and effectively smooth exterior. Fittings shall be fabricated from pipe meeting these standards.

3. Pipe and fittings shall be fabricated from PVC compounds meeting the minimum requirements of cell classification 12364 as defined by ASTM D-1784.

4. Joints shall have an integral bell and spigot with an elastomeric gasket and shall conform to the requirements of ASTM D-3212 and ASTM F-477. Gaskets shall be factory installed and chemically bonded to the bell end of the pipe. The use of putty, fillers, rubber or plastic inserts or wedges to form either the inner or outer wall of the pipe will not be allowed on spigots or bells. Jointing shall be accomplished in accordance with the manufacturer's recommendations.

5. PVC closed profile pipe shall be designed to provide a minimum pipe stiffness value of 60 psi for all sizes when tested in accordance with ASTM D-2412.

6. Each pipe length and fitting shall be clearly marked with the name of the manufacturer, nominal size, cell classification, ASTM designation F-1803, pipe stiffness designation "PS-60", and manufacturer's date code.

7. Handling and storage shall be in accordance with the pipe manufacturer's recommendations.

1016-1.1.1.2 Non-metallic Restrained Joint PVC:

a. Pipe shall be manufactured only from water distribution pipe and couplings conforming to AWWA C900 (4-inch through 12-inch) and AWWA C905 (14-inch through 48-inch). The restrained pipe joint system shall meet all short and long-term pressure test requirements of AWWA C900 and AWWA C905, respectively.

b. The compound shall qualify for a Hydrostatic Design Basis (HDB) of 4000 psi for water at 73.4 degrees F., in accordance with the requirements of ASTM D2837.

c. Nominal outside diameters and wall thicknesses of thrust-restrained pipe shall conform to the requirements of AWWA C900 and AWWA C905. Pipe shall be furnished in standard lengths of 20 feet.

d. PVC pipe shall be in accordance with Table 1016-1.

e. Green or white pipe shall be supplied, unless otherwise agreed upon at time of purchase.

f. Pipe and couplings shall be made from unplasticized PVC compounds having minimum cell classification of 12454, as defined in ASTM D1784.

g. Pipes shall be joined using non-metallic couplings which have been designed as an integral system for maximum reliability and interchangeability. High-strength flexible

thermoplastic splines shall be inserted into mating precision-machined grooves in the pipe and coupling to provide full 360-degree restraint with evenly distributed loading. No external pipe-to-pipe restraining devices, which clamp onto or otherwise damage the pipe surface as a result of point-loading, shall be permitted.

h. Couplings shall be designed for use at the rated pressures of the pipe with which they are utilized, and shall incorporate twin elastomeric sealing gaskets meeting the requirements of ASTM F477. Joints shall be designed to meet the leakage requirements of ASTM D3139.

i. Every pipe and machined coupling shall pass AWWA C900/C905 hydrostatic proof test requirements.

j. Pipe shall be legibly and permanently marked in ink with the following information:

1. Manufacturer and Trade Name
2. Nominal Size and DR Rating / Pressure Class
3. Hydrostatic Proof Test Pressure (NSF-61)
4. Manufacturing Date Code

1016-1.1.1.3 Fusible Polyvinylchloride (FPVC) Pipe:

a. Fusible PVC pipe shall be permitted for only 4" through 16" diameter gravity sewer pipe.

b. All piping shall be made from a PVC compound conforming to cell classification 12454 per ASTM D1784.

c. Fusible polyvinylchloride pipe shall conform to ASTM D3034 or ASTM F679.

d. Fusible polyvinylchloride pipe may instead conform to AWWA C900 or AWWA C905, if applicable. Testing shall be in accordance with AWWA standards for any of these pipe types. If the AWWA standards are used, pipe diameters shall be in Ductile Iron Pipe Sizes (DIPS).

e. Rework material shall be allowed per ASTM D3034, ASTM F679, AWWA C900 or AWWA C905 standards.

f. All pipe shall have an SDR of 35 and a minimum pipe stiffness of 46 psi when tested in accordance with ASTM D 2412. Where pipe depth is greater than 20 ft., provide pipe in SDR 26 with minimum pipe stiffness of 115 psi.

g. Fusible polyvinylchloride pipe shall be extruded with plain ends. The ends shall be square to the pipe and free of any bevel or chamfer. There shall be no bell or gasket of any kind incorporated into the pipe.

h. Fusible polyvinylchloride pipe shall be manufactured in a standard 20', 30' or 40' nominal length.

i. Fusible polyvinylchloride pipe shall be green in color for wastewater use.

j. Pipe generally shall be marked per AWWA C900 or AWWA C905, and shall include as a minimum:

1. Nominal pipe size

2. PVC
3. Dimension Ratio, Standard Dimension Ratio or Schedule (omit for ASTM D3034 or ASTM F679 pipe)
4. Pipe legend or stiffness designation, or AWWA pressure class, or standard pressure rating for non-AWWA pipe
5. AWWA Standard designation number or pipe type for non-AWWA pipe (omit for ASTM D3034 or ASTM F679 pipe)
6. Extrusion production-record code
7. Trademark or trade name
8. Cell Classification 12454 and/or PVC material code 1120 may also be included.

k. Pipe shall be homogeneous throughout and be free of visible cracks, holes, foreign material, blisters, or other visible deleterious faults.

l. Unless otherwise specified, fusible polyvinylchloride pipe lengths shall be assembled in the field with butt-fused joints. The Contractor shall follow the pipe supplier's written guidelines for this procedure. All fusion joints shall be completed with the following minimum requirements:

1. Fusible polyvinylchloride pipe will be handled in a safe and non-destructive manner before, during, and after the fusion process and in accordance with this specification and pipe supplier's guidelines.
2. Fusible polyvinylchloride pipe will be fused by qualified fusion technicians, as documented by the pipe supplier.
3. Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) affixed to the fusion machine.
4. Only appropriately sized and outfitted fusion machines that have been approved by the pipe supplier shall be used for the fusion process.

m. Handling and storage shall be in accordance with the pipe manufacturer's recommendations.

1016-1.1.2 High Density Polyethylene (HDPE) Pipe and Fittings:

a. HDPE Pipe for gravity sewers shall be as specified in Section 1016-2.2.

b. HDPE Pipe for gravity sewers shall also have a light interior color.

c. Electrofusion Fittings: Fittings shall be made of HDPE material in accordance with subsection 1016-2.2a. Electrofusion (EF) fittings shall have a manufacturing standard of ASTM F 1055.

1. These fittings shall be supplied with an integral indentification resistor and an ISO compliant 24 bit barcode which is recognized by fusion processors to set the proper fusion parameters.
2. The electrofusion processor used must be capable of reading and storing the input parameters and the fusion results for later download to a record file which will be made available to the Engineer.
3. These fittings, such as EF couplings, gasketed EF sewer saddles, and EF flex restraints, shall be for use with pipe conforming to ASTM D 2513/3035, F-714, and with butt fittings comforming to ASTM D 3216 as applicable.
4. Fittings shall have a pressure rating equal to the pipe unless otherwise specified.
5. ASTM F2620 and the pipe manufacturer's recommended procedure shall be observed for butt fusion and saddle fusion joints.

6. ASTM F1290 and the electrofusion fitting manufacturer's recommended joining procedure shall be observed for electrofusion joints.
7. Field fusion joints shall be made by qualified fusion technicians. Qualification of the fusion technician shall be demonstrated by evidence of certified training within the past year, specific to the fusion joint type and equipment to be utilized for the project.

1016-1.2 Ductile Iron Pipe: Ductile Iron Pipe for gravity sewers shall be as specified in Section 1016-2.3.

1016-1.3 Steel Pipe: Pipe less than 6" diameter shall be galvanized steel pipe conforming to ASTM A 53, Type E or S, Grade A.

Pipe 6" diameter and larger shall conform to AWWA C 200, Class 125. Fittings shall conform to AWWA C 208. Pipe and fittings shall be coal-tar lined and coated in accordance with AWWA C 203.

1016-1.4 Fiberglass Reinforced Polymer (FRP) Pipe:

a. The pipes shall be manufactured in accordance with ASTM D3262. Pipe materials shall conform to the following:

    1. Resin Systems: The manufacturer shall use only approved polyester resin systems with a proven history of performance of in this particular application. The historical data shall have been acquired from a composite material of similar construction and composition as the proposed product.

    2. Glass Reinforcements: The reinforcing glass fibers to be used to manufacture the components shall be of the highest quality commercial grade of glass filaments suitably treated with binder and sizing compatible with impregnating resins.

    3. Silica Sand: Sand shall be minimum 98% silica with a maximum moisture content of 0.2%.

    4. Additives: Resin additives, such as curing agents, pigments, dyes, fillers, thixotrophic agents, etc., when used, shall not detrimentally effect the performance of the product.

    5. Elastomeric Gaskets: Gaskets shall meet ASTM F477 and be supplied by qualified gasket manufacturers and be suitable for the service intended.

b. The internal liner resin shall be suitable for service as sewer pipe, and shall be highly resistant to exposure to sulfuric acid as produced by biological activity from hydrogen sulfide gases. Pipe shall meet or exceed requirements of ASTM D 3681.

c. Minimum pipe stiffness when tested in accordance with ASTM D2412 shall normally be 46 psi.

d. The pipe shall be field connected with glass reinforced plastic sleeve couplings that utilize elastomeric sealing gaskets as the sole means to maintain joint water tightness. The joints shall utilize elastomeric sealing gaskets and meet the performance requirements of ASTM D4161.

e. Fittings: Flanges, elbows, reducers, tees, and other fittings shall be capable of

withstanding operating conditions when installed. They may be contact molded or manufactured from mitered sections of pipe joined by glass fiber reinforced overlays.

f. Pipe shall be supplied in nominal lengths of 20 feet. Shorter and custom lengths will be supplied as defined by the project requirements. The minimum wall thickness shall be per the manufacturer's design in accordance with ASTM D3567. Pipe ends shall be square to the pipe axis with a maximum tolerance of 1/8".

1016-1.5 Vitrified Clay Pipe (VCP) for Microtunneling and Pipe-Jacked Tunnels:

a. Vitrified clay pipe and joints for jacking and microtunneling pipe shall conform to ASTM C 700 and ASTM C 1208.

b. Joints: All VCP joints shall consist of watertight seat, an elastomeric sealing element, a sleeve, and a load distribution medium (compression disc).

1. Elastomeric Sealing Gaskets: Gaskets shall conform to the requirements ASTM C 1208 and the test requirements of ASTM D 395, D 412, D 471 and D 573.

2. All sleeves shall bridge between pipe sections. Stainless steel joint sleeves/couplings shall meet the requirements per grade 316L of ASTM A240\240M.

3. Water tightness: Joints shall be fully watertight and shall develop the full strength of the pipe. Sealing elements shall be bonded to the bearing surface or shall be positively positioned in a recess. The manufacturer shall certify the joints to be watertight to exceed the maximum project design water head pursuant to ASTM C 828, Standard Test Methods for Low Pressure Air Testing of Vitrified Clay Pipe Lines.

4. Load Distribution Medium: All joints shall be equipped with a load distribution medium (i.e., Plywood spacer or compression disc) which shall distribute the jacking force uniformly around the pipe's jacked bearing surface. All load distribution mediums shall prevent the jacking load from being concentrated on a specific area (i.e., Point loading) of the pipe that would result in damage or failure to the pipe. The width of the compression disc shall not exceed the maximum wall thickness of the pipe, nor shall it extend into the flow line or inhibit the installation of the sleeve onto the spigot end of the connecting pipe.

5. When the pipes are assembled, the joints shall not extend beyond the pipes outside surface and shall not restrict installation during jacking.

6. Joint deflection shall be in strict accordance with manufacturer's recommendations.

c. Clay pipes shall meet applicable standards when tested in accordance with ASTM C 301.

1016-1.6 Fiberglass Reinforced Polymer (FRP) Pipe for Micro tunneling and Pipe-Jacked Tunnels:

a. The pipes shall be manufactured in accordance with ASTM D3262. Pipe materials shall conform to the following:

1. Resin Systems: The manufacturer shall use only polyester resin systems with a proven history of performance in this particular application. The historical data shall have been collected from applications of a composite material of similar construction and composition as the proposed product.

2. Glass Reinforcements: The reinforcing glass fibers used to manufacture the components shall be of highest quality commercial grade glass filaments with binder and sizing compatible with impregnating resins.

3. Silica Sand: Sand shall be minimum 98% silica with a maximum moisture content of 0.2%.

4. Additives: Resin additives, such as curing agents, pigments, dyes, fillers, thixotrophic agents, etc., when used, shall not detrimentally effect the performance of the product.

5. Elastomeric Gaskets: Gaskets shall meet ASTM F477 and be supplied by qualified gasket manufacturers and be suitable for the service intended.

b. Pipe manufacturing process to result in a dense, nonporous, corrosion-resistant, consistent composite structure. Do not use stiffening ribs or rings.

c. The internal liner resin shall be suitable for service as sewer pipe, and shall be highly resistant to exposure to sulfuric acid as produced by biological activity from hydrogen sulfide gases. Pipe shall meet or exceed requirements of ASTM D 3681.

d. Joints: All FRP joints shall consist of watertight seat, an elastomeric sealing element, a sleeve, and a load distribution medium (compression disc). All FRP joints shall meet the performance requirements of ASTM D 4161 and conform to the following:

1. Seat: The seat shall be formed at the time of fabrication or machined after fabrication and shall be watertight when assembled and combined with an elastomeric sealing element.

2. Elastomeric Sealing Gaskets: Gaskets shall conform to the requirements of ASTM F 477.

3. All sleeves shall bridge between pipe sections. Unless otherwise specified, the pipe shall be field connected with fiberglass sleeve couplings.

4. Load Distribution Medium: All joints shall be equipped with a load distribution medium (i.e., Plywood spacer or compression disc) which shall distribute the jacking force uniformly around the pipe's jacked bearing surface. All load distribution mediums shall prevent the jacking load from being concentrated on a specific area (i.e., Point loading) of the pipe that would result in damage or failure to the pipe. The width of the compression disc shall not exceed the maximum wall thickness of the pipe, nor shall it extend into the flow line or inhibit the installation of the sleeve onto the spigot end of the connecting pipe.

5. The joint shall have the same outside diameter as the pipe so when the pipes are assembled; the joints are flush with the pipes outside surface and does not restrict the installation during jacking.

6. Allowable joint deflection shall be in strict accordance with the manufacturer's recommendations.

e. Fittings: Flanges, elbows, reducers, tees, and other fittings shall be capable of withstanding operating conditions when installed. They may be contact molded or manufactured from mitered sections of pipe joined by glass fiber reinforced overlays.

f. Dimensions and Tolerances: All dimensions and sizes of pipe shall conform to the following:

1. Diameters: The actual outside diameter of the pipes shall be in accordance with Table 3 of ASTM D 3262 for gravity sewers.

2. Lengths: The pipe standard length will be approximately 10 feet. A maximum of 10 percent of the lengths, excluding special order pipes, may be supplied in random lengths.

3. Wall Thickness: The minimum average wall thickness shall be the stated design thickness. The minimum single point thickness shall not be less than 90 percent of the stated design thickness.

4. End Squareness: Pipe ends shall be square to the pipe axis.

5. Tolerance of Fittings: The tolerance of the angle of an elbow and the angle between the main and leg of a wye or tee shall be plus or minus 2 degrees. The tolerance on the laying length of a fitting shall be plus or minus 2 inches.

g. Stiffness Classes: Stiffness class of FRP pipe shall satisfy design requirements, but shall not be less than 46 psi. Stiffness class of FRP in a pipe jacking operation shall be governed either by the ring deflection limitations or by a pipe design providing longitudinal strength required by the jacking method and shall satisfy design requirements stated below:

1. Pipe stress calculations based on jacking loads shall be performed to conform with Section 819 - Microtunneling and Pipe Jacked Tunnels.

2. Ring deflection calculations shall be performed accordance to AWWA-M5 for fiberglass pipe in buried applications, to ensure that predicted pipe deflection will be less than 5 percent under long-term loading conditions (soil prism load) for the highest density of soil overburden and surcharge loads. Deflection on calculations shall be prepared using long-term (drained) values for soil parameters contained in the geotechnical investigation report for the Project, or other site-specific data obtained by the Contractor as approved by the Engineer.

1016-1.7 Polymer Concrete Pipe for Microtunneling and Pipe-Jacked Tunnels:

a. Polymer Concrete Pipe (PCP) for use in microtunneling/tunneling installations for sanitary sewers shall be manufactured in accordance with ASTM D 6783-02.

1. Minimum compression strength of 13,000 psi is required. The pipe-jacking load for the pipe shown on the Drawings shall be determined by the contractor for the geotechnical and other specific conditions of this project. Do not use stiffening ribs or rings.

b. Wall Resin: The polyester wall resin used to bond the aggregate material shall be

isophthalic, orthophthalic, or other approved resin with a minimum tensile elongation of two (2) percent. The resin content shall be no less than 9 percent by weight. The resin used shall have a proven history of performance in chemical solutions in a sanitary sewer environment ranging from pH 1.0 to pH 10.0.

c. Aggregate: All PCP shall be comprised of aggregates that have a maximum grain size of 5/8 inch and sand that contains a maximum grain size of 0.08 inches. The filler material shall be a quartzite powder. All aggregate, sand, and filler material shall be washed and dried prior to fabrication. All aggregate and sand materials used in fabrication of the pipe shall be of like material and mined from the same source.

d. Joints: All PCP joints shall consist of watertight seat, an elastomeric sealing element, a sleeve, and a load distribution medium (compression disc). All PCP joints shall meet the performance requirements of ASTM D 4161 and conform to the following:

1. Seat: The seat shall be formed at the time of fabrication and shall be watertight when assembled and combined with an elastomeric sealing element. Seats shall not be ground after fabrication.

2. Elastomeric Sealing Gaskets: Gaskets shall conform to the requirements of ASTM F 477.

3. All sleeves shall bridge between pipe sections. Stainless steel joint sleeves/couplings shall meet the requirements of ASTM A 276.

4. Water tightness: Joints shall be fully watertight and shall develop the full strength of the pipe. Sealing elements shall be bonded to the bearing surface.

5. Load Distribution Medium: All joints shall be equipped with a load distribution medium (i.e., Plywood spacer or compression disc) which shall distribute the jacking force uniformly around the pipe's jacked bearing surface. All load distribution mediums shall prevent the jacking load from being concentrated on a specific area (i.e., Point loading) of the pipe that would result in damage or failure to the pipe. The width of the compression disc shall not exceed the maximum wall thickness of the pipe, nor shall it extend into the flow line or inhibit the installation of the sleeve onto the spigot end of the connecting pipe.

6. The joint shall have the same outside diameter as the pipe so when the pipes are assembled, the joints are flush with the pipes outside surface and does not restrict the installation during jacking.

7. No joint deflection of any amount shall be allowed.

e. Dimensions and Tolerances: All dimensions and sizes of pipe shall conform to the following:

1. Length: The typical pipe lengths shall have nominal dimensions of 3 feet, 6 feet or a maximum length of 10 feet.

2. Minimum wall thickness: The minimum wall thickness shall be as needed to support the anticipated jacking forces with a factor of safety of 3.0 at the joints.

3. Out of straight: Pipes shall not deviate from straight by more than 0.06 inch per linear foot. Measurement shall be taken by measuring the gaps between the pipe wall and a straightedge placed along any longitudinal line on the pipe's exterior surface.

4. Out of round: The inside and outside diameters shall not vary from a true circle by more than 1.0 percent of its designed diameter. The out-of-round dimensions are the difference between the maximum and minimum diameters measured at any one location along the barrel. The compression disk shall be installed in the bell end of the pipe at the factory as part of the manufacturing process.

5. Out of square: The ends of the pipe shall be perpendicular to the straight long axis with a tolerance of 0.125 degrees.

6. Diameter: All diameters for PCP pipe shall be in accordance with tolerances specified by Table 2 in ASTM D 6783-02.

1016-2 FORCE MAIN SEWER PIPE:

a. Contractor shall provide sewer force main pipes with Ductile Iron Pipe (DIPS) diameters shown on the Contract Documents. Diameters shown on the Drawings and listed in the pay items represent the required DIPS diameters, regardless of pipe material, unless otherwise noted.

1016-2.1 Polyvinylchloride (PVC) Pipe and Fittings:

a. PVC pressure pipe (4-inch through 12-inch) and large PVC pressure pipe (14-inch through 48-inch) shall conform to the applicable requirements of AWWA C900 and AWWA C905, respectively, and the additional requirements herein.

b. The pipe shall be of the diameter and pressure class indicated, shall be furnished complete with rubber gaskets, shall be provided as required in the Contract Documents.

c. Materials used in manufacture of the pipe shall be tested in accordance with the requirements of this Section and the applicable ASTM and AWWA standards.

d. Joints for the buried PVC pipe shall be an integral bell manufactured on the pipe employing a rubber ring joint. The bell shall be the same thickness as of the pipe barrel, or greater thickness. Where indicated, restrained joint pipe shall be ductile iron pipe or PVC pipe with approved Mechanical Joint (MJ) restrainer glands.

e. Joint deflection at the joint shall not exceed 75 percent of the maximum deflection recommended by the manufacturer. No deflection of the joint shall be allowed for joints that are over-belled or not belled to the stop mark.

f. PVC pipe shall be in accordance with the following table:

TABLE 1016-1
PVC PRESSURE PIPE DATA

WALL CONSTRUCTION	MANUFACTURER	AWWA DESIGNATION	SDR (MAX)	DIAMETER SIZE RANGE
Solid	See QPL	AWWA C900 (235 psi)	DR 18	4" to 12"
		AWWA C905 (165 psi)	DR 25	14" to 36"

g. Fittings shall be ductile iron conforming to the requirements of AWWA C153 or AWWA C110 and shall have a minimum pressure rating of 250 psi. Bends, tees and other ductile iron fittings shall be restrained with the use of an approved Mechanical Joint restrainer gland or other means as indicated in the Contract Documents. Ductile iron fittings and glands must be installed per the manufacturer's guidelines.

h. All ductile iron fittings shall be lined and coated with Ceramic Epoxy: Protecto-401 by Induron Protective Coatings, Series 431 PermaShield by TNEMEC, Permox-CTF by Permite, or approved equal.

i. Each fitting shall be clearly labeled to identify its size and pressure class.

j. Gaskets shall meet the requirements of ASTM F477. Use elastomeric factory-installed gaskets to make joints flexible and watertight. Lubricant for rubber-gasketed joints shall be water soluble, non-toxic, non-supporting of bacteria growth, having no deteriorating effect on PVC or rubber gaskets.

k. Polyvinyl chloride sewer force main pipe shall be green in color.

