BERKELEY COUNTY

Procurement Department
Scott Maxie, CPPB, Director

Post Office Box 6122
Moncks Corner, South Carolina 29461-6120
PH: (843) 719-4118 FX: (843) 719-4117

INVITATION FOR BID

IFB TITLE: BERKELEY DORCHESTER INTERCONNECT DIV. 1

IFB NUMBER: BCWS-10-20/21

CLOSING DATE AND TIME: July 29, 2021 at 11:00 AM local time

DEADLINE FOR WRITTEN QUESTIONS: July 15, 2021 at 12:00 PM local time

OVERVIEW: Berkeley County is requesting bids from qualified firms for the Berkeley Dorchester Reach Interconnect-Division 1, which includes the installation of approximately 15,200 linear feet of 16" water main, all necessary site work and appurtenances along Autonomous Drive from SC Highway 27 to Volvo Car Drive in Ridgeville, SC.

NOTICE: This Proposal does not commit Berkeley County to award a Contract, to pay any costs incurred in the preparation of a Proposal or to procure or contract for the articles of goods or services. The County reserves the right to waive any informalities or irregularities, to reject any or all Bids received as a result of this request, or to cancel in part or in its entirety this Proposal, if it is in the best interest of the County to do so.

BID BOND: Bids over $100,000.00 shall be accompanied by a bid bond or certified cashier's check in an amount equal to 5% of the bid.

UNITED STATES DEPARMENT OF COMMERCE ECONOMIC DEVELOPMENT ADMINISTRATION (EDA) REQUIREMENTS: This Project will be partially funded with Federal funds from the United States Department of Commerce, Economic Development Administration (EDA) and therefore is subject to the Federal laws and regulations associated with that program. Offers must comply with all applicable state and federal requirements identified in the Bidding Documents. Bidders on this work will be required to comply with the President's Executive Order No. 11246 and Order No. 11375 which prohibit discrimination in employment regarding race, creed, color, sex or national origin. No bid will be considered unless the bidder is legally qualified under the provisions of South Carolina Contractor's Licensing Law (South Carolina Code of Law as amended on April 1, 1999, Chapter 11, Sections 40-11-10 through 40-11428). Bidders must make positive efforts to use small and minority owned business. Attention of bidders is particularly called to the requirements as to conditions of employment to be observed and minimum wage rates to be paid under the contract. The project is subject to the Buy American Act. If archeological materials are encountered during construction, the procedures codified at 33 CFR 800.13(b) will apply and EDA and the South Carolina State Historical Preservation Office shall be contacted immediately. Archeological Materials consist of any items, fifty years or older

which were made or used by man. These items include, but are not limited to, stone projectile points (arrowheads), 00001-2 Berkeley County Berkeley-Dorchester Reach Interconnect – Division I ceramic shreds, bricks, worked wood, bone and stone, metal and glass objects, and human skeletal remains.

IFB Documents Available: Offerors must be registered, free of charge, to view and download a copy of the solicitation document and receive electronic notification of any addenda from the Berkeley County

Web Site: https://proposals.berkeleycountysc.gov/

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SECTION 3
INSTRUCTIONS TO BIDDERS

1. Bids shall be submitted on the form(s) provided, to the **Berkeley County Council Office**, before the day and hour set for opening of bids. Bids shall be in a sealed envelope marked with the Solicitation Number "**BCWS-10-20/21**" Solicitation Name "**Berkeley Dorchester Interconnect Div. 1"** and the Company Name and Address of the Offeror. Bids will be publicly opened and read aloud.

USPS PROPOSAL TO BE MAILED TO:	**HAND CARRY/DELIVERY SERVICE TO:**
Berkeley County Administration Building	Berkeley County Administration Building
ATTN: Shelley Forest- County Council	ATTN: Shelley Forest- County Council
PO Box 6122	Room Number 101
Moncks Corner, S.C.	1003 U.S. 52
29461-6120	Moncks Corner, S.C. 29461

2. **One (1) clearly identified original and two (2) complete copies are required**. All bids received after the deadline will be returned unopened. The Proposal must be complete, clear, and concise. (8 ½ x 11 pages, printed on one side only).

3. Bids must be submitted by the time, date and exact location specified to be considered. No late bids will be accepted.

4. All bids shall be entered in ink or typewritten and shall remain firm for a period of not less than **ninety (90) days**. Mistakes may be crossed-out and corrections inserted adjacent thereto, and shall be initialed, in ink, by the person signing the bid.