1016-2.1.1 Fusible Polyvinylchloride (FPVC) Pipe:

a. Fusible PVC pipe shall be permitted for only 4" through 16" diameter sewer force main pipe.

b. Fusible polyvinylchloride pipe shall conform to AWWA C900 or AWWA C905.

c. Rework material shall be allowed per AWWA C900 and AWWA C905 standards.

d. Fusible polyvinylchloride pipe shall be extruded with plain ends. The ends shall be square to the pipe and free of any bevel or chamfer. There shall be no bell or gasket of any kind incorporated into the pipe.

e. Fusible polyvinylchloride pipe shall be manufactured in a standard 20', 30' or 40' nominal length.

f. PVC pipe shall be in accordance with Table 1016-1.

g. Fusible polyvinylchloride pipe shall be green in color for wastewater use.

h. Pipe generally shall be marked per AWWA C900 or AWWA C905, and shall include as a minimum:

1. Nominal pipe size

2. PVC

3. Dimension Ratio, Standard Dimension Ratio or Schedule

4. AWWA pressure class

5. AWWA Standard designation number

6. Extrusion production-record code

7. Trademark or trade name

8. Cell Classification 12454 and/or PVC material code 1120 may also be included.

i. Pipe shall be homogeneous throughout and be free of visible cracks, holes, foreign material, blisters, or other visible deleterious faults.

j. Connections and Fittings:

1. Connections shall be defined in conjunction with the coupling of project piping, as well as the tie-ins to other piping systems.

2. Ductile Iron Fittings:

i. Fittings shall be ductile iron conforming to the requirements of AWWA C153 or AWWA C110 and shall have a minimum pressure rating of 250 psi. Bends, tees and other ductile iron fittings shall be restrained with the use of an approved Mechanical Joint restrainer gland or other means as indicated in the Contract Documents. Ductile iron fittings and glands must be installed per the manufacturer's guidelines.

ii. All ductile iron fittings shall be lined and coated with Ceramic Epoxy: Protecto-401 by Induron Protective Coatings, Series 431 PermaShield by TNEMEC, Permox-CTF by Permite, or approved equal.

iii. Each fitting shall be clearly labeled to identify its size and pressure class.

3. Fusible Polyvinyl Chloride Sweeps or Bends:

i. Fusible polyvinyl chloride sweeps or bends shall conform to the same sizing convention, diameter, dimensional tolerances and pressure class of the pipe that they are joining together.

ii. Fusible polyvinyl chloride sweeps or bends shall be manufactured from the same fusible polyvinyl chloride pipe being used for the installation, and shall have at least 2 feet of straight section on either end of the sweep or bend to allow for fusion of the sweep to the pipe installation.

iii. Standard fusible polyvinyl chloride sweep or bend angles shall not be

greater than 22.5 degrees, and shall be used in nominal diameters ranging from 4 inch through 16 inch.

k. Unless otherwise specified, fusible polyvinylchloride pipe lengths shall be assembled in the field with butt-fused joints. The Contractor shall follow the pipe supplier's written guidelines for this procedure. All fusion joints shall be completed with the following minimum requirements:

    1. Fusible polyvinylchloride pipe will be handled in a safe and non-destructive manner before, during, and after the fusion process and in accordance with this specification and pipe supplier's guidelines.

    2. Fusible polyvinylchloride pipe will be fused by qualified fusion technicians, as documented by the pipe supplier.

    3. Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) affixed to the fusion machine.

    4. Only appropriately sized and outfitted fusion machines that have been approved by the pipe supplier shall be used for the fusion process.

l. Unless otherwise specified, fusible polyvinylchloride pipe lengths shall be assembled in the field with butt-fused joints. The Contractor shall follow the pipe supplier's written guidelines for this procedure. All fusion joints shall be completed with the following minimum requirements:

    1. Fusible polyvinylchloride pipe will be handled in a safe and non-destructive manner before, during, and after the fusion process and in accordance with this specification and pipe supplier's guidelines.

    2. Fusible polyvinylchloride pipe will be fused by qualified fusion technicians, as documented by the pipe supplier.

    3. Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) affixed to the fusion machine.

    4. Only appropriately sized and outfitted fusion machines that have been approved by the pipe supplier shall be used for the fusion process.

m. Handling and storage of the pipe shall be in accordance with the pipe manufacturer's recommendations.

1016-2.2 High Density Polyethylene (HDPE) Pipe and Fittings:

a. Polyethylene pipe shall be made from HDPE material having a material code of PE3408 or higher. The material shall meet the requirements of ASTM D 3350 and shall have a minimum cell classification of PE345464C (345464E for gray HDPE pipe).

b. Pipe and Fittings: The pipe shall meet the requirements of AWWA C906. Pipe shall be in ductile iron pipe sizes (DIPS). The pressure rating shall be 160 psi with a maximum dimension ratio (DR) of 11. Laying lengths shall be 40-ft standard.

c. Pipe and fittings shall be marked as prescribed by AWWA C906. Pipe markings shall include nominal size, OD base (ie: 12-inch ductile iron pipe sizing, DIPS),

dimension ratio, pressure class, AWWA C906, manufacturer's name, manufacturer's production code including day, month, and year extruded, and manufacturer's plant and extrusion line.

d. Workmanship: Furnish pipe and fittings that are homogeneous throughout and free from visible defects such as foreign inclusions, concentrated ridges, discoloration, pitting, varying wall thickness, cracks, holes, foreign material, blisters, and other deformities. Pipe with gashes, nicks, abrasions, or any such physical damage which may have occurred during storage and/or handling, which are larger/deeper than 10% of the wall thickness shall not be used and shall be removed from the construction site. Provide pipe as uniform as commercially practical in color, opacity, density, and other physical properties.

e. HDPE sewer force main pipe shall have a green colored stripe on along the exterior length of the pipe.

f. Connections and Fittings:

1. Connections shall be defined in conjunction with the coupling of project piping, as well as the tie-ins to other piping systems.

2. MJ (Mechanical Joint) Adapters are to be used when connecting HDPE pipe to Ductile Iron Fitting. MJ Adapters are manufactured in standards IPS and DIPS sizes for connecting IPS sized or DIPS sized polyethylene pipe to mechanical joint fittings and appurtenances that meet AWWA C111.

3. Ductile Iron Fittings:

i. Fittings shall be ductile iron conforming to the requirements of AWWA C153 or AWWA C110 and shall have a minimum pressure rating of 250 psi. Bends, tees and other ductile iron fittings shall be restrained with the use of an approved Mechanical Joint restrainer gland or other means as indicated in the Contract Documents. Ductile iron fittings and glands must be installed per the manufacturer’s guidelines.

ii. All ductile iron fittings shall be lined and coated in accordance with Section 1016-2.3.

iii. Each fitting shall be clearly labeled to identify its size and pressure class.

iv. Gaskets shall meet the requirements of ASTM F477. Use elastomeric factory-installed gaskets to make joints flexible and watertight. Lubricant for rubber-gasketed joints shall be water soluble, non-toxic, non-supporting of bacteria growth, having no deteriorating effect on PVC or rubber gaskets.

1016-2.3 Ductile Iron Pipe and Fittings:

a. Lined and polyethylene-wrapped ductile iron pipe shall conform to AWWA C150 and C151, subject to the supplemental requirements in this Section. The pipe shall be of the diameter and class indicated, and shall be provided complete with rubber gaskets, specials, and fittings as required under the Contract Documents.

Nominal pipe laying lengths shall be 20 feet.

b. Fittings shall be ductile iron conforming to the requirements of AWWA C153 or AWWA C110 and shall have a minimum pressure rating of 250 psi. Estimated bid quantities are based on AWWA C153 fitting weights for required fittings.

c. All pipe shall have a minimum pressure rating as indicated in Table 1016-2, or higher ratings as indicated in the Contract Documents.

TABLE 1016-2
MINIMUM PRESSURE CLASS

PIPE SIZES (inch)	PRESSURE CLASS (psi)
4–12	350
14–20	250
24	200
30–64	150

d. The Contractor shall legibly mark specials 24-inches in diameter and larger in accordance with the laying schedule and marking diagram. Each fitting shall be marked at each end with top field centerline.

e. Closures and correction pieces shall be provided as required so that closures may be made due to different headings in the pipe laying operation and so that correction may be made to adjust the pipe laying to conform to pipe stationing on the Contract Drawings. The locations of correction pieces and closure assemblies are shown on the Contract Drawings. Any change in location or number of said items shall only be as accepted by the Engineer.

f. Interior Linings:

1. Preparation: Brush-off blast cleaning conforming to SSPC-SP7.

2. Liner thickness: Minimum 40 mils, for pipe barrel interior.

3. Testing: ASTM G 62, Method B for voids and holidays; provide written certification.

4. Acceptable Lining Materials shall be Ceramic Epoxy: Protecto-401 by Induron Protective Coatings, Series 431 PermaShield by TNEMEC, Permox-CTF by Permite, or approved equal. Interior lining shall be applied in accordance with the manufacturer's recommendations.

5. Contractor shall seal cut ends, touch-up, or repair interior lignin in accordance with manufacturer's recommendations.

g. Exterior Coating: – Exterior pipe coating shall be in accordance with Section 822.

h. All buried piping, fittings, steel lugs, rods, brackets, clamps and other metal components shall be polyethylene encased in accordance with subsection 1016-2.3.1.

i. The pipe shall be designed, manufactured, tested, inspected, and marked according to AWWA C150 and C151 except where modified by this Section. The pipe and fittings shall be of the diameter and class indicated.

j. Ductile iron pipe and fittings shall be furnished with mechanical joints, push-on joints, flanged joints, or restrained joints as required. Mechanical and push-on joints including accessories shall conform to AWWA C111.

k. Flanged joints shall conform to AWWA C115. Flanged joints shall not be used in underground installations except within structures. Where threaded flanges are provided, the pipe wall thickness under the cut threads shall not be less than the calculated net thickness required for the pressure class of the pipe. All flanged piping shall be a thickness Class 53, per AWWA C115. All flanged joints shall be furnished with a minimum 1/8-inch, thick red rubber or styrene butadiene rubber gasket. The bolts and nuts shall be teflon coated high strength low alloy steel per AWWA C111 with head and nut dimensions as specified in ANSI B18.2. For bolts of 1-3/4-inches in diameter and larger, bolt studs with a nut on each end are recommended.

l. Restrained joints shall be commercially available units provided by American Ductile Iron Pipe, U.S. Pipe, or approved equal. Joint restraining devices that impart point loads and/or wedging action on the pipe wall as a means of joint restraint shall not be allowed unless there are no other options for joint restraint available. Under such circumstances, the Contractor may propose such devices provided the following conditions are met and the request is made as a substitution:

    1. A statement from the pipe manufacturer is provided accepting the use of the retaining devices and indicating that the use of such devices will in no way affect the warranty of the pipe and/or the performance of the pipe.

    2. The manufacturer of the device and the pipe manufacturer jointly provide instruction on the proper installation of the device to the personnel installing the units and provide certification to the Owner that the installers are adequately trained in the installation of the units and that all warranties are in full affect for the project.

    3. The devices shall be MegaLug Model 1100 as manufactured by EBAA Iron or approved equal.

m. For bell-and-spigot ends with rubber gaskets, the clearance between the bells and spigots shall be such that when combined with the gasket groove configuration and the gasket itself, will provide watertight joints under all operating conditions when properly installed. The Contractor shall require the pipe manufacturer to submit details complete with significant dimensions and tolerances and also to submit performance data indicating that the proposed joint has performed satisfactorily under similar conditions. In the absence of a history of field performance, the results of a test program shall be submitted.

1016-2.3.1 Polyethylene Encasement:

a. Submittals:

1. Product Data: Submit product data for proposed film and tape for approval. Product shall be manufactured from virgin polyethylene, shall not be recycled and shall be purchased new for the project, clean, sound and without defects. Product shall comply with ANSI/AWWA C105/A21.5 – Polyethylene Encasement for Ductile-Iron Pipe Systems.

2. Quality Assurance Plan: Submit quality assurance plans for film manufacturing and field application.

    i. Film Manufacturing: The manufacturer of polyethylene film for corrosion protection encasement of ductile iron pipe shall have a verifiable quality control system to assure that film is produced from only virgin polyethylene and that it complies with all requirements of this specification. Documentation of Quality Control procedures and test results shall be submitted and shall be made available for inspection for at least one year. A current ISO certificate may be used in lieu of other quality control documentation.

    ii. Field Application: The contractor shall develop, and submit for approval, a comprehensive Quality Assurance Plan for installation of polyethylene encasement. Address all aspects of material and pipe handling, bedding, preparation of pipe surface, film installation and anchoring, service taps and backfill. Include written procedures to be used by installers.

    iii. Manufacturer's Certification: Submit polyethylene film manufacturer's certification of compliance with this subsection. The polyethylene film manufacturer shall provide a notarized statement from an officer of the company that the film meets the inspection and all applicable material specifications of this specification. The manufacturer's statement of compliance must be verifiable. Statements from distributors or contractors shall not be accepted in lieu of a statement from the original manufacturer of the polyethylene film.

    iv. Installer Qualifications: Polyethylene encasement shall only be installed by qualified persons who have been trained in the proper installation and handling procedures. Qualified persons shall be those that have had training and experience in the installation of polyethylene encasement for corrosion protection of ductile iron pipe. Such persons may be qualified by the Ductile Iron Pipe Research Association, ductile iron pipe manufacturers or engineering/inspection firms who offer training courses in the proper method(s) of installation. Proof of qualifications shall be submitted with the shop drawings and shall be provided to project inspectors upon request.

b. Materials:

    1. V-Bio Enhanced Polyethylene Encasement:

        i. Polyethylene encasement shall meet all the requirements for ANSI/AWWA C105/A21.5, Polyethylene Encasement for Ductile Iron Pipe Systems.

        ii. Polyethylene encasement shall consist of three (3) layers of co-extruded linear low density polyethylene (LLDPE), fused into a single thickness of not less than eight (8) mils (0.008 in.).

        iii. The inside surface of the polyethylene wrap to be in contact with the ductile pipe exterior shall be infused with a blend of anti-microbial biocide to

mitigate microbiologically influenced corrosion (MIC) and a volatile corrosion inhibitor to control galvanic corrosion.

2. Polyethylene Tape: Provide 1½-inch wide, plastic-backed, adhesive tape for fitting and anchoring the encasement. Acceptable tapes are Fulton No. 355, Polyken No. 900, Scotchwrap No. 50, or other approved tape. Fulton Tie Strips are an approved alternative to tape. For patching or repairing the polyethylene film, use only polyethylene tape.

c. Installation:

1. Polyethylene encasement for corrosion protection of ductile iron pipe shall be installed in accordance with ANSI/AWWA C105/A21.5 and as required by the Contract Documents.

2. The wrap shall be overlapped one (1) foot in each direction at the joints and secured in place around the pipe with approved polyethylene tape.

3. All installations shall be carried out by personnel trained and equipped to meet these various requirements.

SECTION 1017 PRECAST CONCRETE SEWER AND DRAIN UNITS

Delete this Section in its entirety and replace with the following:

SECTION 1017
PRECAST CONCRETE SEWER AND DRAIN UNITS

1017-1 PRECAST CONCRETE BOX CULVERTS: Precast reinforced concrete box culvert sections shall conform to ASTM C 850, table 1.

1017-2 PRECAST CONCRETE MANHOLES:

a. Precast reinforced concrete manhole sections, transitions, conical sections, and base shall conform to ASTM C 478 and shall be designed for an AASHTO HS-20 loading. Frames and covers shall conform to Subsection 1011-5. Lifting inserts shall be embedded in manhole walls; through-wall holes will not be permitted.

b. Pipe connection openings shall be 4"±1/2" larger than pipe O.D.

c. Sewer manhole bases shall have paved inverts, and sewer manhole sections shall have rubber gasket joints conforming to ASTM C 990 or C 443.

d. Sewer manholes shall be externally sealed with rubber seal wraps conforming to ASTM C 877 (Type III – Chemically-Bonded Adhesive Butyl Bands).

1017-3 PRECAST CONCRETE DRAIN INLETS AND JUNCTION BOXES:

a. Materials, workmanship and curing shall be as specified for precast manholes in ASTM C 478. Frames, grates and covers shall conform to Subsection 1011-5. Lifting devices shall be embedded in walls; through-wall holes will not be permitted.

b. Pipe connection openings shall be 4"+1/2" larger than pipe O.D.

SECTION 1111
MAIL BOXES

Whenever the contractor removes, damages or destroys a mail box, he shall restore it using the same type of materials as the original construction and in accordance with the instructions issued by the UNITED STATES POST OFFICE, Baton Rouge, Louisiana as shown on the following page.

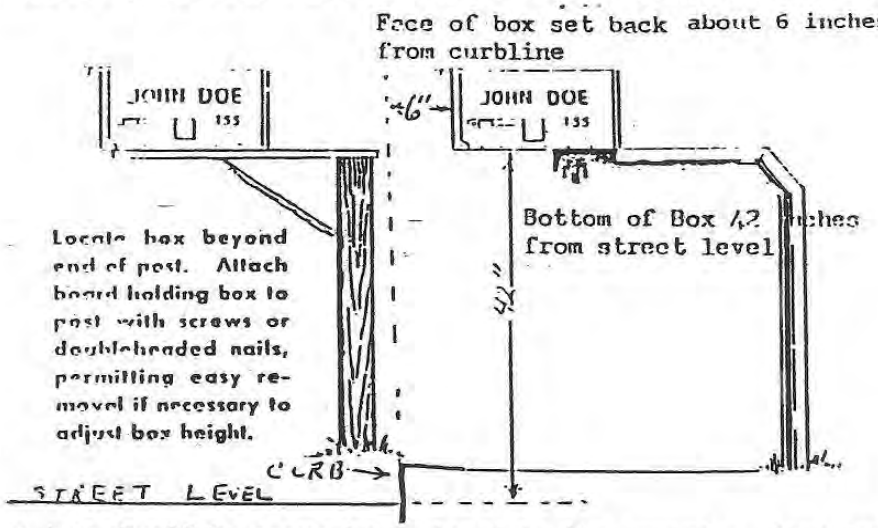
Mail boxes shall be restored to a condition which permits delivery of the mail and protects it from inclement weather within 24 hours of the occurrence of damage.

UNITED STATES POST OFFICE
BATON ROUGE, LOUISIANA 70821

Delivery of mail to postal customers is contingent on mailboxes conforming to prescribed regulations. The following instructions will aid you in erecting your mailbox.

1. Ask your carrier which side of the street and where specifically to install your mailbox.

2. Your box should be at a convenient height--42 inches from the roadbed to the bottom of the box; face of box set back 6 inches from curbline.



3. Your box should be securely fastened to its support. Your box should be level and the post or support firmly planted.

4. Your box number must be painted not less than 1 inch high on the side of the box from which the carrier approaches or, if the boxes or grouped, on the door. It is preferable that your name be placed on the box for additional identification. This is optional, however.

5. Your box must be located so your carrier can serve it without leaving his vehicle. It must be far enough off the roadway so the carrier will not have to stop on the road to serve the box.

6. The approach to your box should be properly filled and graded and kept unobstructed at all times.

Add the following Section:

SECTION 1122
COLD PLANING

1122-1 DESCRIPTION: This work consists of removing asphaltic concrete surfacing and/or PCC Gutter Lip by cold planning methods to the specified depth, width and cross section.

1122-2 EQUIPMENT: Equipment for planning asphaltic surfacing shall be self-propelled planning machines or grinders capable of removing a thickness of asphaltic concrete and/or PCC gutter necessary to provide profile and cross slope uniformly across the surface. Equipment shall have sufficient power, traction and stability to maintain accurate depth of cut and slope. Equipment shall be capable of accurately and automatically establishing a profile grade along each edge of the machine by referencing from existing pavement by means of a ski or matching shoe or from an independent grade control and shall have an automatic system for controlling cross slope at a given rate. Adequate loading equipment shall be provided to immediately remove materials being cut from the surface and discharge cuttings into a truck. Adequate personnel shall be provided to insure that all cuttings are removed from the surface daily. The machine shall be equipped with means to adequately control dust created by the cutting action and shall have a manual system providing for uniformly varying the depth of cut while the machine is in motion.

When cold planing of PCC gutter lip is required, the equipment shall be capable of removing the required material without spalling, over breaking or cracking the remaining concrete. If necessary, a portion of the cutting drum may be fitted with special teeth for removing PC Concrete.

Equipment for cleaning loose material from the surface after planning shall consist of sweepers or vacuum trucks equipped so as to produce little or no dust. Equipment that, in the opinion of the Engineer, produces excessive dust shall be removed from the Project and replaced with satisfactory equipment.

1122-3 CONSTRUCTION REQUIREMENTS:

General: If the entire roadway width has not been planed to a flush surface by the end of a work period, resulting in a vertical or near vertical longitudinal face exceeding 1-1/4 inches in height, this longitudinal face shall be sloped as directed. Transverse faces present at the end of a work period shall be beveled as directed. Satisfactory provisions shall be made at drives and turnouts to maintain local traffic.

Asphaltic concrete next to structures that cannot be removed by the planing machine shall be removed by other acceptable methods.

Pavement surfaces resulting from planing operations shall be uniform and free from loose material. After planing, all loose material shall be removed from the surface, including gutters where applicable, using sweepers or vacuum equipment as specified in Section 1122-2. It will be the Contractor's responsibility to provide for surface drainage of planed areas.

PCC gutter surfaces shall be smooth or grooved after cold planing. Groove depth shall not exceed ¼".

On roadways that are open to traffic, pavement striping removed by planing shall be replaced with temporary pavement markings at the end of each day's planing operations. Payment for these temporary pavement markings shall be included in the price bid on cold planing.

All surfacing material removed by planing shall become the property of the Contractor and shall be

disposed of by him outside the right-of-way.

All required joint repairs shall be made after planing.

Patching: Any required patching shall be performed before planing; however, if additional areas requiring are exposed by planing operations, such additional patching shall be performed prior to placing asphaltic concrete.

Within 72 hours of beginning the Cold Planing operation the Contractor shall begin the next scheduled operation and shall continuously prosecute the work until all cold planed surfaces are covered, except for those periods in which the work, in the opinion of the Engineer, can not be carried out because of adverse weather or for other reasons.

In the event that the base is left exposed to the elements for periods longer than defined in the preceding paragraph, any failures in the base occurring after the cold planing operation shall be repaired by the Contractor at his expense.

1122-4 MEASUREMENT: Measurement of cold planing will be made by the square yard of asphaltic concrete surfacing satisfactorily removed, and by the linear foot of PCC gutter satisfactorily cold planed.

1122-5 PAYMENT: Cold planing will be paid for at the contract unit price, which includes removal of asphaltic concrete surfacing and/or PCC gutter lip and disposal of removed materials.

1122-6 PAY ITEMS:

Item No.	Item	Unit
1122100	Cold Planing Asphaltic Pavement	Square Yard
1122200	Cold Planing PC Concrete Gutter Lip	Linear Foot

Add the following Section:

SECTION 1150
JOINTS IN ASPHALT CONCRETE PAVEMENT

1150-1 DESCRIPTION: These items consist of sawing and sealing longitudinal and transverse joints in asphaltic concrete overlay and sawcuts in asphaltic concrete lifts in accordance with plan details and the following requirements.

1150-2 CONSTRUCTION:

Sawcuts shall be made in the overlay at the locations of all transverse and longitudinal joints in the concrete pavement, the existing joint between concrete pavement and asphaltic concrete shoulder and the existing joint between the concrete pavement and concrete shoulder. Before the overlay operation is started, the Contractor shall accurately mark the location of each transverse joint in the existing concrete pavement and shoulder to the satisfaction of the Engineer by placing a hub with a tack even with the ground at each edge of shoulder or by other approved methods. Offsets shall be measured from these hubs and tacks to locate the longitudinal joints.

All asphaltic concrete lifts shall be sawcut a minimum of 1/8-inch wide by 1-inch deep over the existing longitudinal and transverse concrete pavement joints. These saw cuts shall be made after the overlay has thoroughly cooled and shall be completed within 3 calendar days after each lift is placed, before any reflective cracking has developed or other courses placed.

Both longitudinal and transverse joint reservoirs in the final wearing course shall be sawed to the dimensions shown on the plans. Sawing shall not begin until the overlay has thoroughly cooled. Joint faces shall be blown free of sawing slurry, dirt and water by compressed air just prior to resealing. The air compressor shall be equipped with an approved oil and water trap. The joint shall be dry before sealing. Joints which have become contaminated or dirty before sealing shall be recleaned as directed by the Engineer.

The longitudinal and transverse joints shall be sealed with a hot poured joint sealant conforming to Subsection 1007-2a in accordance with plan details and the manufacturer's recommendations. The sealing operation shall be done as soon as possible after the sawing and cleaning and before traffic, including construction traffic, is allowed on the overlay. The sealed joints shall remain closed to traffic until, in the Engineer's opinion, the sealant has satisfactorily cured to tack free. The hot poured sealant shall be sampled as directed by the Project Engineer.

1150-3 MEASUREMENT: Measurement of sawing and sealing longitudinal and transverse joints in asphaltic concrete pavement will be made by the linear foot along the sealant reservoirs in the final wearing course.

Measurement of sawcuts in asphaltic concrete lifts will be made by the linear foot along the sawcuts in each lift.

1150-4 PAYMENT: Sawing and sealing longitudinal and transverse joints in asphaltic concrete overlay will be paid for at the contract unit price, which includes locating and marking the joints, sawing the sealant reservoirs in the final wearing course, cleaning the sawed sealant reservoirs, bond breaker tape in the transverse joints, joint sealant, and all labor, equipment and incidentals necessary to complete these items. Sawcuts in the asphaltic concrete lifts will be paid for at the contract unit price which includes locating the joints in each lift of asphaltic concrete, sawcuts in each lift of asphaltic concrete and all labor, equipment and incidentals necessary to complete this item.

1150-5 PAY ITEMS:

Item No.	Item	Unit
1150100	Sawing and Sealing Joints in Asphalt Concrete Overlay	Linear Foot
1150200	Sawing and Sealing Longitudinal Joints in Asphalt Concrete Overlay	Linear Foot
1150300	Sawing and Sealing Transverse Joints in Asphalt Concrete Overlay	Linear Foot
1150400	Sawcuts in Asphalt Concrete Lifts	Linear Foot

Add the following Section:

SECTION 1151
ASPHALT CONCRETE PAVEMENT

1151-1 DESCRIPTION: The work consists of furnishing and constructing one or more courses of asphaltic concrete mixture applied hot in conformance with lines, grades, thicknesses and typical cross sections shown on the plans or established by the Engineer.

The Contractor shall comply with the requirements of Subsection 7-5.2.

The Contractor and the Engineer will cooperate in notifying affected residents of this project, and both parties will make a concerted effort to have parked vehicles removed from the construction area.

1151-2 MATERIALS: Materials shall conform to the following Sections and Subsections.

Asphalt Concrete	1004
Asphalt Tack Coat	1003

Tack coat shall be emulsified asphalt (grade CRS-2 or SS-1).

1151-3 EQUIPMENT: All equipment, asphalt plant, paver, rollers, trucks, etc., used on City-Parish projects, shall be certified in accordance with current Louisiana Department of Transportation and Development procedures.

Material Transfer Vehicle (MTV): When required in the Quantities Table, a material transfer vehicle will be required to deliver mixtures from the hauling equipment to the paving equipment. The MTV shall perform additional mixing of the asphaltic concrete mixtures and then deposit the mixture in the paving equipment hopper to reduce segregation. The MTV shall be approved prior to use.

As a minimum the MTV shall have a high capacity truck unloading system which will receive mixtures from the hauling equipment; a storage bin in the MTV with a minimum capacity of 25 tons of mixture; an auger system in the MTV to continuously mix the mixture prior to discharge to a conveyor system; a discharge conveyor, with the ability to swivel, to deliver the mixture to a paving equipment hopper while allowing the MTV to operate from an adjacent lane; and a paver insert hopper with a minimum capacity of 18 tons which can be inserted into conventional paving equipment hoppers.

1151-4 PROJECT STREET LOCATIONS, CONSTRUCTION LIMITS AND REQUIRED ASPHALT THICKNESS: The locations of the various streets to be overlaid under this contract are shown in the Drawings. Unless otherwise approved by the Engineer in writing, the average compacted wearing surface thickness shall be applied at the rate shown in the Drawings.

1151-5 CONSTRUCTION:

1151-5.1 Maintenance Work: All required grass stripping; vegetation sterilization; pulling of roadway shoulders; pavement base restoration, and other maintenance work shall be done by the Contractor on this project.

1151-5.2 Weather Conditions: Asphaltic concrete mixtures shall not be applied on a wet surface or when the ambient temperature is below 50 degrees Fahrenheit, except that material in transit or in surge bins at the time plant operation is discontinued may be laid; however, mixtures laid shall perform satisfactorily and meet specification requirements.

If materials are placed in thicknesses of 2- ½" or greater, these temperature limitations shall not apply provided all other specification requirements are met.

1151-5.3 Surface Preparation: The surface to be covered shall be approved by the Engineer prior to placing mixtures. The Contractor shall maintain the surface until covered.

a. Cleaning: The surface to be covered shall be swept clean of dust, dirt, caked clay and loose material by municipal type street sweepers capable of picking up all swept material and equipped with an adequate water system for dust suppression, supplemented with hand equipment as directed. The use of rotary brooms will not be permitted. When mixtures are to be placed on Portland cement concrete pavement or overlaid Portland cement concrete pavement, the Contractor shall remove excess joint filler from the surface by an approved burning method. The contractor shall remove any existing raised pavement markers prior to asphaltic concrete overlay operation. All areas to be paved that have vegetation encroachment will be sterilized with an approved soil sterilizer, a minimum of seven (7) days prior to the commencement of laydown operations.

b. Applying liquid asphaltic materials:

    1. Existing pavement surfaces: Before constructing each course, an approved asphaltic tack coat shall be applied. The Contractor shall protect the tack coat and spot patch as required.

    2. Raw aggregate base course and Raw Embankment Surfaces: The Contractor shall apply prime coat to unprimed surfaces, or protect in-place prime coat and spot patch as required with asphaltic prime coat.

    3. Cement and lime stabilized or Treated Embankment and Base Course Surfaces: The Contractor shall apply curing membrane if none is in place, or protect the in place curing membrane and spot patch as required, with asphaltic material.

    4. Other Surfaces: Contact surfaces of curbs, gutters, manholes, longitudinal edges and joints, and other structures shall be painted with a uniform coating of asphaltic tack coat before placing asphaltic mixtures.

    5. Tack coat shall be applied on the same day that the asphalt mixture is placed, at a minimum temperature of 160°F for grade CRS-2, and 70°F for grade SS-1.

c. Restoration of Existing Pavement Surface and/or Base: All irregularities, depressions or failures in the existing pavement surface and/or base shall be repaired prior to the placement of any hot-mix asphaltic concrete wearing surface. In general, surface defects shall be repaired by removing all loose or defective material to sound pavement, and replacing with approved hot-mix asphaltic concrete patching material conforming to Table 10-9. The hot-mix leveling mixture shall be thoroughly compacted to produce a tight surface conforming to the adjacent pavement area.

    Whenever the existing surface is in such a condition that the Engineer deems it necessary to apply a leveling course he shall direct the Contractor to do so. The leveling course shall be placed as directed and will be paid for at the contract price per ton for asphalt overlay. The leveling course shall be placed, spread, and compacted as directed by the Engineer.

    When directed by the Engineer all base failures in the existing pavement base shall

be repaired prior to the placement of any hot-mix asphaltic concrete wearing surface.

1151-5.4 Joint Construction: Longitudinal joints shall be constructed by overlapping the paver approximately 2" onto the adjacent pass. Prior to rolling, the overlapped mix shall be pushed back, without scattering loose material over the uncompacted mat, to form a vertical edge above the joint. The vertical edge shall then be compacted by rolling to form a smooth, sealed joint. Longitudinal joints in one layer shall offset those in the layer below by approximately 3"; however, the joint in the top layer shall be offset 3" to 6" from the centerline of pavement or from lane lines.

Transverse joints shall be butt joints formed by cutting back on the previously placed mixture to expose the full depth of the course. Transverse joints in succeeding courses shall be offset at least 2 feet. Asphaltic tack coat shall be placed on contact surfaces of transverse joints before mixture is placed against them.

1151-5.5 Hauling, Spreading and Finishing: Mixtures shall be transported from plant to paver at a temperature no cooler than 10 degrees Fahrenheit below the lower limit of the approved job mix formula. No loads shall be sent out so late in the day as to prevent completion of spreading and compaction of the mixture during daylight, unless artificial lighting has been approved.

Each course of asphaltic mixture shall be placed in accordance with the specified lift thickness. If no lift thickness is specified, binder and wearing course mixtures shall be placed in lifts not exceeding 2" thick, or as directed by the Engineer. Base course mixtures shall be placed in lifts of such thickness that all specification requirements are met.

With the Engineer's approval, blade graders may be used to fill isolated depressions in the initial layer.

a. **Coordination of Production**: The contractor shall coordinate and manage plant production, transportation of mix and laying operations to achieve a high quality pavement and shall have sufficient hauling vehicles to insure reasonably continuous plant and roadway operations. Then Engineer may order a halt to operations if sufficient hauling vehicles are not available. If less than the optimum number of hauling vehicles are available and it is determined that satisfactory quality can be obtained, the Contractor will be permitted to work provided plant production and hauling vehicles are coordinated to minimize the adverse effect of idle time between loads.

b. **Paving operations**: Transfer of mixture from haul truck to pavement may be made by direct unloading into the spreader hopper or by use of approved mechanical loading devices. Delivery of material to the paver shall be at a uniform rate and in an amount within the capacity of paving and compacting equipment. Equipment shall be so designed and operated that the finishing machine will place mixtures to required line, grade and surface finish without resorting to hand finishing. Equipment which leaves tracks or indented areas which cannot be corrected in normal operations or fails to produce a satisfactory surface shall not be used. Operation of equipment resulting in accumulation of material and subsequent shedding of accumulated materials into the mixture will not be permitted.

   All mixtures shall flow through the spreader hopper. Mixtures dropped in front of the spreader shall be either lifted into the hopper or rejected and cast aside.

   Longitudinal joints and edges shall be constructed along lines established by the Engineer, and stringlines or other devices shall be placed by the Contractor for the

paver to follow. The paver shall be positioned and operated to closely follow the established line. Irregularities in alignment shall be corrected by trimming directly behind the paver. After the 1st load of material has been spread, the texture of the unrolled surface shall be checked to determine it's uniformity. The adjustment of screed, tamping bars, feed screws, hopper feed, etc. shall be checked frequently and adjusted as required to assure uniform spreading of the mix to proper line and grade and adequate compaction. If segregation of materials occurs, spreading operations shall be suspended until the cause is determined and corrected.

Surface irregularities shall be corrected directly behind the paver. Excess material forming high spots shall be removed. Indented areas shall be filled and finished smooth. Hand placement for surface repair will be permitted. Material shall not be cast over the surface.

If spreading and finishing operations are interrupted to such extent that the mixture remaining in trucks, paver, spreader hopper or on the roadway cools to such extent that it cannot be laid, finished or compacted to the same degree of smoothness and with the same texture and density as the uncooled mixture, the cooled mixture shall be removed and replaced at the Contractor's expense.

Mechanical pavers shall be equipped with automatic screed and slope control devices for use with an approved traveling reference plane or erected stringline, as directed. The following requirements shall apply:

1. 30 foot (minimum) Traveling Referenced Plane: The initial paving strip of each layer of mixture shall be constructed using the traveling referenced plane and automatic slope control method; however, if permitted, the portion of mixtures required to level isolated depressions in the initial layer may be placed without automatic screed control. After the initial paving strip of each layer is finished and compacted, adjacent paving strips shall be laid to the grade of the initial paving strip using a shoe device or traveling referenced plane to control grade and a slope control device to control cross slope.

   On multi-lane pavements, the sequence of lane construction will be subject to approval.

   When both outside edges of the paving strip being placed are flush with previously placed material, the slope control device shall not be used. A grade sensor is required for each side of the paver.

   In superelevated curves, the cross slope shall be changed from that specified for tangents to that specified for superelevation in gradual increments as the paver is in motion so a smooth transition in grade is obtained. The change in cross slope shall be accomplished within the transition distance specified.

   This is the minimum acceptable method and the contractor must meet or exceed current surface tolerance specifications.

2. Erected Stringline: An erected stringline shall consist of a piano wire stretched between stakes set at maximum 25-foot intervals tensioned between supports so that there is less than 0.1" variance between supports when the sensor is in place. The initial paving strip of the 1st lift shall be constructed using an erected stringline referenced to established grade. Mixtures used to level isolated depressions may be placed without automatic screed control. Subsequent lifts

may be constructed with the traveling reference plane, provided surface and grade tolerances are met on the previous lift.

Only 1 grade sensor and the slope control device are necessary for roadways with normal crown on tangent alignment. Superelevated curves will require the use of 2 grade sensors and 2 erected stringlines to obtain proper grade and slope; however, if the automatic screed control device is equipped with a dial or other device which can change the cross slope in small increments, superelevated curves may be constructed using this device and 1 erected stringline.

After the initial paving strip of the 1st lift is finished and compacted, adjacent paving strips shall be placed using a minimum 30-foot traveling reference plane.

3. Without automatic Screed Control: When permitted, pavers without automatic screed control may be used for pavement patching, pavement widening, paved drives, turnouts, and irregular areas.

c. **Hand Placement**: Where the use of mechanical finishing equipment is not practical, the mix may be spread and finished by hand to the satisfaction of the Engineer. No casting of the mixture will be permitted. During spreading operations, material shall be thoroughly loose and uniformly distributed. Material that has formed into lumps and does not break down readily will be rejected. The surface shall be checked before rolling and irregularities corrected.

d. **Curb and Gutter and Integral Curb**: On streets having curb and gutter or integral curb where the Asphaltic concrete is to extend to the curb, the cross slope shall be broken to provide an additional ½" drop at the curb line. The break point shall occur between 2 and 4 feet from the curb line. The exact break point shall be agreed upon by the Engineer and the contractor, considering the capabilities of the type of equipment to be used for laydown.

1151-5.6 Compaction: After placement, mixtures shall be uniformly compacted by rolling while still hot to an average density of at least 95% of maximum density determined by DOTD TR304.

When polymer asphalt cement is not specified in the mixture, a pneumatic tire roller may be used for intermediate rolling; however, when the ambient temperature is below 60 degrees Fahrenheit, it must be used. With polymer asphalt pneumatic rollers will not be permitted. The use of rollers which results in excessive crushing of aggregate will not be permitted.

The rolling pattern established by the Contractor shall be conducted by experienced operators in consistent sequences and by uniform methods that will obtain specified density and smoothness. Individual roller passes shall uniformly overlap preceding passes to ensure complete coverage of the paving area. The speed operation of rollers shall be such that no displacement or tearing of the mat occurs. Non-vibrating steel wheel rollers shall be operated with drive wheels toward the paver. Any displacement or tearing of the mat shall be immediately corrected. Finish rolling shall be accomplished with a non-vibrating steel wheel roller until roller marks have been eliminated.

To prevent adhesion of mixture, wheels of steel wheel rollers shall be kept properly moistened, but excess water will not be permitted. Pneumatic tire rollers shall be operated in such manner that tires will retain adequate heat to prevent mix from adhering to tires. The pneumatic tire roller shall be operated at a contact pressure which will result in a uniform, tightly knit surface. The pneumatic tire roller shall be kept approximately 6" from unsupported edges of the paving strip; however, when more than 1 paving strip is down, the adjacent paving strip shall be overlapped approximately 6

inches.

If continuous roller operation is discontinued, rollers shall be moved to cooled areas of the mat, where they will not leave surface indentations.

Vibratory rollers may be used provided they do not impair the stability of the pavement structures of underlying layers. If mix is placed on newly constructed cement or lime stabilized or treated base, sub-base or working table, vibratory rollers shall not be used for at least 7 days after such stabilization or treatment.

Along forms, curbs, headers, walls and at other places inaccessible to rollers, mixtures shall be uniformly compacted to the satisfaction of the Engineer with hot hand tampers, mechanical tampers, or other approved methods.

Surface of mixtures after compaction shall be smooth and true to cross slope and grade within the tolerances specified. Mixtures that become loose, broken, contaminated or otherwise defective shall be removed and replaced with fresh hot mixture compacted to conform with the surrounding mixture.

Newly finished pavements shall be protected from traffic until they have sufficiently hardened.

Newly finished pavements, after finish rolling, shall have uniform tightly knit surface free of cracks, tears or other deficiencies. Ripples in the mat surface will not be accepted. All deficiencies shall be corrected at the Contractor's expense and the Contractor shall adjust his operations to correct the problem. This may require the Contractor to adjust the mix or furnish additional or different equipment.

1151-5.7 Surface Finish Requirements: Testing for surface tolerances as specified in Table 1151-1 of this Section will be the responsibility of the City-Parish. The contractor shall furnish the Engineer assistance, as directed, in pulling the rolling straightedge. Control checks will be the responsibility of the Contractor. The Contractor shall furnish a 10 foot rolling straightedge for longitudinal testing and a 10 foot metal static straightedge for transverse testing, both of which shall be acceptable to the Engineer. The rolling straightedge shall be calibrated and used in accordance with DOTD TR-603 and TR-618.

For the purpose of surface finish requirement, the wearing course is defined as the last course placed and the binder course is defined as the last course placed prior to the wearing course. When only one course is placed, the surface finish requirements for Binder (as shown in Table 1151-1) shall apply.

a. Longitudinal Surface Finish: The finished surface will be tested by the Engineer in the longitudinal direction for conformance to surface finish requirements in Table 1151-1. One path in each lane will be selected at random and tested.

   Longitudinal variations in binder course surfaces shall be subject to the provisions of Table 1151-1. Any surface finish deficiency that exceeds 3/8" shall be corrected in accordance with Subsection 1151-5.7 (e). Longitudinal variations in the final wearing surface will be subject to provisions of Subsection 1151-7 (B) (2) (iv). Surface finish deficiencies exceeding ¼" shall be corrected in accordance with Subsection 1151-5.7 (e). After corrections have been made, the mix laid that day will be subject to the provisions of Subsection 1151-7 (B) (2) (iv).

b. Transverse Surface Finish: the transverse surface finish shall be so controlled that the values shown in Table 1151-1 will not be exceeded. The surface for binder and

wearing courses will be tested at selected locations by the Engineer in the transverse direction for conformance to the surface finish requirements of Table 1151-1. Corrections shall be made as directed in accordance with Subsection 1151-5.7 (e).

c. Cross Slope: When the plans require the section to be constructed to a specified cross slope, test shall be run at selected locations, using a stringline, slope board or other comparable method. The cross slope shall be so controlled that the values shown in Table 1151-1 will not be exceeded. Cross slope variations allowed in Table 1151-1 shall apply to each lane constructed.

d. Grade: When the plans require the pavement to be constructed to a grade, tests for conformance shall be run at selected locations, using a stringline or other comparable method. Grade variations shall be so controlled that the tolerance shown in Table 1151-1 will not be exceeded.