5. Offerors mailing a proposal should allow sufficient mailing period to insure timely receipt of proposal. Berkeley County is not responsible for bids delayed by mail and/or delivery services of any nature. Bids received after the set time for closing will be returned unopened.

6. Bids may be withdrawn by offeror prior to, but not after, the time set for the closing. A telegraphic request is acceptable provided it is received before the closing, and written confirmation of the withdrawal has a postmark prior to the closing.

7. Offers, amendments thereto or withdrawal requests must be received by the time advertised for Invitation for Bids closing to be timely filed. It is the offeror's sole responsibility to ensure that the documents are received by the person (or office) at the time indicated in the solicitation document.

INSTRUCTIONS TO BIDDERS CONTINUED

8. Offerors must clearly mark as "Confidential" each part of their offer which they consider to be proprietary information that could be exempt from disclosure under Section 30-4- 40, Code of Laws of South Carolina, 1976 as amended (Freedom of Information Act). If any part is designated as "confidential", there must be attached to that part an explanation of how this information fits within one or more categories listed in Section 30-4-40. Berkeley County reserves the right to determine whether this information should be exempt from disclosure and no legal action may be brought against The County and/or its agents for any determination in this regard.

   Berkeley County reserves the right:

   8.1 To accept or reject any or all bids received as a result of this solicitation, or to cancel in part or in its entirety this solicitation if it is in the best interest of the County to do so;
   8.2 To waive any or all informalities;
   8.3 To solicit additional information from the Offerors, or any one Offeror should Berkeley County deem such information necessary;
   8.4 To consider modifications received at any time before the award is made, if such action is in the best interest of the County; and,
   8.5 To negotiate contract terms, conditions

9. By submission of an offer, you are guaranteeing that all goods and services meet the requirements of the solicitation.

10. If the Offeror discovers any ambiguity, conflict, discrepancy, omission or other error in the Invitation for Bids, it shall immediately notify the County's Director of Procurement of such error in writing and request modification or clarification of the document. The Offeror is responsible for clarifying any ambiguity, conflict, discrepancy; omission or other error in the written request for bid, or it shall be deemed waived.

11. Failure to submit all required information may be determined as a non-responsive offer.

12. A conditional or qualified bid will not be accepted.

13. Unit price will govern over extended price; errors in mathematics will be corrected where applicable.

14. ADDENDA: If it becomes necessary to revise any part of this solicitation, an amendment will be posted on the Web Page at the address provided on the Cover Sheet of this solicitation. All amendments become part of the Invitation for Bids and are contractually binding whether or not received by the Offeror.

INSTRUCTIONS TO BIDDERS CONTINUED

14. ADDENDA CONTINUED: Changes or corrections may be made in the Proposal Documents after they have been issued and prior to the proposal due date. In such cases, written Addenda describing the changes or corrections will be released by the County's Procurement Department.
    All Addenda shall take precedence over the original portion of the Invitation for Bids and shall be considered and included in the Offeror's Proposal.
    All Addenda shall become part of the Contract Documents and be acknowledged in the Proposal Documents.

15. CONTRACT DOCUMENTS: The Contract Documents will consist of the County-Contractor Contract, the conditions of the Contract (general, supplementary and other conditions), the drawings, the specifications, work requirements, solicitation documents and all Addenda issued prior to, and any modifications issued after the execution of the Contract.

16. OFFEROR'S REPRESENTATION: Each Offeror, by making his proposal represents that:

    a) He has read and understands all documents relating to the project and that his firm holds current State of South Carolina Licenses sufficient for the specified Work, and; therefore, his proposal is made in accordance herewith.

    b) He has visited the site, has familiarized himself with the local conditions under which the work is to be performed, and has correlated his observation with the requirements of the proposed Project documents.

    c) His proposal is based upon the specified materials, systems, labor, supervision, supplies, work sequence requirements, taxes, insurance, permits, bonds and all other costs, incidental or otherwise, as would reasonably be required and expected for the project, required by the solicitation documents, without exception.

17. PROJECT COMPLETION TIME: Project shall be substantially completed within 270 calendar days of the County's Notice to Proceed. Final completion shall occur within 300 calendar days after Notice to Proceed. Liquidated Damages shall be applied as shown in the Agreement.