   If the pavement is consistently above or below the established grade for a reasonably long segment, the Engineer may, for the purpose of determining conformance to the tolerance, use a new grade approximately parallel to the established grade; in which case, any required transition in grade or vertical curve at each extremity of the segment shall be in accordance with the base design requirements. Grade tolerances shall apply to only one longitudinal line, such as the centerline or outside edge of pavement. Corrections shall be made in accordance with Subsection 1151-5.7 (e).

e. Correction of Deficient Areas: Deficiencies to be corrected in the final wearing course shall be corrected by milling, removing and replacing or furnishing and placing a supplemental layer of wearing course mixture at least 1- ½" thick for the full width of roadway; all in a satisfactory manner at the Contractor's expense. Deficiencies to be corrected in binder courses shall be corrected in a satisfactory manner at the Contractor's expense. Corrections shall be made before subsequent courses are constructed.

   With the written permission of the Project Engineer, deficiencies in Longitudinal and/or Transverse Surface Finish may be corrected by heating and re-rolling the surface. Devices used to heat asphaltic concrete shall not expose the surface to open flame.

1151-5.8 Dimensional Requirements: Mixtures that are specified for payment on a cubic yard or square yard basis shall conform to the following dimensional requirements. Overthickness and overwidth will be waived at no additional cost to the City-Parish.

a. Thickness: Thickness of mixtures will be determined by random coring. Underthickness shall not exceed ¼". For all mixtures except the final surface course, areas with underthickness in excess of the ¼" shall be connected to plan thickness at the Contractor's expense by furnishing and placing additional mixture. For the final surface course, areas with underthickness in excess of the ¼" shall be corrected to plan thickness at the Contractor's expense by furnishing and placing a supplemental layer of wearing course mixture at least 1- ½" thick over the entire area for the full width of the roadway.

b. Width: The width of completed courses will be determined in accordance with DOTD TR-602. Underwidths shall be corrected to plan width at the contractor's expense by furnishing and placing additional mixture.

1151-5.9 Manhole and Inlet Adjustment: It is contemplated that some streets may have manholes or grate type inlets in them which will require adjusting to accommodate the new asphaltic concrete pavement. The contractor shall make such adjustment as specified in Section 806. When using raising rings to make the required adjustment, the contractor shall utilize the existing manhole covers and shall install the raising ring just before new asphalt concrete pavement is placed.

1151-5.10 Driveways, Paved Shoulders, Parking Areas, Etc.: When paved driveways, paved shoulders not to be overlaid, paved parking areas etc. about the area to be overlaid, additional asphaltic concrete shall be placed outside the normal limits of the asphaltic concrete to provide a smooth vertical transition and/or to facilitate drainage. The limits of such additional asphaltic concrete shall be as directed by the Engineer, but shall not extend beyond the limits of the right-of-way. Methods of placement and compaction shall be as approved by the Engineer. Surface tolerances shall not apply, but the area shall be finished to the satisfaction of the Engineer.

1151-5.11 Utility Trench Cuts for Sanitary Sewer, Storm Drains, Etc.: Backfill and compact utility trench in accordance with specifications and standard plans for the relative type of utility. Existing base shall be replace with a minimum 7" thickness Type B PG64-22 asphalt base course and minimum 2" thickness of asphalt wearing course in accordance with Table 1004-1. Asphalt shall be placed and compacted in 3" maximum lifts. The limits of the pavement repair shall be as shown on the Contract Documents. Unless otherwise approved by the Engineer, pavement repair outside of the established limits shall be at no additional cost to the Owner. Methods of placement and compaction shall be as approved by the Engineer. On short patches or road crossings, the distance at any point from a ten (10) foot straight edge to the surface shall not exceed one-half (1/2) inch in any direction. Lumps or depressions exceeding this tolerance shall be corrected in accordance with 1151-5.7e. For longer or larger patches surface tolerances shall be in accordance with subsection 1151-5.7.

1151-6 PAVEMENT SAMPLES: The contractor shall furnish samples cut from the completed work. The removed pavement shall be replaced with new mixture and refinished within 24 hours. No additional compensation will be allowed for furnishing test samples and replacing the areas with new pavement. Samples shall be taken by the contractor in the presence of the Engineer's representative from areas selected by the Engineer. The location of the area to be cored will be determined by the use of "random number tables" transversely and longitudinally in each subsection of each lot. The procedure used will be in accordance with Louisiana Department of Transportation & Development publication entitled, "Application of End Result Specifications for Asphaltic Concrete."

Samples shall be cores approximately 4" in diameter taken by an approved core drill. Cores less than 1-1-2" thick shall not be used to determine pavement density.

Core holes must be filled the next work day after being cut. Core holes must be dry and tack coat applied prior to filling. The mix used for filling must be the same as where the core was made. The core hole will be overfilled and then rodded 25 times. The mix in the hole will be shaped and crowned ¼" higher than the roadway surface. The mix in the core hole will then be compacted with a 10 lb. hammer. After compactions, the core hole top must be equal to or slightly higher than the roadway surface.

In the event that the Contractor fails to satisfactorily fill and refinish test sample holes within 24 hours, the Engineer may suspend all other operations on the Project, and any other City-Parish project under contract to the contractor, until such time shall not be interrupted by such suspension of their operations and shall continue to run.

1151-7 ACCEPTANCE REQUIREMENTS: All inspection procedures, including sampling and testing, form the basis for acceptance of the asphaltic concrete. Sampling and testing shall be

accomplished following a stratified sampling plan: times and locations shall be set by the Engineer.

Any section of pavement that is obviously deficient shall be satisfactorily corrected or replaced.

Acceptance testing for Marshall stability and aggregate gradation will be conducted on the mix laid each day on the project. Also acceptance testing for pavement density, surface tolerance and dimensional tolerances will be conducted on mix produced and laid for the City Parish each day.

Pavement density and surface tolerance requirements will not be applied for short irregular sections, such as drives, aprons and turnouts; however, mix shall be placed in such manner as to provide a neat, uniform appearance and shall be compacted by satisfactory methods.

For all projects, 1 sample shall be taken from Marshall properties testing for each 250 tons or portion thereof produced and 1 sample taken for extracted gradation testing for each 500 tons or portion thereof produced. Five (5) samples shall be taken for determination of pavement density, with the sampling distribution to be determined by the Engineer.

a. Inspection: Mix exhibiting deficiencies before placement, such as segregation, contamination, lumps non-uniform coating, excessive temperature variations or other deficiencies, apparent on visual inspection, shall not be placed.

   Mix exhibiting deficiencies during placement, such as segregation, contamination, alignment deviations, variations in surface texture and appearance or other deficiencies, apparent on visual inspections, will not be accepted. Poor construction practices such as handwork, improper truck exchanges, improper joint construction, or other deficiencies, apparent on visual inspection, will not be accepted.

   Deficiencies revealed by visual inspection after placement and before final acceptance shall be corrected at the Contractor's expense.

   If requested by the Contractor, the acceptability of mixtures or work rejected by visual inspection of the inspector will be evaluated by tests, measurements and/or visual inspection by the Engineer.

b. Sampling and Testing:

   1. Without Payment Adjustments: The City-Parish will take samples or perform test outlined in these specifications to ensure that the asphaltic concrete conforms to City-Parish standards, which include mix design limits, typical sections, material values, surface deviations and verification of control testing. Deviations from specified tolerances will not be accepted. If a sample or test indicates a deviation from a specified tolerance, the contractor shall take immediate corrective action, or operations shall be discontinued.

   2. With Payment Adjustments: If the mix does not meet requirements in the areas listed in this Section, the payment adjustments schedules shown in Table 1151-2 of this Section will be applied. Production of mix that is not eligible for 100% payment will not be allowed on a continuous basis. If test results demonstrate that payment adjustments are necessary, satisfactory control adjustments shall be made or production shall be discontinued.

      i. Marshal Stability: When individual tests or the average of tests representing the mix produced and laid for the City-Parish is outside acceptance limits shown in Table 10-9 of Section 1004, an adjustment in unit price for the mix

will be made in accordance with Table 1151-2 of this Section.

ii. Aggregate Gradation: Testing for aggregate gradation will be conducted by the contractor's technician. Gradation testing shall be performed for each 500 tons or portion thereof produced per day.

If test results are outside the job mix control limits for aggregate gradation given in Table 10-9 of Section 1004, an adjustment in unit price for that mix will be made in accordance with Table 1151-2 of this Section. This adjustment in unit price is determined by percent deviation from job mix control limits for the No.'s 4, 40 and 80 sieves, and only the sieve with the greatest adjustment in unit price will be used. Deviations for gradation will be calculated for each test and the deviations will be averaged for determination of adjustment in unit price.

iii. Pavement Density: Upon completion of compaction, 5 pavement samples shall be obtained in accordance with Subsection 1151-6 within 24 hours after placement. If this falls on the day the Contractor's crews are not working, sampling will be done the following work day. If the Contractor does not obtain the roadway samples as outlined, the Engineer may deduct 5% of the contract price of asphaltic concrete for the day or days run, where samples are late or lacking.

The density requirement for the average of 5 samples will be as shown in Table 1151-1 of this Section, determined in accordance with DOTD TR-304. Payment will be made in accordance with Table 1151-2 of this Section.

iv. Surface Smoothness: Testing for surface smoothness will be required on the final wearing surface. The surface will be tested longitudinally with a 10-foot rolling straightedge as prescribed in Subsection 1151-5.7. The rolling straightedge shall be furnished by the Contractor. Surface corrections shall be made in accordance with Subsection 1151-5.7.

The requirements for surface smoothness shall be as shown in Table 1151-1.

v. Anti-Strip Additive: Failure to add anti-strip additive shall result in a payment adjustment in accordance with Table 1151-2.

1151-8 MEASUREMENT: Asphaltic tack coat, prime coat or curing membrane required will not be measured for payment.

a. Weight Measurement: Asphaltic concrete will be measured by the ton of 2,000 pound from printed weights.

Stamped printer tickets will be issued for each truckload of material delivered. Material lost, wasted, rejected or applied contrary to specifications will not be measured for payment. Contractor shall provide a copy of the stamped printer ticket to the Inspector for each truckload of material delivered.

Estimated quantities of asphaltic concrete shown on the plans are based on 110 lbs. /sq. yd./inch thickness (115 lbs/sq. yd./inch for Granite Fines Mixes). The theoretical specific gravity of the job mix shall not exceed 2.51.

b. Area Measurement: Measurement for restoring asphalt concrete pavement and base for utility trenching limits shall be the number of square yards restored within the limits shown in the Contract Documents and as approved by the Engineer.

1151-9 PAYMENT: Asphaltic concrete will be paid for at the contract unit price. When the mix does not conform to acceptance requirements, payment will be made at an adjusted price per unit of measurement in accordance with Table 1151-2.

a. General: Payment for asphaltic concrete will include furnishing all required material, producing the mixtures preparing the surfaces on which the mixtures are placed, hauling the mixtures to the work site, and placing and compacting the mixtures.

b. Wearing Course Mixes: The lowest percentage of contract price will be used for final adjustment in unit price for deficiencies in Marshall stability, pavement density, aggregate gradation, and anti-strip additive.

c. Binder and Base: The lowest percentage of contract price will be used for final adjustment in unit price for deficiencies in Marshall stability, pavement density, aggregate gradation, and anti-strip additive.

Payment for restoring asphalt concrete pavement and base for utility trenching will be full compensation for furnishing all labor, materials, equipment, and incidentals required to restore full depth asphalt concrete pavement, complete as specified on the Contract Documents; cleaning the surface upon which the asphalt is placed, providing headers, prime coats and tack coats, and all else incidental thereto for which separate payment is not provided under other items in the Bid Form.

1151-10 PAY ITEMS:

Item No.	Item	Unit
1151100	Asphaltic Concrete Pavement	Ton
1151200	Polymerized Asphalt Concrete Pavement	Ton
1151210	Polymerized Asphalt Concrete Pavement (Granite Fines)	Ton
1151300	Restore Asphalt Concrete Pavement and Base	Square Yard

TABLE 1151-1

Pavement Requirements

Density
All Mixes 95%

Surface Finish Variation (inches)

	Longitudinal	Transverse	Cross Slope	(Grade When Required)
Wearing Course	1/8	1/8	3/8	1/2
Binder	1/4	1/4	1/2	1/2

Note: Longitudinal measure based on a 10-foot rolling straightedge Cross slope based on 10 feet.

Aggregate for all mixes shall be crushed gravel, slag, stone or stone approved for wearing course. At the contractor's option, a maximum 20% limestone screenings that have a minimum of Number 4 skid rating may be used in all mixes.

If the Contractor starts a project using a certain aggregate, he must complete the project using that aggregate. The Engineer **may** waive this requirement if requested by the Contractor.

TABLE 1151-2

PAYMENT ADJUSTMENT SCHEDULE

Percent of Contract Unit Price

	100	98	95	80	50 or remove (Engr. Option)
Marshall Stab.					
Type C					
Average	1000+		900-999	800-899	-800
Indiv. Test	800+	-800			
Type B, BP, BP(GF) (Wearing Course)					
Average	1500+		1400-1499	1250-1399	-1250
Indiv. Test	1300+	-1300			
Type B, and BP (Binder Course)					
Average	1400+		1300-1399	1150-1299	-1150
Indiv. Test	1200+	-1200			
Type B, and BP (Base Course)					
Average	1000+		900-999	800-899	-800
Indiv. Test	800+	-800			
Type A (Wearing Course)					
Average	2200+		1900-1999	1750-1899	-1750
Indiv. Test	1800+	-1800			
Pavement Density					
Ave. of 5 Samples (% Lab. Density)	95.0+		94.0-94.9	92.0-93.9	-92
Surface Smoothness					
Lin. % of Pavement Exceeding 1/8" Surface Tol.	0.0-0.5	0.6-1.0	1.1-1.5	1.6-2.5	+2.5
Agg. Gradation					
Dev. from Job Mix Formula Limits for Ext. Aggregate -					
No.4 Sieve	0-1.0	1.1-4.0	4.1-8.0		+8.0
No.40 & No.80 Sieve	0-1.0	1.1-3.0	3.1-6.0		+6.0
Anti-Strip Additive				Failure to add	

Add the following Section:

SECTION 1195
PAVEMENT MARKINGS

1195-1 GENERAL:

a. The Contractor shall furnish all of the necessary trained personnel, sufficient equipment, proper traffic control and all materials, including reflectorized glass spheres, to install pavement markings at specified locations within East Baton Rouge Parish.

b. The Contractor shall provide written certification that all materials used in this contract meet the specifications contained herein. This certifications must be submitted at the pre-construction conference.

c. The Contractor shall lay out and install all pavement markings, including no passing zones, according to the Manual on Uniform Traffic Control Devices (MUTCD) latest edition, the plans and subject to approval of the City of Baton Rouge, Parish of East Baton Rouge, Department of Public Works, Traffic Engineering Division (CP/DPW/TED). The CP/DPW/TED offices shall be notified upon completion of any new pavement marking layout work for inspection prior to the application of any pavement markings.

d. The Contractor shall maintain a written detailed daily log of work completed. The log shall show the location (by street name, including termini), time and date that each type work (i.e., removal, layout, application) begins and ends on each street or separate street segment. If work is performed on the same street or street segment on more than one day or at different times on the same day, the beginning and ending time for each activity performed shall be shown as a separate entry. Duplicate copies of daily work sheets containing the information shown above for all work completed on each street segment, each day, will be maintained and signed by the City/Parish and contractors representatives. Any change over or under ten percent (10%) in estimated versus actual quantities must be approved and a field change order sheet completed and signed at the end of each work day by both representatives.

e. The same type of pavement marking material (i.e., same manufacturer and composition) shall be used throughout a single roadway project. Variations with regards to this requirement may be allowed by verbal permission, to be confirmed in writing within forty-eight (48) hours, from the CP/DPW/TED.

f. No payment will be made for any work done without the presence of the CP/DPW/TED designated representative or an acceptable alternate on the site provide sufficient advance notice of all planned activities to permit scheduling of City/Parish representatives. Separate operations at more than two (2) different locations cannot be planned without advance written approval of the CP/DPW/TED or City/Parish representative. Price quoted by contractor shall include the cost of removal of all temporary pavement markings at no additional cost to the City/Parish.

1195-2 MATERIALS: Materials shall conform to the following Sections and Subsection:

Pavement Striping Tape	1020-2.1 (a)
Traffic Paint	1020-2.2.3

Thermoplastic Pavement Markings	1020-2.2.1
Performed Plastic Pavement Markings	1020-2.2.2
Glass Spheres (Beads)	1020-2.2.4

1195-3 EQUIPMENT:

a. **General**

Selection of the proper equipment to produce satisfactory results within the following basic requirements shall be the responsibility of the Contractor.

1. Applicator equipment for longitudinal lines shall consist of a self-contained, self-propelled mobile unit that does not require the operator to walk behind or beside during the installation of pavement markings either left or right of the application unit so that only one (1) lane of traffic will be occupied. The applicator unit shall have a tachometer or other approved device to insure uniform application at the required rate. It shall be adjustable for applying one (1), two (2) or three (3) adjacent lines simultaneously at the specified spacing.

2. Applicators shall produce sharply defined lines and provide means for cleanly cutting off square stripe ends and applying broken lines.

3. Applications for longitudinal lines shall permit traffic to pass within the limit of the roadway surface and shoulder while the unit is operating.

4. Equipment shall be capable of producing continuous uniformity in dimensions of stripes. Equipment shall produce varying widths of traffic markings.

b. **Thermoplastic Equipment**

1. Hot thermoplastic pavement marking materials shall be applied to pavement by spray, ribbon gun or extrusion methods. Equipment shall provide continuous mixing and agitation of material. Conveying parts of equipment between main material reservoir and discharge mechanism shall prevent accumulation and clogging. Parts of equipment which come in contact with the material shall be easily accessible for cleaning and maintaining. Mixing and conveying parts shall maintain material at the plastic temperature, minimum three hundred and fifty (350) °F [one hundred and seventy-seven (177) °C].

2. Heating kettles to hold a minimum of one thousand (1,000) pounds of material shall be provided for melting and heating thermoplastic material. Kettles must be equipped with automatic thermostatic control devices so that heating can be done by controlled heat transfer liquid or other approved methods (no direct flame will be allowed) to provide positive temperature control and prevent overheating of material. A direct reading temperature gauge will be provided on each kettle so that the temperature of material can be observed and recorded.

3. Applicators and kettles must be equipped and arranged to comply with requirements of the National Board of Fire Underwriters. Applicators shall be maneuverable to the extent that straight lines can be followed and normal curves can be made in true arc.

4. The contractor at his option may provide a hand held infrared temperature gauge to measure the surface and material temperature in lieu of the direct reading temperature gauge specified above. This device will be given to the City-Parish

representative with proper operating guidelines and manuals at the pre-construction conference. The device will be returned to the contractor when the final inspection of all work has been completed. The cost of this device will be absorbed by the contractor in lieu of supplying the direct reading temperature gauge on the application equipment.

c. **Painting Equipment**
Painting equipment shall provide for the application of “drop-on” glass spheres.

d. **Symbols, Legends and Crosswalks**
Applicator equipment for symbols, legends, and crosswalks, may be hand propelled, but must meet all other requirements indicated above.

1195-4 TIME AND WEATHER LIMITATIONS

a. No work that interferes with the movement of traffic shall be permitted during weekday peak traffic hours, unless authorized by the CP/DPW/TED or City-Parish representative in writing. Peak traffic hours are:

7:30 a.m. – 8:30 a.m., Monday thru Friday
4:30 p.m. – 5:30 p.m., Monday thru Friday

Work during these hours on weekend days (Saturday and Sunday) may be authorized on an individual location basis by the CP/DPW/TED or City-Parish representative.

b. Application of markings will not be permitted when there is moisture on the pavement surface nor when the surface temperature is below fifty (50) °F Temperature will be measured and recorded at the start of each application and at approximately one (1) hour intervals.

c. Application of hot thermoplastic markings will not be permitted when the material temperature in the application equipment is below three hundred and seventy five (375) °F for extruded or ribbon-gun applications and four hundred (400) °F for spray applications. Temperature will be recorded at the start of each application and at approximately one (1) hour intervals thereafter.

1195-5 CLEANING OF PAVEMENT SURFACES:

a. Surfaces on which pavement markings are to be applied shall be cleaned of all materials that would reduce adhesion of the marking materials to the pavement. Cleaning shall be done by approved methods and surfaces shall be kept clean until placement of markings

b. All existing temporary markings shall be removed. No direct payment will be made for removing existing temporary markings and costs shall be included in the price for other items.

c. Existing permanent marking on the roadway may not require removal prior to placement of new markings. The CP/DPW/TED and/or City-Parish representative will examine and test existing pavement markings to determine if removal is necessary (see subsection 1195-6). The decision of the Traffic Engineering/ City-Parish representative will be final and the contractor will remove any existing permanent pavement markings as directed.

d. At the end of each day's operations, temporary pavement markings conforming to Subsection 905-3.2.1 shall be placed in areas where existing markings have been removed and new markings not placed. Temporary pavement markings shall be satisfactorily removed prior to resuming plastic striping operations. No direct payment will be made for the installation and removal of temporary markings and the cost shall be included in the price bid on other items**.**

1195-6 REMOVAL OF EXISTING PERMANENT PAVEMENT MARKINGS:

a. The contractor will be required to remove any permanent pavement markings (painted, thermoplastic or semi-permanent tape) when directed to do so by the CP/DPW/TED or City-Parish Representative.

b. CP/DPW/TED or City –Parish representative will make the final determination on removal of existing pavement marking based on field observations and a field test performed by the Contractors as follows:

1. On a typical ten foot (10') long segment of existing pavement marking stripe or a typical legend or symbol, a steel wire brush will be vigorously applied across the existing pavement marking material.

   i. If the existing pavement marking material remains firmly adhered to the pavement surface and does not powder or crack or flake, then removal is not required. A simple cleaning with a power brush or compressed air to remove surface dirt and debris will still be required at no additional cost.

   ii. If the existing pavement marking material shows loss of adhesion or significant powdering, cracking, or flaking, it shall be removed by approved methods which do not significantly damage the pavement surface to the extent that at least seventy-five percent (75%) of the pavement surface is exposed.

2. When any existing pavement markings are not completely recovered the application of new pavement markings, it shall be removed by approved methods so that at least seventy five percent (75%) of the pavement surface is exposed. Compensation will be at unit cost bid for such removal.

1195-7 LAYOUT:

a. **Location & Dimensions**
Pavement Markings (lines, legends, and symbols) shall have the following MUTCD dimensions and patterns, unless specified differently in these specifications or as directed by the Traffic Engineer.

1. All solid and skip-lane lines shall be four (4) inches wide. A skip-line shall consist of ten (10) foot line segments and thirty (30) foot gap segments. A dotted line shall consist of two (2) foot line segments and four (4) foot gap segments.

2. Double yellow lines shall have a spacing of four (4) to fourteen (14) inches between the lines as specified or as directed by the CP/DPW/TED or City-Parish representative.

3. Diagonal lines shall be twelve (12) inches or twenty-four (24) lines wide as shown

on the plans or as directed by the CP/DPW/TED or City-Parish representative. Spacing between diagonal lines(measured perpendicular to diagonal lines) shall be as follows:

i. Ten (10) feet when the posted speed limit is forty (40) miles per hour (mph) or less.

ii. Twenty (20) feet when the posted speed limit is above forty (40) miles per hour (mph)**.**

4. The longitudinal joint or existing centerline strip shall be used in determining the location of the centerline for new-restriping; however, in the absence of a longitudinal joint or existing stripe, by the contractor with the approval of the CP/DPW/TED or City-Parish representative. Edge striping on curves shall be adjusted as necessary so that the stripe on tangent will be parallel to the centerline and will not run off the edge of the pavement. Skip line individual interval will not be marked. No striping material shall be applied over a guide cord. All new layouts which do not use longitudinal joint or existing centerline stripe must be approved by the CP/DPW/TED or city –parish representative prior to application. No hot thermoplastic pavement marking material will be applied directly over longitudinal joint (centerline or otherwise). If conditions in the field require this type of application it must be approved in advance by CP/DPW/TED/

5. Legends and Symbols

All symbols, words and legends shall conform to the "Manual on Uniform Traffic Control Devices" as shown below:

Description	MUTCD Reference
Single Head Arrow	Section 3B-20, Fig 3-18 (a) or (b)
Double Head Arrow	Section 3B-20, Fig. 3-18 (c)
"Only"	Section 3B-20, Fig. 3-17
Railroad Crossing	Section 8B-4, Fig. 8.2
"School"	Section 7c-6, Fig. 7-2 or 7-3
"STOP	Section 3B-20
"SLOW"	Section 3B-20
"Ped X-ing"	Section 3B-20

b. **No Passing Zone Criteria**
When plans or specifications specify the installation of skip lane lines on two or three lane roads, "No passing zones" shall be installed as required.

1. **Horizontal and Vertical Curves**

(See MUTCD, Section 3B-5)

A no-passing zone (single or double) at a horizontal or vertical curves is warranted where the sight distance, as defined below , is less than the minimum necessary for safe passing at the prevailing speed of traffic. A single no-passing zone is required when the sight distance is obscured from both directions. Passing sight distance on a a vertical curve is the distance at which an object is three and one- half feet (3.50') above the pavement surface can just be seen from a point three and one-half feet (3.50') above the pavement. Similarly

passing sight distance on a horizontal curve is the distance measured along the centerline (or right hand lane of a three (3) lane highway) between two (2) points, three and one-half feet (3.50') above the pavement on a line tangent to the embankment or other obstruction that cuts off the view on the inside of the curve. Where centerlines are installed and a curve warrants a no-passing zone, it should be so marked where the sight distance is equal to or less then that list below for the prevailing off-peak eighty fifth (85^{th}) percentile speeds or the posted speed limit, whichever is higher.

Eighty-Fifth (85^{th}) Percentile Speed or Posted Speed Limit (MPH)	**Length of No passing Zone (Feet)**
25	450
30	500
35	500
40	600
45	700
50	800
55	900
60	1000
65	1100
70	1200

In the event the 85^{th} percentile speed is between table increments, the next higher five (5) MPH will be used.

The beginning of a no-passing zone is that point at which the sight distance first becomes less than that specified in the above table. The end of the zone is that point at which the sight distance again becomes greater than the minimum specified.

2. **Intersecting Cross Streets**: A no-passing zone is required approaching all public cross streets or roads. The length of these no- passing zones are influenced by the posted speed limit or prevailing off peak 85^{th} percentile speed (if known) whichever is higher and is given in the following table:

Eighty-Fifth (85^{th}) Percentile Speed or Posted Speed Limit (MPH)	**Length of No passing Zone (Feet)**
25	295
30	315
35	335
40	360
45	410
50	460
55	560

3. **Stop and Yield Sign Controlled Intersection Approach:** A combination of a double and a single no-passing zone approaching a Stop or Yield condition may be warranted on any public street as shown below. The length of the no-passing zone is based on the posted speed limit or prevailing off-peak 85^{th} percentile speed (if known) prior to the stop line location (near side curb or edge of pavement):

Eighty-Fifth (85^{th}) Percentile Speed	**Length of No passing Zone (Feet)**

or Posted Speed Limit (MPH)	
35 mph or lower	350
40 mph or higher	550

The intersection approach no –passing zone will be (when required) a combination of double and single no-passing zones measured from the stop bar going away from the intersection based on the approaching 85th percentile speed or the posted speed limit.

Eighty-Fifth (85th) Percentile Speed	**Double no passing/single no passing**	
35 mph or lower	150 ft.	200 ft
40 mph or higher	250 ft	300 ft

Installation of no-passing zones on the approaches to stop or yield controlled intersections will be made based on the decision of the CP/DPW/TED or City-Parish representative at the time the pavement marking layout is made. If the available sight distance to the stop line location, near side curb or edge of roadway of the intersecting roadway, is less than shown above, then the no-passing zone must be installed.

4. **Connecting Successive No-Passing Zones:** where the distance between successive no passing zones is less than four hundred (400) feet, the appropriate no passing marking (one direction or two directions) should connect the zones.

5. The contractor is required to layout all new no-passing zones or replace any that already exist (see subsection 1195-1(c)). The criteria used for "no passing zone" lay out and approval shall be agreed upon with the CP/DPW/TED at the pre-construction conference. Any additional conditions not specifically addressed herein shall be done in accordance with MUTCD.

1195-8 APPLICATION OF MARKINGS: Material shall be installed in specified widths from four (4) to twenty- four (24) inches. Finished lines shall have well defined edges and be free of waviness. Measurements shall be taken as an average throughout any thirty-six (36) inch section of line. Longitudinal lines shall be offset approximately two (2) inches from construction joints of Portland Cement concrete pavement.

a. **Tolerances:** A tolerance of plus one-half (+1/2) inch or minus one eight (-1/8) inch from the specified width will be allowed, provided the variation is gradual and does not detract from the general appearance. Segments of broken line may vary up to plus or minus six (+- 6) inches from the specified length. Segments shall square off at each end without mist or drip. Variations from the control guide up to one (1) inch will be allowed proved the variation does not increase or decrease at a rate of more than 1(/2) inch in twenty-five (25) feet. Lines do not meet these tolerances shall be removed and replaced without additional compensation.

b. **Protection of Markings:** During and immediately following the removal and/or application of the striping in areas having public traffic; traffic cones; red flags supported by springs or heavy wire on pedestals, or other approved devices, shall be placed alongside or over the line at intervals not exceeding fifty (50) feet to remain in place until the stripe has dried to such an extent that it will not be picked up by the tires of vehicles. Traffic shall be prevented from crossing a wet traffic stripe and if the above provisions are not sufficient to prevent such, the contractor shall use a sufficient number of flagmen, prober boards, signs or other protection for the wet stripe, or he shall reduce the amount of wet line by slowing down the striping operation. Sections of traffic stripe which have been marred or picked up by traffic

crossing before drying shall be repaired by the Contractor and the pavement cleaned outside the stripe without extra compensation.

Sections of traffic striping which have been placed in accordance with the plans and specifications and as directed will be considered satisfactory and the contractor relieved of responsibility for ordinary maintenance on such section after they are opened to public traffic, pending completion and acceptance of the contract.

c. **Protection of Traffic:** the contractor shall furnish and place all warning and directional signs required to direct, control and protect the traveling public while marking operations are in progress. Traffic shall be maintained at all times through the area where the stripes are being placed.

The pavement striping train shall move in the direction of normal traffic flow. The trailing vehicle shall be equipped with approved flashing arrow boards capable of directing traffic to the appropriate side of the train. All traffic control signs, cones and equipment shall be removed from the roadway when the striping train is not in operation.

Additional traffic control signs and equipment may be required, as directed, depending upon traffic conditions.

All protective and traffic warning devices shall be in accordance with MUTCD. The cost of protective and traffic warning devices shall be included in the price of other items bid for this project.

d. **Thermoplastic Markings:**

1. Thickness and Temperature

i. Type I:

The thickness of material on the pavement for Type I Thermoplastic Markings shall be not less than ninety (90) mils for lane lines, edge lines and gore markings and not less than one hundred and twenty-five (125) mils for crosswalks, stop lines, legends, and symbol markings, except that edge lines shall be thirty (30) mils when so designated by the plans, specification or Engineer.

Type I Thermoplastic material shall be applied either by extrusion at three hundred ninety degrees Fahrenheit to four hundred fifty degrees Fahrenheit (390 °F to 450 °F), or by spray at four hundred ten degrees Fahrenheit to four hundred fifty degrees Fahrenheit (410 °F to 450 °F). Material shall not scorch or discolor if kept at this temperature for four (4) hours or if reheated to this temperature four (4) separate times.

ii. Type II:

The thickness of material on the pavement for Type II Thermoplastic Markings shall be not less than ninety (30) mils for lane lines, edge lines and gore markings and not less than sixty (60) mils for crosswalks, stop lines, legends, and symbol markings.

Type II Thermoplastic material shall be applied either by extrusion or ribbon gun at three hundred seventy-five degrees Fahrenheit to four hundred twenty-five degrees Fahrenheit (375 °F to 425 °F) or by spray at four hundred degrees Fahrenheit to four hundred twenty-five degrees Fahrenheit (400 °F to 425 °F). Material shall not scorch or discolor if kept at this temperature for four (4) hours or if reheated to this temperature four (4) separate times.

iii. Type III:

The thickness of material on the pavement for Type III Thermoplastic Markings shall not be less than thirty (30) mils for lane lines, edge lines and gore markings and not less than one hundred twenty-five (125) mils for crosswalks, stop lines, legends and symbol markings.

Method of application and temperatures for 30 mil markings shall be as specified for Type II Markings and for 125 mil markings shall be as specified for Type I Markings.

iv. Temperature will be checked and recorded at the start of each application and at approximately one (1) hour intervals thereafter.

2. Application on Portland Cement Concrete Surfaces:

i. For application of hot thermoplastic material on new or unweathered Portland cement concrete pavement surfaces the Contractor will be required to treat the surface with primer of a type recommended and approve by the thermoplastic material manufacturer. The primer must be applied sufficiently in advance of the hot thermoplastic material to cure as required. The application of primer may be either a separate operation or combined with the application of the hot thermoplastic material subject to limitation on “curing” above.

ii. On other pavement surfaces, if recommended by the material manufacturer, binder-sealer material shall be applied to the road surface prior to thermoplastic installation.

iii. For application of hot thermoplastic material on existing Portland Cement concrete pavement where pavement markings have previously been placed, the new material may be placed directly on the existing material or surface subject to the requirements concerning the “Cleaning of Pavement Surfaces” in Subsection 1195-5.

3. Reflectorized glass spheres shall be applied to the surface of completed thermoplastic pavement markings by an automatic sphere dispenser attached to the striping machine in such a manner that reflectorized glass spheres are dispensed almost simultaneously at a uniform rate of a minimum of five (5) pounds of reflectorized glass spheres per one hundred (100) square feet of line. Reflectorized glass spheres shall be sprayed or dropped onto thermoplastic material while it is in a molten state immediately after it has been applied to the pavement. The reflectorized glass sphere dispenser shall be equipped with an automatic cutoff control synchronized with cutoff of thermoplastic material.

e. **Painted Marking**

1. Preparation of paint: Immediately before application, paints shall be agitated and mixed thoroughly to a uniform consistency, free from lumps or agglomerates. Paints shall be kept covered to retain volatiles. Paint shall not be thinned unless approval is given to correct consistency.

2. Rate of application: This rate of application shall apply to all paints, with proper adjustments for broken line stripe or for other widths, and the rate shall not vary from this amount more than five percent (5%) in any mile. At any point where a check indicates a variation in excess of 5%, the work shall be stopped and the equipment properly adjusted or replaced. The minimum wet thickness of paint shall be 15 mils.

   For rapid setting pigmented binder, the glass spheres shall be applied at the same time, but in a separate operation, at the rate of six (6) pounds (plus or minus 0.5 pound) of spheres per gallon of binder. Glass spheres shall be applied to the binder before final set has occurred and accomplished in such manner as to provide uniform coverage for the full width of the stripe. The glass spheres shall be applied to the paint stripe while it is still wet throughout, no dry surface film, immediately after it has been applied to the pavement. The glass spheres shall be applied by compressed air of sufficient pressure to cause embedment of the spheres throughout the entire thickness of the paint film. The guns used for glass sphere application shall be of a type approved for embedment.

   The paint may be heated in heat exchangers in order to accelerate drying. Under no circumstances is the paint to be heated to a temperature exceeding 180 °F (82 °C).

   The paint machine shall be so designed that its operation will be at a uniform speed on a grade as well as level ground. The operating speed of the equipment shall be approved by the Engineer consistent with the characteristics of the equipment's capabilities to produce an acceptable stripe within the required tolerances at the specified rate.

1195-9 CONTRACTOR QUALIFICATIONS:

a. The Contractor or subcontractor performing work under this contract must employ competent field level supervision with experience in the layout and applications of pavement markings, shall utilize equipment appropriate for the work, and must have performed other projects of a similar size and nature.

   References to verify these qualifications are met shall be provided within seven (7) calendar days to substantiate Contractor's experience. Also, a list of equipment which will be utilized for the work must be submitted upon request. It is not the intent of this specification to exclude any qualified contractor, but a reasonable amount of experience is required in highway and urban area municipal striping.

b. The Contractor's attention is specifically directed to the following:

   1. Application of all pavement markings will occur while normal traffic movement is being maintained on the street.

   2. The project may require the layout of new pavement markings include "No Passing" zones (in accordance with Subsection 1195-7b for horizontal and

vertical curves. The Contractor must have personnel capable of performing these layouts.

c. The Contractor's attention is also directed to Subsection 9-1 of the Standard Specifications regarding the limitations on subcontracting portions of the work.

1195-10 MEASUREMENT: Measurement will be made by the linear foot of pavement markings installed and accepted, exclusive of gaps, for the various widths (all colors) specified. Legends and symbols will be measured per each legend or symbol installed and accepted.

If an unspecified width marking is required in order to satisfy a specific field condition, then the measurement will be by the linear foot, pro-rated on the four inch (4") width of the same type pavement marking.

Removal of existing pavement markings will be measured by the square foot of markings actually removed and removal of legends and symbols will be measured per each. Removal of Existing Raised Pavement marker will be measured per each.

If no items for pavement markings and removal of existing markings are included in the contract, markings, symbols, legends, raised markers and removal thereof shall be at no direct cost and the Contractor shall include the cost in the price bid on other items.

1195-11 PAYMENT: Payment for pavement markings and removal of existing markings, measured as provided above will be made at the contract unit price and shall constitute full compensation for furnishing all labor, equipment, materials, tools, and incidentals and the performance of all work as required to satisfactorily complete these items in accordance with the plans and specifications.

The Contractor may, at his option, provide pavement markings which are thicker than specified in the contract. No additional payment will be made for the thicker markings, which will be paid for at the contract unit price for the thickness specified in the plans and specifications, unless a work directive or change order is approved by the Director prior to application of the markings.

1195-12 PAY ITEMS:

Item No.	Item	Unit
1195104	Four (4) Inch Wide Thermoplastic Reflective Striping (90 mil)	Linear Foot
1195108	Eight (8) Inch Wide Thermoplastic Reflective Striping (90 mil)	Linear Foot
1195112	Twelve (12) Inch Wide Thermoplastic Reflective Striping (90 mil)	Linear Foot
1195124	Twenty-four (24) Inch Wide Thermoplastic Reflective Striping (90 mil)	Linear Foot
1195150	Single Head Arrow (125 mil)	Each
1195151	Double Head Arrow (125 mil)	Each
1195152	"ONLY" (125 mil)	Each
1195153	"RAILROAD CROSSING" (125 mil)	Each
1195154	"SCHOOL" (125 mil)	Each
1195155	"STOP" (125 mil)	Each
1195156	"SLOW" (125 mil)	Each

1195204	Four (4) Inch Wide Thermoplastic Reflective Striping (30 mil)	Linear Foot
1195208	Eight (8) Inch Wide Thermoplastic Reflective Striping (30 mil)	Linear Foot
1195212	Twelve (12) Inch Wide Thermoplastic Reflective Striping (30 mil)	Linear Foot
1195224	Twenty-four (24) Inch Wide Thermoplastic	Linear Foot
	Reflective Striping (30 mil)	Linear Foot
1195250	Single Head Arrow (60 mil)	Each
1195251	Double Head Arrow (60 mil)	Each
1195252	“ONLY” (60 mil)	Each
1195253	“Railroad Crossing” (60 mil)	Each
1195254	“School” (60 mil)	Each
1195255	“STOP” (60 mil)	Each
1195256	“SLOW” (60 mil)	Each
1195257	“PED X-ING” (60 mil)	Each
1195312	Twelve (12) Inch Wide Thermoplastic	Linear Foot
	Reflective Striping (125 mil)	
1195324	Twenty-four (24) Inch Wide Thermoplastic	Linear Foot
	Reflective Striping (125 mil)	
1195412	Twelve (12) Inch Wide Thermoplastic	Linear Foot
	Reflective Striping (60 mil)	
1195424	Twenty-four (24) Inch Wide Thermoplastic	Linear Foot
	Reflective Striping (60 mil)	
1195504	Four (4) Inch Wide Painted Reflective Striping	Linear Foot
1195508	Eight (8) Inch Wide Painted Reflective Striping	Linear Foot
1195512	Twelve (12) Inch Wide Painted Reflective Striping	Linear Foot
1195524	Twenty-four (24) Inch Wide Painted Reflective Striping	Linear Foot
1195550	Single Head Arrow (Painted)	Each
1195551	Double Head Arrow (Painted)	Each
1195552	“ONLY” (Painted)	Each
1195553	“Railroad Crossing” (Painted)	Each
1195554	“School” (Painted)	Each
1195555	“STOP” (Painted)	Each
1195556	“SLOW” (Painted)	Each
1195557	“PED X-ING” (Painted)	Each
1195601	Removal of Existing Pavement Markings	Square Foot
1195602	Removal of Existing Legends and Symbols	Each
1195603	Removal of Existing Raised Pavement Markers	Each

Homeowner Notification Door Knockers

Contractor Name

CP Project No.

BATON ROUGE SSO Program

SANITARY SEWER SURVEY IN YOUR NEIGHBORHOOD!

Dear Resident:

The Baton Rouge Sanitary Sewer Overflow Program is underway throughout the City of Baton Rouge/Parish of East Baton Rouge. This work will reduce sanitary sewer overflows, help accommodate growth in the City-Parish, and enable us to comply with federal Clean Water Act regulations.

Within the next 7 days, crews will be conducting a physical survey of the sanitary sewer system in your area. This survey will involve the opening & entering of manholes in the streets & servitudes. An important task of the survey will be cleaning & televising the sewer lines to locate breaks and defects in the sewer system. Non-toxic smoke testing may also be used.

Things You Need to Know:

- If you have any seldom used drains or toilets, please pour water in the drain to fill the trap or flush toilets, this will prevent sewer gases or odors from entering the building.
- Some sewer lines & manholes may be located on the backyard servitude property line. Whenever these lines require investigation, members of the inspection crews will need access to the servitude for the sewer lines & manholes. Homeowners do not need to be home & the technicians will not need to enter your house.
- If you have dogs or other pets in your yard, we ask that you confine them while our crews are working in your area.
- In the unlikely case that smoke from the smoke testing appears on private property or in homes, you should know that the smoke is harmless. We will work with you to eliminate any sewer line problems indicated by the smoke.

Questions? Contact the SSO Program Public Information Line at 225-588-5678 or email help@BRprojects.com.

Si usted tiene cualquier pregunta, favor de llamar al Coordinador de Participación Comunitaria al (225) 588-5678 o enviar un email al help@BRprojects.com.

Baton Rouge SSO Program
Visit our website at
www.BRprojects.com

Shall be printed on Hot Pink colored card stock (80lb).

Contractor Name

CP Project No.

BATON ROUGE SSO Program

WORK IS BEGINNING IN YOUR NEIGHBORHOOD!

Dear Resident:

The Baton Rouge Sanitary Sewer Overflow Program is underway throughout the City of Baton Rouge/Parish of East Baton Rouge. This work will reduce sanitary sewer overflows, help accommodate growth in the City-Parish, and allow us to comply with federal Consent Decree and Clean Water Act regulations.