18. PROGRESS PAYMENTS: Progress payments shall be allowable for this project.

19. PAYMENT: All payments by the County shall be in accordance with the General Terms and Conditions of the Contract documents contained herein.

20. LAWS, REGULATIONS, ORDINANCES, AND RULES: All applicable laws, ordinances, rules and regulations of any regulatory agency shall be binding upon the Offeror throughout the term of the Contract. The Offeror shall be responsible for compliance with all such laws, ordinances, rules and regulations and shall hold the County harmless and indemnify same in the event of non-compliance.

INSTRUCTIONS TO BIDDERS CONTINUED

21. DEFAULT: In case of default, Berkeley County reserves the right to purchase any or all services and materials in the open market, charging contractor with any excessive costs. Should such charges be assessed, no subsequent offers of the defaulting contractor shall be considered until the assessed charge has been satisfied.

22. AWARD: The contract shall be awarded with reasonable promptness by written notice to the most responsible and responsive Offeror whose proposal meets the requirements and criteria set forth in the Invitation for Bids.

23. VERBIAGE: The words "Contractor", "Vendor", "Bidder", "Offeror", "Consultant", "Proposer", are used interchangeably throughout this IFB to define the companies submitting bids, and replace terms such as person(s), firm(s), or corporation(s).

24. LIQUIDATED DAMAGES: The Successful Bidder shall agree that if the Work, or any part thereof, is not completed within the time agreed and indicated in the Contract Document that he shall be liable to the County in the amount as stipulated below for each and every calendar day the completion of the Work is delayed beyond the time provided in the Contract.
    A) Substantial Completion: The Successful Bidder shall pay the County $400.00 for each day that expires after the time specified in Paragraph 17 above for Substantial Completion until the Work is substantially complete.
    B) Final Completion: After Substantial Completion, if the Successful Bidder shall neglect, refuse, or fail to complete the remaining Work within the Contract Times (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, the Successful Bidder shall pay the County $300.00 for each day that expires after such time until the Work is completed and ready for final payment.

25. SUBCONTRACTORS: In order for the bids to be considered as responsive, the following shall be met:
    A) Offeror shall set forth in his proposal the name and location of the place of business of each subcontractor, as may be specified within the proposal, who will perform work or render service to the Offeror to or about the Work. If the Successful Offeror determines to use his own employees to perform any portions of the Work for which he would otherwise be required to list a subcontractor and if the Successful Offeror is qualified to perform such work under the terms of the solicitation document, the Successful Offeror shall indicate this in his proposal and not subcontract any of that work except with the approval of the County for good cause shown.
    B) Failure to list subcontractors in accordance with this section may render the Successful Offeror's Proposal unresponsive or non-conforming.
    C) No Offeror whose proposal is accepted shall substitute any person as a subcontractor in place of the subcontractor listed in the original proposal, without the County's prior approval.

INSTRUCTIONS TO BIDDERS CONTINUED

D) Where substitution is allowed, the Successful Offeror, before obtaining prices from any other subcontractor, must attempt in good faith to negotiate a subcontract with at least one (1) subcontractors whose offer was received prior to the submission of the Successful Offeror's proposal.

26. INSURANCE: The Successful Bidder shall provide a Certificate of Insurance to the County in accordance with the General Terms and Conditions of the Contract documents.

27. INTERGOVERNMENTAL PURCHASING: Vendor may agree to extend their cost to the local governments in the State of South Carolina with mutual agreement of both parties.

28. AFFIDAVIT OF NON-COLLUSION: An Affidavit of Non-Collusion contained herein, shall be signed, notarized, and attached to and become a part of the IFB.

29. AFFIDAVIT OF DELINQUENT TAX: An Affidavit of Delinquent Tax contained herein, shall be signed, notarized, and attached to and become a part of the IFB.

30. REFERENCES: All Offerors shall submit and include with their proposal, selected projects which they have been awarded, and are in progress or has completed for Towns, Cities, Counties, Municipal or State Governments, educational or health institutions which will exemplify expertise in this Project by the firm and by the proposed project lead. A minimum of three (3) references shall be submitted.

31. DRUG FREE WORKPLACE CERTIFICATE: Bidder shall comply with the South Carolina Drug-Free Workplace Act, Section 44-107-10 et seq., South Carolina Code of Laws (1976, as amended) and shall file a certification form with Berkeley County in accordance with the same. Aforesaid certification form is provided by Berkeley County in this solicitation and shall be executed by the Bidder (or, in case of a corporation, by a duly authorized representative of the corporation) and shall be delivered to Berkeley County together with the IFB.