Work in your community is scheduled to start within 7 days.

We want you to know that:

- We may require access to manholes or other sewer facilities on your property, but we will never need to enter your home. A crew member with proper identification will knock on your door and let you know if we need access to your yard.
- If you have a fence, building, or other obstruction in the public right-of-way (servitude), we may be required to move it temporarily until the work is completed.
- Service laterals (your private sewer line) may be inspected up to your property line, and a cleanout may be installed at the property line.
- If you have dogs or other pets in your yard, we ask that you confine them while our crews are working in your area.
- If repairs involve digging on your property, we will restore your property in a timely fashion once the work is completed.
- Your safety is our concern. Always avoid construction and excavation sites.

Questions? Contact the SSO Program Public Information Line at 225-588-5678 or email help@BRprojects.com

Si usted tiene cualquier pregunta, favor de llamar al Coordinador de Participación Comunitaria al (225) 588-5678 o enviar un email al help@BRprojects.com.

Baton Rouge SSO Program
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Contractor Name

CP Project No.

BATON ROUGE SSO Program

STREET CLOSURE ALERT

Dear Resident/Business Owner,

The Baton Rouge Sanitary Sewer Overflow (SSO) Program is underway throughout the City of Baton Rouge/Parish of East Baton Rouge. This work will reduce sanitary sewer overflows, help us accommodate growth in the City-Parish, and allow us to comply with federal Consent Decree and Clean Water Act regulations.

In order to perform this work, it will be necessary to close certain streets in your area. The streets will be closed within the next two weeks. Please plan your routes accordingly; for alternate route information, please visit the City-Parish website at http://brgov.com/ and scroll down to the "Road Closures" section.

Access to your home or business will be maintained at all times. If short term lane closures are required traffic control and alternate routes will be communicated through traffic signage and/or personnel.

We apologize for any inconvenience and would like to thank you in advance for your cooperation. If you have any questions or problems, please feel free to contact our SSO Program Public Information Line at 225-588-5678.

Questions? Contact the SSO Program Public Information Line at 225-588-5678 or email help@BRprojects.com.

Si usted tiene cualquier pregunta, favor de llamar al Coordinador de Participación Comunitaria al (225) 588-5678 o enviar un email al help@BRprojects.com.

Baton Rouge SSO Program
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WBG091710223002BTR

Shall be printed on Fluorescent Orange colored card stock (80lb).

(FRONT)

Contractor Name

CP Project No.

BATON ROUGE SSO Program

TEMPORARY SEWER ACCESS SHUT-OFF

The Baton Rouge Sanitary Sewer Overflow Program is underway throughout the City of Baton Rouge/Parish of East Baton Rouge. This work will reduce sanitary sewer overflows, help accommodate growth in the City-Parish, and allow us to comply with federal Consent Decree and Clean Water Act regulations.

Work in your community is scheduled to start within the next few days.

We will not be digging, but we will be lining the sewer pipes. We need your cooperation to avoid backup of sewer water into your residence or business by preventing water from escaping through any drain during the specified time period. Therefore, during the time period shown below:

- Do not wash clothes or dishes.
- Do not take showers or baths.
- Do not flush toilets.
- Turn off sump pumps that are connected to the sewer service.
- For your safety, always avoid construction and excavation sites

If any problems occur with your sewer service during this rehabilitation process, please notify an on-site representative, or call the **SSO Program Public Information Line** at **225-588-5678**.

Your Service Will Be Shut-off from

_____ **to** _____

(time) **(time)**

on

_____

(Day and Date)

Visit our website at www.brprojects.com

(BACK)

PLEASE NOTE:

You may detect odors (like plastic or glue) from the new sewer service connections being installed on your street. If you smell this odor inside your home, it is perhaps the result of a dry or broken sewer trap. The purpose of the sewer trap is to maintain a water barrier in the pipe to prevent all sewer odor and sewer gases from entering your home (see figures below).

Pour water (4 liters or 1 gallon) down all floor drains or any rarely used sinks/tubs/toilets to ensure that a water barrier is maintained in the traps. If this does not prevent odors from entering your home, then your trap may require repair and you may need to temporarily place plastic bags filled with water over the drain to prevent the backflow of odors. If you continue to smell odors, please call the SSO Program Information Line (225-588-5678), so we may assist you with this problem.

Baton Rouge SSO Program
Visit our website at
www.BRprojects.com

Shall be printed on Fluorescent Yellow colored card stock (80lb).

SPECIAL CONDITIONS

33 01 30.73 – Spiral Wound Pipe Rehabilitation

SECTION 33 01 30.73

SPIRAL WOUND PIPE REHABILITATION

PART 1 GENERAL

1.1 SCOPE

A. The scope of this Work is to provide all material, labor, and equipment to rehabilitate an existing active sewer with spiral wound pipe liner.

1.2 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer's standard data including:
         1) Literature.
         2) Illustrations.
         3) Specifications.
         4) Product data sheets indicating physical, mechanical, and chemical characteristics of all materials, including data confirming conformance with specification requirements.
         5) Qualified third-party test results demonstrating long-term performance and structural strength of liner system.
         6) Storage requirements.
         7) Installation requirements.
         8) Repair instructions.
   2. Liner Design:
      a. Prepared by a licensed professional engineer licensed in the State of Louisiana and confirming that specification requirements are met:
         1) Liner dimensions.
         2) Reinforcing steel.
         3) Basis of design, assumptions and other technical data collected for design. This can include but is not limited to borings, soil samples or other information from the field.
   3. Design loads and calculations. Grout Design Mix and Grouting Plan:
      a. Prepared by a professional engineer licensed in the State of Louisiana.
      b. Approved by spiral wound liner manufacturer.
      c. Supported by tests of sample grout mixes by a certified testing laboratory.
      d. Confirming that specification requirements are met:
         1) Minimum strength and thickness.
         2) Grouting stages/levels.
         3) Locations of ports.
         4) Bulkhead spacing/design.
         5) Bracing spacing/design.
         6) Grout port repair method.
   4. Installation Plan:
      a. Access manhole locations.
      b. Site plan sketch showing dimensions of access within work limits and utilities.

c. Approximate installation rate (ft/day).
d. Appropriate excavation/backfill/resurfacing procedures, including permits according to applicable local standard specifications.
e. Schedule and timeline of spiral wound rehabilitation activities identified by line segment.
f. Discussion of bypass pumping requirements.

5. Spill Containment Plan.
6. Traffic Control Plan.

B. Informational Submittals:

1. Qualifications: **The apparent low bidder shall complete and submit the required qualifications to the Engineer within ten (10) days after the bid opening.**
a. Manufacturer.
b. Manufacturer's representative, authorized to act on behalf of manufacturer.
c. Contractor.

2. Special liner shipping, storage and protection, and handling instructions.
3. Pre-installation video, log of connections, and manufacturer's confirmation of review.
4. Factory Test Results for PVC Liner Pipe:
a. Inspection for defects.
b. Physical properties, including initial stiffness factor.
5. Grout test results.
6. Installation Test Results:
a. Exfiltration test.
b. Hammer test.
c. Spark test.
d. Welding strip test.
7. Post installation video.
8. Special Guarantees:
a. Manufacturer: Material.
b. Contractor: Workmanship.

1.3 RESPONSIBILITY FOR OVERFLOWS AND SPILLS

A. Schedule and perform the Work to avoid causing or contributing to sewage overflows or spills.

B. If an overflow or spill occurs within the Work area or related to the Work, immediately take appropriate action to contain and stop overflow, clean up spillage, disinfect area affected by spill, and notify Owner.

1.4 EXPERIENCE REQUIREMENTS

A. Manufacturer/Supplier Qualifications:
1. Document specialized experience in the manufacture of products specified in this specification.
2. Document a minimum of 10 successful field installations of spiral wound pipe liner systems in North America.
3. Proposed Spiral Wound Pipe Liner System Minimum Installation Record: 5 years and 1,000,000 linear feet of the exact-name brand product successfully installed in stormwater or sanitary sewer collection system applications in North America.

B. Contractor Qualifications:
   1. Sewer Rehabilitation Experience: Contractor shall have a minimum of five (5) years of active continuous experience installing spiral wound pipe using the exact name brand product proposed. In addition, Contractor shall have successfully rehabilitated at least 300,000 feet of pipe using spiral wound technology including at least 20,000 linear feet in 36-inch diameter (or larger) host pipe and at least 5,000 linear feet in 54-inch diameter host pipe in wastewater collection system applications.
   2. The Qualifying Field Superintendent employed by the Contractor will have at least five (5) years experience with installing spiral wound pipe using the exact name brand product proposed. In addition, the Qualifying Superintendent must have supervised jobs in which at least 300,000 feet of pipe has been rehabilitated using spiral wound pipe technology including at least 20,000 feet in 36-inch diameter (or larger) host pipe and at least 5,000 feet in 54-inch (or larger) host pipe of the exact named product proposed. The Qualifying Superintendent shall be on-site during all phases of the work involving any pre and post-installation video inspection, sewer cleaning, or spiral wound pipe installation.
   3. The spiral wound pipe product manufacturer shall have 1,000,000 linear feet installed of the exact name-brand product bid in the United States, with a minimum of 20,000 linear feet in diameters 36-inch or larger and a minimum of 5,000 feet of 54-inch diameter or larger.
   4. The installation contractor shall be approved and qualified by the Manufacturer

1.5 Special Guarantees:

A. Material Guarantee: Provide manufacturer's written 1-year guarantee, with Owner named as beneficiary, for correction of any material defect in structural repair elements, including all Work required to remove and replace defective material.

B. Workmanship Guarantee: Provide a 1-year written guarantee, with Owner named as beneficiary, for correction of any installation defects.

C. Warranty Inspection: Owner will conduct a warranty CCTV inspection in the 11th month following the Final Acceptance of the Work. Contractor and a representative of liner product manufacturer shall participate in this inspection. Repair all material and installation defects to Owner's satisfaction under warranties provided above.

PART 2 PRODUCTS

2.1 GENERAL

A. Spiral Wound Pipe: Polyvinyl chloride pipe liner with or without steel reinforcing strips. Other proposed liner products must be pre-approved by Engineer.

B. Engineer, Owner or other designated representative may inspect pipes or witness pipe manufacturing.

C. Clearly mark each profile strip on inside surface at intervals not to exceed 60 inches with a code number identifying manufacturer, plant, date of manufacture and shift, and profile type.

Provide same information on each reel. Maintain a log onsite documenting code information as material arrives onsite. Provide log to Engineer at any time upon request.

D. Liner and any sealants, gaskets, couplings, or other components must be suitable for use in a sewerage environment, resistant to corrosion because of sulfuric acid produced by biological activity and other chemicals found in wastewater.

E. Lining: Light color to facilitate inspection.

2.2 APPROVED MANUFACTURERS

A. Sekisui SPR Americas, LLC.

B. Danby, LLC; Houston, Texas.

2.3 DESIGN PARAMETERS

A. Submit engineering design calculations stamped by a professional engineer licensed in the State of Louisiana and Shop Drawings for renewed conduit:
   1. Documenting the required:
      a. Profile designation (geometry).
      b. Grout strength.
      c. Grout thickness.
   2. Reflecting evaluation of:
      a. Existing condition of host pipe.
      b. Long-term design loads on renewed conduit.
      c. Loads on spiral wound lining conduit during installation.
      d. Required chemical resistance and flow capacity of renewed pipe.

B. Use the following parameters for pipe liner design:

Design Parameter Table	
Design Life:	50 Years
Host Pipe Diameters:	Per Contract Documents
Liner Pipe Inner Diameter, unless directed by the Engineer	48” for 54” Host Pipe 54” for 60” Host Pipe
Ovality (Calculated from X1.1 of ASTM F1216)	Per Contract Documents
Pipe Condition (as defined in X1.2.2 of ASTM F1216)	Fully deteriorated
External Water:	Ground Surface
Soil Modulus	1,000 psi
Soil Density	120 pcf
Highway Live Load	AASHTO HS20-44
Design Safety Factor	2.0 minimum
Minimum Service Life	50 years

2.4 MACHINE-WOUND PVC LINER PIPE

A. PVC Profile Strip Material: PVC compounds conforming to ASTM D1784 with a cell classification of 12344C or higher.

B. Profile Designation (Geometry): Compatible with design requirements for renewed conduit and suitable for installation in host pipe.

C. Steel Reinforcing Strip:
   1. Sheet Steel: Conform to ASTM A653.
   2. Thickness, Formed Shape, and Yield Strength: Compatible with design requirements for renewed conduit and specified PVC profile designation.

D. Steel Reinforcing: Cold-rolled steel and fully encapsulated, preventing exposure to corrosive elements.

E. Interior diameter of relined pipe shall be the maximum allowed by thickness of material (liner plus grout), structural strength, and shape considerations. Place liner relative to existing wall of the pipe as submitted and approved.

2.5 NON MACHINE-WOUND PVC LINER PIPE

A. Provide liner made from compounds specified for PVC extrusion and meeting specifications of cell class 12343 of ASTM D1784.

B. Compounds with a different cell classification because one or more properties are superior (higher number) to those of specified compounds are also acceptable.

C. PVC Profile: Comply with ASTM F1735.

D. Interior diameter of relined conduit shall be maximum allowed by thickness of material (liner plus grout), structural strength, and shape considerations.

E. Place liner relative to existing wall of host pipe as submitted and approved.

F. Steel Reinforcing Strips within PVC Windings:
   1. Fabricate from steel conforming to ASTM A653.
   2. Thickness, Formed Shape, and Yield Strength: Compatible with design requirements of renewed pipe and specified PVC profile designation.

G. Provide mechanical shear dowels or spaces where required to satisfy design requirements for renewed pipe consisting of reinforcing steel bonded to host pipe by a bonding method proposed by manufacturer of spiral wound liner and accepted by Engineer.

2.6 ANNULAR SPACE NONSHRINK GROUT

A. Provide grout recommended and approved by spiral wound liner manufacturer with the following minimal characteristics:
   1. Compressive strength in accordance with ASTM C39:
      a. >5,000 psi at 28 days.

b. >1,000 psi at 1 day.
2. Compressive strength in accordance with ASTM C109 >1,000 psi at 1 day.
3. <5 percent bleed in accordance with ASTM C940.
4. Flow characteristic +/-44 seconds in accordance with ASTM C939.
5. Shrinkage <1 percent in accordance with ASTM C1090.
6. Fly ash, if used, shall meet ASTM C618, Class F.

B. Submit grout design for approval prior to commencement of Work.

PART 3 EXECUTION

3.1 CONTRACTOR'S RESPONSIBILITIES

A. Locate and designate all manhole access points as necessary for the Work.

B. Provide water from hydrants for cleaning, installation, and other process related work items requiring water. Comply with all connection and use requirements.

C. Locate and mark all existing utilities in areas where excavation is to be performed at least 48 hours prior to beginning any excavation

D. Field verify inside dimensions of sewer.

E. A manufacturer's representative, experienced in installation, must be present onsite for installation of first 1,500-linear feet of spiral wound pipe liner including:
1. Setup.
2. Winding the liner pipe.
3. Splicing connections.
4. Bulk heading ends.
5. Grouting annular space (if required).
6. Final inspection.

3.2 PACKAGING, HANDLING, AND SHIPPING

A. Package, handle, and ship liner in accordance with manufacturer's instructions.

B. Ship lining profile on appropriately sized reels for ease of handling and product protection.

C. Inspect product for defects at time of manufacture and again in field prior to installation. Defects to lining profile include, but are not limited to, gouges, abrasion, flattening, cuts, punctures, and ultra-violet (UV) degradation. Do not install defective product; remove it from Job Site and dispose in accordance with regulations. Handle and store lining profile reels in accordance with manufacturer's instructions.

3.3 TRAFFIC CONTROL

A. Prepare a Traffic Control Plan, conforming to all applicable state and local laws, and submit to Engineer for approval. Conform to requirements of Section 7, Legal Relations and Responsibilities to the Public.

B. Maintain two-way traffic on all affected streets and access to all business entrances adjacent to or within Project Site.

C. Notify Engineer and Owner at least 7 days prior to starting Work in an area.

3.4 TEMPORARY FLOW DIVERSION AND BYPASS PUMPING

A. If installation plan requires flow bypass pumping for proper installation of spiral wound liner pipe, submit a Bypass Pumping Plan in accordance with Section 813, Sewer Flow Control.

B. Perform applicable Work specified in Section 813, Sewer Flow Control, prior to starting rehabilitation work.

3.5 PRE-LINING CLEANING, INSPECTION, AND TESTING

A. Clean pipe as specified in Section 812, Sewer Line, Manhole And Wet Well Cleaning.

B. Remove all loose material, acids, grease, and other deleterious substances, and prepare surface in accordance with manufacturer's recommendations for bonding with cementitious grout.

C. Correct all infiltration leaks (continuous stream) that may, in the opinion of manufacturer, impact successful installation of the liner with a cementitious water-plug or pressure/chemical grouting.

D. After cleaning, conduct a video inspection of the pipe as specified in Section 815, Sewer Line, Manhole And Wet Well Inspection.
   1. Log longitudinal and radial locations of all lateral connections to host pipe for subsequent reinstatement.
   2. Manufacturer shall review video inspection and confirm that host pipe is suitable for installation of spiral wound liner pipe.
   3. Submit manufacturer's confirmation and a copy of inspection results to Engineer prior to installation of any liner pipe.

E. Mandrel Testing: If any defect is encountered during the video inspection that will not be corrected prior to lining and would prevent the successful installation of the liner pipe then a Mandrel Test will be performed. Pull a mandrel of at least the outside diameter of spiral wound liner pipe through line.
   1. A 10-foot-long section of spiral wound liner pipe may be used in place of a mandrel for size testing.
   2. For horizontal pipe sweeps, a shorter 4-foot-long section may be used.
   3. For offset joints, sags, depressions, or slight bends in the line, pull a full length of slipliner pipe through the line to verify planned diameter will fit.

3.6 LINE OBSTRUCTIONS

A. Clear line of obstructions, solids, dropped joints, or collapsed pipe that will prevent insertion of spiral wound pipe liner. If inspection reveals an obstruction, remove or repair obstruction. Submit documentation of repair to Engineer prior to spiral wound liner installation.

B. Repair major pipe obstructions, defined as collapses, partial collapses, or offset joints that restrict cross-sectional area of pipe to extent that the test mandrel cannot pass through damaged pipe section and corrective action requires excavation and replacement of one or more lengths of existing pipe.

C. Repair as specified in Section 802, Gravity Sewer Pipe. For all restrictions in the cross-sectional area of pipe that lie under Federal Interstate 10 or 12, a smaller spiral wound liner that can pass through all restrictions of the cross-sectional area of pipe will be installed. Submit all repairs and modifications to spiral wound liner installation to the Engineer prior to any repairs or installation of liner.

D. All other obstructions are considered to be conditions ordinarily encountered and actions to remove or repair the obstruction, such as removal of debris, patching, repair of leaks, and minor repairs, are recognized as inherent in sewer rehabilitation work.

E. All repairs or excavation proposed by the contractor within the Right of Way for Federal Highway Administration Interstates I-10 or I-12 shall be reported within 24 hours to the Engineer. Resolution to repair will be agreed upon by Engineer and Owner prior to commencing any work on repair.

3.7 MACHINE-WOUND PVC PIPE LINER INSTALLATION

A. Profile Winding:
   1. Wind PVC profile with either self-winding or static equipment.
      a. Self-winding machine traverses down host pipe forming spiral wound PVC lining conduit as it goes.
      b. Static winding machine operates from a fixed location and feeds spiral wound PVC lining conduit into the host pipe.
   2. Maintain a continuous winding process until spiral wound PVC lining is complete for length of host pipe to be renewed.

B. Annular Space Grouting: As specified below.

3.8 INSTALLATION OF NON MACHINE-WOUND PVC LINER

A. Profile Winding:
   1. Comply with ASTM F1698.
   2. Wind liner with ribbed profile of strip as near as practical (but not less than 0.5 inch) to wall of existing structure or as specified by Engineer.
   3. If necessary, strip may be shimmed off wall to avoid discontinuities of wall surface or to maintain specified annulus. Configure shims so they will not significantly impede flow of grout into annulus (such as, rebar beam bolsters).
   4. Lock adjacent panel edges together using the manufacturer supplied joiner strip with a plastic/rubber mallet or other means approved by manufacturer.
   5. Additional coils of PVC strip may be introduced by joining ends of strip by means of a manufacturer supplied joiner strip (such as, “H” section).
   6. Seal joint on both sides of strip with an approved sealant/adhesive or thermal weld.
   7. Extend each welding strip that reaches a lower edge of liner beyond liner creating a tab.
   8. Where existing pipe alignment is curved (either smooth or chords with deflection angles), has angular bends at structures, manholes, and junction chambers, or changes in size,

shape or slope; modify liner to closely follow existing shape and dimensions, unless otherwise shown on Drawings, by any of the following methods:

a. Stretching and/or compressing adjacent panel joints.
b. Using fittings or profile accessories as provided by liner manufacturer.
c. Field trimming panels, fittings, or accessories to fit existing conditions.
d. Modifying panels, fittings, or accessories by heating and bending to shape.

B. Reinforcing Steel Installation:
   1. Maintain a minimum cover of 1-inch over steel.
   2. Anchor steel to host pipe to maintain its position during liner and grout installation.

3.9 ANNULAR SPACE GROUTING

A. Install grout by one of the following methods:
   1. Pump into annular space from openings at upstream and downstream structure.
   2. Pump into annular space from within pipe liner through predrilled locations around circumference of spiral wound PVC conduit.
   3. Pump into annular space from above ground through drilled locations along alignment of pipe.

B. Grout between bulkheads installed at predetermined distances along conduit.

C. Prior to grouting, install a bracing framework to:
   1. Prevent flotation of spiral wound PVC conduit.
   2. Align PVC conduit within host pipe so the required annular space is maintained between PVC conduit and host pipe.
   3. Prevent excessive deflection or buckling of PVC conduit.

D. Provide vent holes for air relief from annular space and to monitor grout fill levels.

E. Grout in one or more lifts to completely fill the annular space.

F. Provide adequate elapsed time between successive grout stages to allow grout to attain a minimum compressive strength of 1,000 psi.

G. Sample and Test Grout:
   1. Provide flow cone and cube molds with restraining plates onsite.
   2. Take three, 2-inch cube samples for each 25 cubic feet of grout used. Use restraining caps for cube molds in accordance with ASTM C1107.
   3. Store cubes at 70 degrees F.
   4. Remove and replace grout with strength, consistency, or bleed test results that are not in accordance with specified requirements or manufacturer’s recommendations.
   5. Submit tests results to Engineer.

H. After grouting, fill the remaining 6 inches of annular space at beginning and terminus of liner with a hydraulic non-shrink grout suitable for use in a corrosive sewer environment. Provide a water-tight, corrosion-resistant seal at all manholes and lateral connections.

3.10 COMPLETION OF WORK AND SITE RESTORATION

A. Blend step in the flow line at ends of renewed conduit into existing flow line.

B. Seal any holes made in the spiral wound pipe liner during the grouting operation using means and methods approved by Engineer.

C. Encase exposed spiral wound pipe liner and/or connecting pipes at points where temporary excavation was required for access to host pipe or lateral connections in accordance with Section 801, Excavation, Backfilling, and Compaction for Sanitary Sewers and Related Structures. Encasement materials may consist of concrete, sand slurry, or other materials as approved by Engineer.

D. Once rehabilitation is complete, re-establish access at manholes. Provide a completely water tight seal at each manhole, preventing any infiltration into the manhole from the rehabilitated sewer.

3.11 INSPECTION AND ACCEPTANCE

A. Conduct and submit a CCTV inspection, as specified in Section 815, Sewer Line, Manhole And Wet Well Inspection, of inside of spiral wound pipe liner within 2 weeks after completion of grouting to establish acceptance of liner.

B. Spiral wound pipe liner acceptance criteria:
   1. All joints properly assembled.
   2. Liner is free from visual defects, damage, or excessive deflection.
   3. No visible infiltration through liner, at joints, lateral connections, or at manhole connections.
   4. Any leakage or deformation is within allowable limits as determined by Engineer.
   5. Installation test and grout test results accepted.

C. Repair liner deemed defective by post-installation CCTV inspection. Submit proposed repair method of repair to Engineer for approval. Video-tape repaired section for acceptance.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT: if a pay item for Spiral Wound Rehabilitation is included in the Contract, measurement will be as follows:

A. Sewer Pipe Spiral Wound Lining: Measurement for installed spiral wound pipe shall be on a lump sum basis for the spiral wound liner pipe sizes listed under this item in the Contract Documents

B. Grout: No measurement will be made for grout

4.2 PAYMENT:

A. Sewer Pipe Spiral Wound Lining: Payment for this Item will be full compensation for spiral wound pipe, fittings, insertion pits, bulkheads, pipe cleaning, CCTV inspection, plugging,

traffic control, replacing manhole structures, placing new manhole structures, sealing at manholes, locating, excavating, disconnecting, and backfilling service lateral connections, and testing, in accordance with the Contract Document; and all else incidental thereto for which separate payment is not provided under other Items in the Bid Form. No direct payment will be made for Re-establishment and grouting of service lateral connections required for spiral wound lining.

B. Grout: No direct payment will be made for grout

END OF SECTION

SANITARY SEWER QUALIFIED PRODUCTS LIST

The City of Baton Rouge/Parish of East Baton Rouge Department of Public Works has a Qualified Products List (QPL) to evaluate new products which shall be used on the department's typical sanitary sewer construction and maintenance projects. This QPL is available for download at the following website:

http://brprojects.com/baton-rouge-sso-program/design-construction/wastewater-qualified-products-list/

Materials identified on the QPL do not require a certificate of compliance unless the need for such a document is specifically identified in the material requirements, by specifications, or departmental request. **Listing of a Material on the QPL does not constitute a waiver of the Contractor's obligation to submit product information such as the product cut sheet/shop drawing, manufacturer's recommended installation procedures, or other data requested by the Owner.** Materials on the QPL will be re-evaluated on an as needed basis. In addition to materials on the list meeting certification requirements, they can also be inspected and/or tested to verify conformance to the specifications. Any materials presently on the list and subsequently failing to conform to the certification or specification requirements can be removed at any time.

Be advised, the QPL is for informational purposes and is not intended to be all inclusive. If the product meets the specifications outlined in the Contract Documents but is not on the QPL, it may be used as long as the necessary certification documents are submitted according to the specifications, reviewed, and deemed as an approved equal by the Owner and Engineer.

Inclusion of a product on this list does not imply that the product meets any or all applicable State or Federal regulations related to safety or environmental issues in effect at the time. The manufacturer's Material Safety Data Sheet (MSDS) should be referred to before and during use of any product appearing on this list. This list is intended as an information tool for contractors, engineering consultants, and Department personnel to identify products meeting the Department's standards or specifications for particular applications. The use of any product listed on this site by a contractor shall in no way relieve contractors from their contractual obligations.

DISCLAIMER: This QPL assumes no liability on the part of the City of Baton Rouge/Parish of East Baton Rouge or its Program Manager for the products included nor is it intended to promote any product, supplier or manufacturer over another.

East Baton Rouge Parish
Department of Public Works
QUALIFIED PRODUCTS LIST 802

(Product shall conform to section 802- Gravity Sewer Pipe)

HYDRAULIC CEMENT MATERIAL		
PRODUCT SOURCE CODE	PRODUCT	SOURCE
802.01	Strong-Plug	Strong Company
802.02	EMACO	Master Builders Technologies
802.03	Preco Plug	FOSROC Incorporated

NEW PIPE-EXISTING PIPE CONNECTIONS		
PRODUCT SOURCE CODE	PRODUCT	SOURCE
802-05-01	Stainless Steel Shear Rings 5000 Series Repair Couplings StrongBack RC Series Repair Couplings	Fernco, Inc.
802-05-02	Flex Seal Adjustable Repair Couplings Heavy Weight Couplings	Mission Rubber Co.

PIPE-MANHOLE CONNECTIONS		
PRODUCT SOURCE CODE	PRODUCT	SOURCE
802-06-01	Flexible Rubber Boot Connector - 106/406 SS Wedge, 206, & 306 Series	Kor-N-Seal
802-06-02	Integrally Cast Flexible Connectors	A-Lok X-Cel
802-06-03	Flexible Rubber Boot Connector - PSX: Direct Drive	Press-Seal Gasket Corp.
802-06-04	Flexible Rubber Boot Connector – Cobra (Wedge) Style	Hamilton Kent, LLC

SERVICE LATERAL CONNECTIONS			
PRODUCT SOURCE CODE	PRODUCT	SOURCE	APPLICATIONS
802-07-01	Flexible Saddle Wye	Fernco	Connection to CIPP Lining
802-07-02	PVC Saddle Wye	J-M Eagle	Connection to CIPP Lining
802-07-03	Sealant	Hydrophilic Water Stop	Connection to CIPP Lining
802-07-04	Compressive-fit Service Connections	Inserta-Tee	Sliplining/FRP/Clay/Closed Profile PVC Pipe
802-07-05	Electrofusion Branch Saddles	Central Plastics	Pipe Bursting/HDD
802-07-06	PVC Saddle Wye	GPK Products, Inc.	Connection to CIPP Lining

(Product shall conform to section 803- Sewer Manhole)

STANDARD PRECAST CONCRETE MANHOLES		
PRODUCT SOURCE CODE	PRODUCT	SOURCE
803-4.2-01	Std. 48″ Manhole Std. 60″ Manhole Std. 72″ Manhole	Gainey's Concrete Products, Inc. Holden, LA
803-4.2-02	Std. 48″ Manhole Std. 60″ Manhole Std. 72″ Manhole	Northshore Concrete Products, LLC. Albany, LA
803-4.2-03	Std. 48″ Manhole	Barber Brothers Baton Rouge, LA
803-4.2-04	Std. 48″ Manhole	Glenco Precast St. Gabriel, LA
803-4.2-05	Std. 48″ Manhole Std. 60″ Manhole Std. 72″ Manhole	Wastewater Treatment of Louisiana Prairieville, LA
803-4.2-06	Std. 48″ Manhole Std. 60″ Manhole Std. 72″ Manhole	Hanson Pipe and Precast LaPlace, LA

Note: Shop drawing submittals of manholes are still required for approval.

CONCRETE PROTECTIVE ADMIXTURES			
PRODUCT SOURCE CODE	PRODUCT	SOURCE	APPLICATIONS
803-2h1-01	Admix C-Series	Xypex Chemical Corporation	Crystalline waterproofing
803-2h1-02	MasterLife 300D	BASF Corporation	Crystalline waterproofing
803-2h1-03	Crystal X	Conshield Technologies	Crystalline waterproofing
803-2h1-04	Penetron Admix RP	Penetron USA Inc	Crystalline waterproofing
803-2h2-01	Con^{MIC} Shield	Conshield Technologies	Anti-microbial additive
803-2h2-02	Conblock MIC	ConSeal – Concrete Sealants, Inc.	Anti-microbial additive
803-2h2-03	Bio-San C500	Xypex Chemical Corporation	Anti-microbial additive & Crystalline waterproofing

Note: Must submit concrete mix design with actual admix dosage rate.

EXTERNAL SEAL WRAP FOR RISER RINGS AND FRAME			
PRODUCT SOURCE CODE	PRODUCT	SOURCE	
803-4.7a-01	Infi-Shield® Uni-Band	Sealing Systems Inc.	
803-4.7a-02	External X-85 Seal	Cretex Companies	
803-4.7a-03	E3 Chimney Seal	Adaptor, Inc.	
803-4.7a-04	Conseal CS-212	Conseal Concrete Sealants, Inc.	

EXTERNAL JOINT WRAP			
PRODUCT SOURCE CODE	PRODUCT	SOURCE	
803-4.7b-01	Infi-Shield® Gator Wrap	Sealing Systems Inc.	
803-4.7b-02	EZ-Wrap Joint Wrap	Press-Seal Gasket Corporation	
803-4.7b-03	External Cretex Wrap	Cretex Companies	
803-4.7b-04	Seal Barrel Wrap	Adaptor, Inc.	
803-4.7b-05	Conseal CS-212	Conseal Concrete Sealants, Inc.	

East Baton Rouge Parish
Department of Public Works
QUALIFIED PRODUCTS LIST 805

(Product shall conform to section 805- Submersible Pump Stations)

PUMPS				
PRODUCT SOURCE CODE	PRODUCT	SOURCE	SIZE/RATING	
805-3-01	Explosion proof submersible non-clog pump	Wilo/EMU	In accordance with the engineer's design	
805-3-02	Explosion proof submersible non-clog pump	Fairbanks-Morse	In accordance with the engineer's design	
805-3-03	Explosion proof submersible non-clog pump	Flygt (Xylem)	In accordance with the engineer's design	
805-3-04	Explosion proof submersible non-clog pump	Hydromatic	In accordance with the engineer's design	
805-3-05	Explosion proof submersible non-clog pump	Yeomans-Chicago (Grundfos)	In accordance with the engineer's design	

East Baton Rouge Parish
Department of Public Works
QUALIFIED PRODUCTS LIST 806

(Product shall conform to section 806- Manhole Rehabilitation)

PATCHING MATERIAL		
PRODUCT SOURCE CODE	PRODUCT	SOURCE
806-3.6-01	Strong-Seal QSR	Strong Company
806-3.6-02	Fast Set Bench Repair	Standard Cement Materials
806-3.6-03	Quadex Hyperform	Quadex Inc.

HYDRAULIC CEMENT		
PRODUCT SOURCE CODE	PRODUCT	SOURCE
806-3.7-01	Strong-Seal Strong Plug	Strong Company
806-3.7-02	Custom Plug Cement	Standard Cement Materials
806-3.7-03	Instaplug No. F-180	Sauereisen
806-3.7-04	ML-10 Hydraulic Cement Mortar	Madewell Products Corporation
806-3.7-05	AW Cook Silatec Hydraulica Cement	The Sherwin Williams Company

CHEMICAL GROUT		
PRODUCT SOURCE CODE	PRODUCT	SOURCE
806-3.8-01	Hydro Active Multigel NF	De neef Construction Chemicals
806-3.8-02	Hydro Active Polyurethane Grout No. F-370	Sauereisen
806-3.8-03	Avanti AV202	The Sherwin Williams Company

CEMENTITIOUS LINER MATERIAL		
PRODUCT SOURCE CODE	PRODUCT	SOURCE
806-3.9a-01	Strong-Seal MS-2 C	Strong Company
806-3.9a-02	Quadex Aluminaliner	Quadex
806-3.9a-03	Maximum CA Cement	Standard Cement Materials
806-3.9-04	SewerSeal No. F-170	Sauereisen
806-3.9-05	ML-CA Calcium Aluminate Mortar	Madewell Products Corporation

Note: Cementitious lining products approved for manhole rehabilitation only.

EPOXY LINER MATERIAL		
PRODUCT SOURCE CODE	PRODUCT	SOURCE
806-3.9b-01	Raven 405	Raven Lining Systems
806-3.9b-02	S-301 Epoxy Spray System	Warren Lining Systems
806-3.9b-03	STANDARDSHIELD	Standard Cement Materials
806-3.9b-04	SewerGard No. 210	Sauereisen
806-3.9b-05	DS-5 Ultra High Build Epoxy	Madewell Products Corporation
806-3.9b-06	Quadex Structure Guard	Quadex
806-3.9b-07	Dinjer SG Mastic	Dinjer
806-3.9b-08	DuraPlate 6100 High Performance Epoxy	The Sherwin Williams Company

Note: Epoxy lining products approved for manhole rehabilitation only.

RISER RING SEALANT		
PRODUCT SOURCE CODE	PRODUCT	SOURCE
806-3.1-01	Anchor IT #2447	PROCHEM INC.

STAINLESS STEEL INSERTS		
PRODUCT SOURCE CODE	PRODUCT	SOURCE
806-3.4-01	Tetherlok stainless steel "Rainstopper" manhole cover insert	Southwestern Packing & Seals

(Product shall conform to section 808 & 809 Cured-in-Place (CIPP) & Laterals)

CIPP LINING TUBE MATERIAL	
PRODUCT SOURCE CODE	SOURCE
808/809-3b-01	Applied Felts
808/809-3b-02	Insituform Technologies
808/809-3b-03	Liner Products
809-3b-01	LMK Enterprises
809-3b-02	Trelleborg Epros LCR-S hat profile (85/15)

RESIN MATERIAL		
PRODUCT SOURCE CODE	PRODUCT	SOURCE
808/809-3e-01	Polylite #33420, DION 9800-20	Reichhold
808/809-3e-02	#COR72-AA-455HV, #COR72-AA-656, #CORVE8190	Interplastic Corporation
808/809-3e-03	#AROPOL MR12018, HETRON Q6405	Ashland Specialty Chemical Company
808/809-3e-04	701, 102NA	AOC
808/809-3e-05	L704NET-11, L704AAP-12	Vipel
809-3e-01	Epros Silicate Resin Type W1 & Type S1	Trelleborg

CATALYST MATERIAL			
PRODUCT SOURCE CODE	PRODUCT	SOURCE	
808/809-3f-01	Perkadox 16, Perkadox BTW-50, Norox 600	Akzo	Primary Catalysts
808/809-3f-02	Trigonox C, Norox TBPB	Akzo	Secondary Catalysts
808/809-3f-03	N, N-dimethyl aniline (DMA)	Puritan Products	Secondary Catalysts

(Product shall conform to section 810- Sliplining)

CLOSED PROFILE PVC SLIPLINER				
PRODUCT SOURCE CODE	PRODUCT	SOURCE	SIZE/RATING	SDR/ STIFFNESS
810-2f-01	Vylon Slipliner Pipe	Lamson Vylon Pipe Cleveland, OH	21" and larger	PS 46

SOLID WALL PVC SLIPLINER				
PRODUCT SOURCE CODE	PRODUCT	SOURCE	SIZE/RATING	SDR/ STIFFNESS
810-2g-01	Vylon Slipliner Pipe	Lamson Vylon Pipe Cleveland, OH	18" and larger	PS 46

SOLID WALL HDPE SLIPLINER				
PRODUCT SOURCE CODE	PRODUCT	SOURCE	SIZE/RATING	SDR/ STIFFNESS
810-2h-01	Driscoplex	Chevron Phillips Pipe	18" and larger	SDR 17
810-2h-02	JM Eagle	HDPE Pipe	Pressure rating: 160 psi	SDR 11 (max)

FIBERGLASS REINFORCED POLYMER (FRP) PIPE				
PRODUCT SOURCE CODE	PRODUCT	SOURCE	SIZE/RATING	SDR/ STIFFNESS
810-2j-01	Hobas Pipe	Hobas Pipe USA Houston, TX	18" and larger	PS 46
810-2j-02	Flowtite Pipe	USCPS (Thompson Pipe Group) Zachary, LA	18" and larger	PS 46

East Baton Rouge Parish
Department of Public Works
QUALIFIED PRODUCTS LIST 1011

(Product shall conform to section 1011- Structural Steel)

STANDARD CASTINGS		
PRODUCT SOURCE CODE	PRODUCT	SOURCE
1011-5-01	• Std. Manhole Frames & Covers • Boltdown (Watertight) Manhole Frame & Cover • Hinged Manhole Frame & Cover • Manhole C.I. Riser Rings • ARV Frame & Covers • Cleanout Covers • Valve Boxes	East Jordan Iron Works (EJIW) East Jordan, MI Ardmore, OK Youngstown, OH
1011-5-02	• Std. Manhole Frames & Covers • Boltdown (Watertight) Manhole Frame & Cover • Hinged Manhole Frame & Cover • Manhole C.I. Riser Rings • ARV Frame & Covers • Cleanout Covers • Valve Boxes	East Jordan Iron Works (EJIW) East Jordan, MI Ardmore, OK Youngstown, OH

(Product shall conform to section 1016.1- Gravity Sewer Pipe)

DIRECT BURY PVC PIPE				
SOLID WALL				
PRODUCT SOURCE CODE	SOURCE	SIZE/RATING	SDR/ STIFFNESS	JOINTS
1016-1.1.1.1a-01	J-M Eagle	4″ - 24″	Depth ≤ 12ft - SDR 35/ SN 46 Depth > 12ft - SDR 26/ SN 115	Integral bell and spigot-type Gaskets
1016-1.1.1.1a-02	CertainTeed	4″ - 24″	Depth ≤ 12ft - SDR 35/ SN 46 Depth > 12ft - SDR 26/ SN 115	Integral bell and spigot-type Gaskets
1016-1.1.1.1a-03	Diamond Plastics	4″ - 24″	Depth ≤ 12ft - SDR 35/ SN 46 Depth > 12ft - SDR 26/ SN 115	Integral bell and spigot-type Gaskets
1016-1.1.1.1a-04	North American Pipe Corporation (NAPCO)	4″ - 24″	Depth ≤ 12ft - SDR 35/ SN 46 Depth > 12ft - SDR 26/ SN 115	Integral bell and spigot-type Gaskets
1016-1.1.1.1a-05	Hawk Plastics	4″ - 15″	Depth ≤ 12ft - SDR 35/ SN 46 Depth > 12ft - SDR 26/ SN 115	Integral bell and spigot-type Gaskets
1016-1.1.1.1a-06	Sanderson Pipe	4″ - 18″	Depth ≤ 12ft - SDR 35/ SN 46 Depth > 12ft - SDR 26/ SN 115	Integral bell and spigot-type Gaskets
1016-1.1.1.1a-07	Pipelife Jet Stream	4″ - 24″	Depth ≤ 12ft - SDR 35/ SN 46 Depth > 12ft - SDR 26/ SN 115	Integral bell and spigot-type Gaskets

PVC FITTINGS (TEES, WYES, & TEE-WYES)			
PRODUCT SOURCE CODE	SOURCE	PRODUCT	APPLICATION
1016-1.1.1.1a-07	Multi Fittings, Inc.	TRENCH TOUGH PLUS	• Gasketed SDR 35 Sewer Fittings • Large Diameter Molded SDR 35 Sewer Fittings • Heavy Wall SDR 26 Gasketed Sewer Fittings
1016-1.1.1.1a-08	GPK Products,	GPK Gasketed	• Gasketed Sewer Fittings (SDR 35) • Gasketed Heavy Wall Sewer Fittings

	Inc.	Sewer Fittings	(SDR 26)
1016-1.1.1.1a-09	Harrington Corp. (HARCO)	Gasketed Sewer Fittings	• Gasketed Sewer Fittings (SDR 35) • Gasketed Heavy Wall Sewer Fittings (SDR 26)
1016-1.1.1.1a-10	Tigre-ADS, USA	Gasketed Sewer Fittings	• Gasketed Sewer Fittings (SDR 35) • Gasketed Heavy Wall Sewer Fittings (SDR 26)

LARGE DIAMETER CLOSED PROFILE PVC				
PRODUCT SOURCE CODE	SOURCE	SIZE/RATING	SDR/ STIFFNESS	JOINTS
1016-1.1.1.1b-01	Vylon Heavy Duty Pipe	21″ - 54″	PS 60	Integral bell and spigot-type Gaskets

PVC FOR TRENCHLESS APPLICATIONS				
PRODUCT SOURCE CODE	SOURCE	SIZE/RATING	SDR/ STIFFNESS	JOINTS
1016-1.1.1.2-01	CertainTeed (Certa-Lok)	4″ - 16″	SDR 18 (max) C900 ≤ 12″ C905 >12″	Twin Elastomeric sealing gaskets
1016-1.1.1.2-02	Underground Solutions	4″ - 16″	SDR 25 (max) C900 ≤ 12″ C905 >12″	Electrofusion

HIGH DENSITY POLYETHYLENE (HDPE) PIPE AND FITTINGS				
PRODUCT SOURCE CODE	SOURCE	PRODUCT NAME	SDR/STIFFNESS	JOINTS
1016-1.1.2-01	Chrevon-Phillips	DriscoPlex	Pressure rating: 160 psi SDR 11 (max)	Electrofusion
1016-1.1.2-02	JM Eagle	HDPE Pipe	Pressure rating: 160 psi SDR 11 (max)	Electrofusion

1016-1.1.2-03	PolyPipe	PolyPipe (PW)	Pressure rating: 160 psi SDR 11 (max)	Electrofusion
1016-1.1.2-04	WL Plastics	HDPE Pipe	Pressure rating: 160 psi SDR 11 (max)	Electrofusion

DUCTILE IRON PIPE		
PRODUCT SOURCE CODE	SOURCE	JOINTS
1016-1.2-01	American Ductile Iron Pipe	• Push-on Joint • Mechanical Joint • Flanged Joint • Restrained Joint • Gasket material shall be standard styrene butadiene rubber (SBR.)
1016-1.2-02	U.S. Pipe	• Push-on Joint • Mechanical Joint • Flanged Joint • Restrained Joint • Gasket material shall be standard styrene butadiene rubber (SBR.)
1016-1.2-03	McWane Cast Iron Pipe Co.	• Push-on Joint • Mechanical Joint • Flanged Joint • Restrained Joint • Gasket material shall be standard styrene butadiene rubber (SBR.)
1016-1.2-04	Griffin Pipe Products	• Push-on Joint • Mechanical Joint • Flanged Joint • Restrained Joint • Gasket material shall be standard styrene butadiene rubber (SBR.)

DUCTILE IRON PIPE INTERIOR COATING		
PRODUCT SOURCE CODE	SOURCE	PRODUCT
1016-2.3f-01	Induron Protective Coatings	Protecto 401 Ceramic epoxy lining
1016-2.3f-02	TNEMEC Company	Series 431 Perma-Shield PL
1016-2.3f-03	Permite Corporation	Permox CTF

FIBERGLASS REINFORCED POLYMER (FRP) PIPE				
PRODUCT SOURCE CODE	SOURCE	SIZE/RATING	SDR/ STIFFNESS	JOINTS
1016-1.4-01	Hobas Pipe Hobas, USA Houston,TX	18″ or larger	SN 46	Glass reinforced plastic sleeve couplings Gaskets
1016-1.4-02	Flowtite Pipe USCPS, LLC (Thompson Pipe Group)	18″ or larger	SN 46	Glass reinforced plastic sleeve couplings Gaskets

EXTRA STRENGTH CLAY PIPE FOR MICROTUNNELING AND PIPE-JACKED TUNNELS			
PRODUCT SOURCE CODE	SOURCE	SIZE/RATING	JOINTS
1016-1.5-01	Mission Clay Products Corp. Corona, CA	6″ and larger	Flush with outside diameter.
1016-1.5-02	CanClay Corp. Cannelton, Indiana	6″ and larger	Flush with outside diameter.

FIBERGLASS REINFORCED POLYMER (FRP) PIPE FOR MICROTUNNELING AND PIPE-JACKED TUNNELS					
PRODUCT SOURCE CODE	PRODUCT	SOURCE	SIZE/RATING	STIFFNESS/ PRESSURE	JOINTS
1016-1.6-01	Hobas Pipe	Hobas Pipe USA Houston, TX	18″ and larger	Satisfy design requirements No less than 46 psi	Flush with outside diameter.

POLYMER CONCRETE PIPE FOR MICROTUNNELING AND PIPE-JACKED TUNNELS				
PRODUCT SOURCE CODE	PRODUCT	SOURCE	SIZE/RATING	JOINTS
1016-1.7-01	Meyer Polycrete	USCPS, LLC (Thompson Pipe Group)	8″ and larger	Flush with outside diameter.
1016-1.7-02	Meyer Polycrete	Meyer Pipes Engineering GmbH & Co.Lueneburg, Germany	8″ and larger	Flush with outside diameter.

East Baton Rouge Parish
Department of Public Works
QUALIFIED PRODUCTS LIST 1016

(Product shall conform to section 1016.2- Force Main Sewer Pipe)

PVC PRESSURE PIPE			
PRODUCT SOURCE CODE	SOURCE	SIZE/RATING	SDR/STIFFNESS
1016-2.1-01	JM Eagle	AWWA C900≤ 12″ (235 psi)	SDR 18 (max)
		AWWA C905 >12″ (165 psi)	SDR 25 (max)
1016-2.1-02	Certain Teed	AWWA C900≤ 12″ (235 psi)	SDR 18 (max)
		AWWA C905 >12″ (165 psi)	SDR 25 (max)
1016-2.1-03	North American Pipe Corporation	AWWA C900≤ 12″ (235 psi)	SDR 18 (max)
		AWWA C905 >12″ (165 psi)	SDR 25 (max)
1016-2.1-04	Underground Solutions (Aegion)	AWWA C900≤ 12″ (235 psi)	SDR 18 (max)
		AWWA C905 >12″ through 16″ (165 psi))	SDR 25 (max)
1016-2.1-05	Sanderson Pipe	AWWA C900≤ 12″ (235 psi)	SDR 18 (max)
1016-2.1-06	Pipelife Jet Stream	AWWA C900≤ 12″ (235 psi)	SDR 18 (max)
1016-2.1-07	Diamond Plastics Corporation	AWWA C900≤ 12″ (235 psi)	SDR 18 (max)
		AWWA C905 >12″ (165 psi)	SDR 25 (max)

RESTRAINING GLANDS FOR PVC PIPE		
PRODUCT SOURCE CODE	SOURCE	PRODUCT
1016-2.1d-01	EBAA Iron	Mechanical Joint Series 2000PV
1016-2.1d-02	EBAA Iron	Restraint Harness Series 1600 and Series 2800
1016-2.1d-03	Ford Meter Box	Uni-Flange Series 1390 and Series 1500
1016-2.1d-04	Star Pipe	PVC Stargrip Series 4000 and 4100P
1016-2.1d-05	SIP Industries	EZ Grip Joint Restraint (PVC) and EZ Grip PTP Series Bell Joint Restraints (PVC)

HIGH DENSITY POLYETHYLENE (HDPE) PIPE			
PRODUCT SOURCE CODE	SOURCE	PRODUCT	SIZE/RATING
1016-2.2-01	Chrevon-Phillips	DriscoPlex 4200 and 4300	Pressure rating: 160 psi Maximum SDR of 11
1016-2.2-02	JM Eagle	HDPE Pipe	Pressure rating: 160 psi Maximum SDR 11
1016-2.2-03	PolyPipe	PolyPipe (PW)	Pressure rating: 160 psi Maximum SDR 11
1016-2.2-04	WL Plastics	HDPE Pipe	Pressure rating: 160 psi Maximum SDR 11

DUCTILE IRON PIPE		
PRODUCT SOURCE CODE	SOURCE	JOINTS
1016-2.3-01	American Ductile Iron Pipe	• Push-on Joint • Mechanical Joint • Flanged Joint • Restrained Joint • Gasket material shall be standard styrene butadiene rubber (SBR.)
1016-2.3-02	U.S. Pipe	• Push-on Joint • Mechanical Joint • Flanged Joint • Restrained Joint • Gasket material shall be standard styrene butadiene rubber (SBR.)
1016-2.3-03	McWane Cast Iron Pipe Co.	• Push-on Joint • Mechanical Joint • Flanged Joint • Restrained Joint • Gasket material shall be standard styrene butadiene rubber (SBR.)
1016-2.3-04	Griffin Pipe Products	• Push-on Joint • Mechanical Joint • Flanged Joint • Restrained Joint • Gasket material shall be standard styrene butadiene rubber (SBR.)

DUCTILE IRON PIPE FITTINGS		
PRODUCT SOURCE CODE	SOURCE	APPLICATION
1016-2.3b-01	American Ductile Iron Pipe	Ductile Iron and PVC Force mains
1016-2.3b-02	U.S. Pipe	Ductile Iron and PVC Force mains
1016-2.3b-03	Tyler Union	Ductile Iron and PVC Force mains
1016-2.3b-04	CLOW Water Systems Co.	Ductile Iron and PVC Force mains

1016-2.3b-05	Star Pipe	Ductile Iron and PVC Force mains
1016-2.3b-06	SIP Industries	Ductile Iron and PVC Force mains (MJ and Flanged only)
RESTRAINING GLANDS FOR DUCTILE IRON PIPE		
PRODUCT SOURCE CODE	SOURCE	APPLICATION
1016-2.3m-01	EBAA Iron	MegaLug Model 1100
1016-2.3m-02	Ford Meter Box	Uni-Flange Series 1500
1016-2.3m-03	Star Pipe	PVC Stargrip Series 3000 and 3000S
1016-2.3m-04	SIP Industries	EZ Grip Joint Restraints (Ductile Iron)
DUCTILE IRON PIPE INTERIOR COATING		
PRODUCT SOURCE CODE	SOURCE	PRODUCT
1016-2.3f-01	Induron Protective Coatings	Protecto 401 Ceramic epoxy lining
1016-2.3f-02	Tnemec Company	Series 431 Perma-Shield PL
1016-2.3f-03	Permite Corporation	Permox CTF

(Product shall conform to section 1019- Valves and Appurtenances)

GATE VALVES Non-rising Stem			
PRODUCT SOURCE CODE	**PRODUCT**	**SOURCE**	**SIZE/RATING**
1019-4a-01	Figure 438, NPT threaded ends	Crane	3 inches and smaller
1019-4a-02	Figure B103, NPT threaded ends	Stockham	3 inches and smaller
1019-4a-03	Figure 1320, soldered ends	Crane	3 inches and smaller
1019-4a-04	Figure B104, soldered ends	Stockham	3 inches and smaller
GATE VALVES Rising Stem			
PRODUCT SOURCE CODE	**PRODUCT**	**SOURCE**	**SIZE/RATING**
1019-4b-05	Figure 428, NPT threaded ends	Crane	3 inches and smaller
1019-4b-06	Figure B-100, NPT threaded ends	Stockham	3 inches and smaller
1019-4b-07	Figure 1330, soldered ends	Crane	3 inches and smaller
1019-4b-08	Figure B-108, soldered ends	Stockham	3 inches and smaller

RESILIENT SEATED GATE VALVE			
PRODUCT SOURCE CODE	**PRODUCT**	**SOURCE**	**SIZE/RATING**
1019-4-01	AWWA C509	M&H Valve	3-12 inches
1019-4-02	AWWA C515	M&H Valve	4-36 inches
1019-4-03	A-USPO	U.S. Pipe	3-20 inches
1019-4-04	Series 2360	Mueller Water Products	3-12 inches
1019-4-05	Series 2361	Mueller Water Products	14-48 inches
1019-4-06	Series 2500 RWGV	American Flow Control	3-66 inches

PLUG VALVES		
PRODUCT SOURCE CODE	**SOURCE**	**SIZE**
1019-05-01	Val-matic 5700	4-30 inches
1019-05-02	DeZurik PEF/PEC	4-72 inches

CHECK VALVES Lever and Spring Swing Check Valves		
PRODUCT SOURCE CODE	**SOURCE**	**SIZE/RATING**
1019-06a-01	Mueller Series 2600	3″ – 12″ – 175psi
1019-06a-02	Mueller Series 8100	14″ – 36″ – 150psi
1019-06a-03	M&H Valve Style 259	3″ – 12″ – 175psi 14″ – 36″ – 150psi
1019-06a-04	Golden Anderson Fig 340-S	3″ – 24″ – 250psi

CHECK VALVES Rubber Flapper Swing Check Valves		
PRODUCT SOURCE CODE	**SOURCE**	**SIZE/RATING**
1019-06b-01	Val-matic Series VM-500A	3″-≤30″ - 250 psi 30″-48″ – 150 psi
1019-06b-02	Golden Anderson Fig 200BF	3″ - 24″ - 250 psi
1019-06b-03	Danfoss Flomatic Model 745 BFPI	3″-12″ - 250 psi 14″-24″ – 175 psi

QUICK CONNECT COUPLINGS		
PRODUCT SOURCE CODE	**PRODUCT**	**SOURCE**
1019-07-01	Model PF-C coupler with Model 634A plug	Dover Corporation OPW Division

AIR AND VACUUM VALVES		
PRODUCT SOURCE CODE	**PRODUCT**	**SOURCE**
1019-08-01	Model D-025 (combo)	A.R.I. USA Inc.
1019-08-02	Series 800 (combo)	Val-matic Valve and Manufacturing Company
1019-08-03	Series 300 (air/vacuum)	Val-matic Valve and Manufacturing Company
1019-08-04	Series 48ABW (air release)	Val-matic Valve and Manufacturing Company

CORPORATION STOPS			
PRODUCT SOURCE CODE	**PRODUCT**	**SOURCE**	**SIZE/RATING**
1019-09-01	H-15029	Mueller Company	¾", 100 psi pressure rating

FLANGE ADAPTER COUPLINGS Restrained Couplings			
PRODUCT SOURCE CODE	**PRODUCT**	**SOURCE**	**SIZE/RATING**
1019-10-01	Style Alpha FC	ROMAC Industries	≤ 12 inches
FLEXIBLE COUPLINGS **Non-Restrained Couplings**			
PRODUCT SOURCE CODE	**PRODUCT**	**SOURCE**	**SIZE/RATING**
1019-10-01	Style 128-W	Dresser Company	≤ 24 inches
1019-10-02	Style FCA 501	ROMAC Industries	≤ 16 inches

FLEXIBLE COUPLINGS Victaulic Type Couplings		
PRODUCT SOURCE CODE	**PRODUCT**	**SOURCE**
1019-11-01	Style 741	Victaulic Vic Flange

FLEXIBLE COUPLINGS Sleeve Couplings		
PRODUCT SOURCE CODE	**PRODUCT**	**SOURCE**
1019-11-02	Style 40 (long body)	Dresser
1019-11-03	Style 38 (short body)	Dresser

DIAPHRAGM SEALS		
PRODUCT SOURCE CODE	**PRODUCT**	**SOURCE**
1019-12-01	Type SB	Mansfield and Green
1019-12-02	Series 40 Flanged Sensor	Red Valve Company

MECHANICAL WALL SEALS		
PRODUCT SOURCE CODE	**PRODUCT**	**SOURCE**
1019-14-01	Link-Seal	Thunderline Corporation

HOSE END FAUCETS		
PRODUCT SOURCE CODE	**PRODUCT**	**SOURCE**
1019-15-01	Model Z-1385	Zurn

PRESSURE GAGES		
PRODUCT SOURCE CODE	**PRODUCT**	**SOURCE**
1019-16-01	Series 450	H.O. Trerice Company

REDUCED PRESSURE BACKFLOW PREVENTERS		
PRODUCT SOURCE CODE	**PRODUCT**	**SOURCE**
1019-17-01	Model FRP-11	Beeco-Hersey
1019-17-02	6 CM	Beeco-Hersey

DIAPHRAGM AND FLAP CHECK VALVES		
PRODUCT SOURCE CODE	**PRODUCT**	**SOURCE**
1019-18-01	Series TF-2 Compression Bands	Red Valve
1019-18-02	Figure No. F-3016	CLOW Water Systems Co.

AGREEMENT

This Agreement made and entered into at Baton Rouge, Louisiana, effective this _ day of_____, 20___, by and between the **City of Baton Rouge and Parish of East Baton Rouge**, hereinafter called "Owner", and _____ _____, hereinafter called "Contractor".

The Contractor shall perform all work required by the Contract Documents for the construction of:

ESSEN/STARING LARGE DIAMETER SEWER REHABILITATION
CITY-PARISH PROJECT NO. 20-AR-MS-0089

The following Contract Documents are all hereby made a part of this Agreement to the same extent as if incorporated herein in full:

1. Notice to Contractors
2. Uniform Construction Bid Forms
3. Unit Price Form
4. Special Provisions/Technical Specifications
5. The Construction Drawings
6. The Standard Specifications
7. The following enumerated addenda _____

CONTRACT TIME

The entire contract shall be completed in all details and ready for final acceptance within **180 calendar days** after date stipulated in the Notice to Proceed. Time is of the essence in the contract and the Notice to Proceed will be issued promptly. Contract time extensions will only be allowed in accordance with provisions in the Contract Documents.

FAILURE TO COMPLETE WORK ON TIME

Should the Contractor fail to complete the work within the contract time, as extended, liquidated damages in the amount of **four hundred eighty dollars ($480.00)** per calendar day will be assessed the Contractor in accordance with the Contract Documents.

INTERPRETATIONS OF CONTRACT PROVISIONS

The interpretations of the provisions of this contract by the Director, Department of Public Works, shall be binding upon both parties hereto.

CONTRACT PRICE

The amount to be paid to the Contractor by the Owner is _____ _____($_____).

Contract price shown is based on the Unit Price Form included in Contractor's Uniform Public Works Bid Form for the project showing approximate quantities and unit prices therefore. The final contract price will be determined by the actual quantities in place at the unit prices set forth in said form and any other modifications or changes as mutually agreed upon in writing.

PAYMENT

The Owner will make partial or progress payments less applicable retainage, based upon monthly estimates, in accordance with the Contract Documents and subsection 10-6 of the Standard Specifications.

Upon satisfactory completion of the work, the Owner will make a final payment in accordance with provisions of the Contract Documents.

INSURANCE, INDEMNITY AND LEGAL REGULATIONS

Insurance, indemnity requirements, and legal regulations shall conform to those stated in the Contract Documents.

RIGHT TO AUDIT

The Contractor shall permit the authorized representative of the City-Parish to periodically inspect and audit all data and records of the Contractor relating to his performance under this contract.

IN WITNESS WHEREOF, the parties hereto have executed this agreement effective as of the date first written above.

WITNESSES

Name of Contractor

_____ BY: _____
Name
Title

DATE: _____

Witness:

CITY OF BATON ROUGE
PARISH OF EAST BATON ROUGE

_____ BY: _____
Sharon Weston Broome
Mayor-President

DATE: _____

PERFORMANCE AND PAYMENT BOND
(Required For Contracts Over $25,000)

That we, the undersigned _____ as principal, hereinafter referred to as "Contractor" and _____, duly authorized to transact business in the State of Louisiana as surety, are held and firmly bound unto the City of Baton Rouge and Parish of East Baton Rouge, hereinafter referred to as "Owner", in the penal sum of _____ ($ _____) lawful money of the _____ United States, for the payment of which well and truly to be made, the said principal and the said surety do hereby bind ourselves, our heirs, executors, administrators, and assigns, jointly and severally, by these presents as follows:

The condition of this obligation is such that whereas, the Contractor by an instrument in writing attached hereto and bearing date of _____, 20___, has agreed with said Owner to furnish labor, materials, tools and equipment to construct: **ESSEN/STARING LARGE DIAMETER SEWER REHABILITATION, CITY-PARISH PROJECT NO. 20-AR-MS-0089** shown on plans and specified thereby and in the specifications, proposals, and agreement forming the contract documents thereto attached.

NOW THEREFORE, if said Contractor shall well and truly in good, sufficient and workmanship manner, and to the satisfaction of the Owner, perform and complete the work required and shall pay all costs, charges, rentals, and expenses for labor, material, supplies, and equipment and deliver the said improvement to the Owner complete and ready for occupancy or operation, and free from all liens, encumbrances or claims for labor, material or otherwise; and shall pay all other expenses lawfully chargeable to the Owner by reason of any default or neglect of the said Contractor in the performance of said agreement and said work, then this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED FURTHER, That the said surety for value received hereby stipulates and agrees that no change, extension of time, alterations, or addition to the terms of that contract, or the work to be performed there under, or the specifications accompanying the same, shall in anywise affect its obligation on the bond and it does hereby waive notice of any change, extension of time, alterations, or addition to the terms of the contract, or the work, or the specifications.

PROVIDED FURTHER, That if the Contractor, or his, their, or its subcontractors fail to duly pay for any labor, materials, team hire, sustenance, provisions, provender or any other supplies or materials used or consumed or for any materials or supplies furnished for use by such contractors or his, their, or its subcontractors in performance of the work contract to be done, the Surety will pay the same in any amount not exceeding the sum specified in the bond, together with interest and attorney's fees as provided by law.

IN WITNESS WHEREOF, Said Principal and Surety have hereunto set their hands and seals this_____day of _____, 20__.

_____
(Contractor)

_____
(Address)

_____ By: _____
(WITNESS)

_____
(Typed Name and Title)

_____
(Surety)

_____
(Address)

_____ By: _____
(WITNESS)

_____
(Typed Name and Title)

AFFIDAVIT

STATE OF LOUISIANA
PARISH OF EAST BATON ROUGE

BEFORE ME, the undersigned authority, personally came and appeared

_____

who, being duly sworn did depose and say:

That he is a duly authorized representative of _____
receiving value for services rendered in connection with:

ESSEN/STARING LARGE DIAMETER SEWER REHABILITATION
CITY-PARISH PROJECT NO. 20-AR-MS-0089

a public project of the City of Baton Rouge, Parish of East Baton Rouge, Louisiana: that he has employed no person, corporation, firm, association, or other organization, either directly or indirectly, to secure the public contract under which he received payment, other than persons regularly employed by him whose services in connection with the construction, alteration, or demolition of the public building or project or in securing the public contract were in the regular course of their duties for him; and that no part of the contract price received by him was paid or will be paid to any person, corporation, firm, association, or other organization for soliciting the contract, other than the payment of their normal compensation to persons regularly employed by him whose services in connection with the construction of the public building or project were in the regular course of their duties for him.

This affidavit is executed in compliance with the provisions of LA R.S. 38:2224.

_____
Affiant's Signature

SWORN TO AND SUBSCRIBED before me, on this_____day of _____, 20__.
Baton Rouge, Louisiana.

_____
NOTARY PUBLIC