32. PRECEDENCE: Berkeley County's Ordinances and Policies take precedent in this Invitation for Bids. Where there is a discrepancy between the IFB and any of the EJCDC Documents to include the General Conditions, Qualifications Statement or Agreement, the IFB takes Precedence.

32. ADDITIONAL INFORMATION/QUESTIONS: Offerors requiring additional information may submit their questions in writing. Questions may be directed to Kayla Dyson, Buyer, via email at Kayla.Dyson@berkeleycountysc.gov. **The deadline for submitting written questions is July 15, 2021 @ 12:00 PM local time**. Verbal information obtained otherwise will not be considered in the awarding of the solicitation.

SECTION 4
SCOPE OF WORK

SUMMARY: Berkeley County is requesting proposals from qualified firms for the Berkeley Dorchester Interconnect Division 1, which includes the installation of approximately 15,200 linear feet of 16" water main, all necessary site work and appurtenances along Autonomous from SC Highway 27 to Volvo Car Drive in Ridgeville, SC. Plans and Specifications are attached herein.

SECTION 5
LOCAL REFERENCE
Amended Procurement Ordinance Bill 16-08 7/25/2016

Sec. 50-64(h) Local vendor preference (State preference has been repealed)

(1) *Supply vendors*: A responsive and responsible county supply vendor who is within five percent of the lowest non-local bidder, may be given the opportunity to match the bid submitted by the non-local bidder and thereby be awarded the contract. This preference shall apply only when purchases are $5,000.00 or more in value.

A vendor shall be deemed a county supply vendor if such vendor be an individual, partnership, association or corporation that is authorized to transact business within the state, has a physical business address located and operating within the limits of the county and has been doing business in the county for a period of 12 months or more prior to the bid opening date, the vendor maintains a representative in inventory of commodities within the county and the vendor provides proof of payment of all applicable the county taxes and fees.

(2) *Service vendors*: A responsive and responsible county service vendor who is within five percent of the lowest non-local bidder, may be given the opportunity to match the bid submitted by the non-local bidder and thereby be awarded the contract. This preference shall apply only when purchases are $5,000.00 or more in value.

A vendor shall be deemed a county service vendor if such vendor be an individual, partnership, association or corporation that is authorized to transact business within the state, has a physical business address located and operating within the limits of the county and has been doing business in the county for a period of 12 months or more prior to the bid opening date, and the vendor provides proof of payment of all applicable the county taxes and fees.

(3) *Construction vendors*:

a. A responsive and responsible county construction vendor who is within five percent of the lowest non-local bidder, may be given the opportunity to match the bid submitted by the non-local bidder and thereby be awarded the contract. This preference shall apply only when purchases are $5,000.00 or more in value.

b. A vendor shall be deemed a county construction vendor if such bidder:
(i) Is an individual, partnership, association or corporation that is authorized to transact business within the state; and
(ii) Has a physical business address located and operating within the limits of the county for a period of at least 12 months prior to the bid opening date or if a person who is at least a 25 percent owner of the bidder maintains a primary residence in the county; and
(iii) Has paid all applicable county taxes and fees.

LOCAL PREFERENCE CONTINUED

c. If the bidder is using a residential address as a business address pursuant to the home occupation provisions of the Berkeley County Zoning Ordinance, that location has to be the company/bidder's only place of business. A physical business address does not include construction trailers or other facilities approved under a temporary use permit.

d. The bidder or his qualifying subcontractors must perform at least 50 percent of the work. A qualifying contractor must meet the requirements of paragraph (2) above.

e. The local vendor preference for construction projects only applies when the county's estimated project cost is **less than $750,000.00**.

f. *Exception* . If procurement is to be made pursuant to state or federal guidelines that prohibit or restrict local preferences, there shall be no local preference unless a more restricted variation is allowed under the guidelines.

g. *Multiple qualifying vendors* . Subject to the restriction above, in the case of multiple vendors qualifying for the county vendor preference, standard procurement practice regarding the priority of selection as determined by the lowest responsive and responsible bidder shall control.

Sec. 50-64(i): Award. The contract shall be awarded with reasonable promptness by written notice

SECTION 6
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IFB TITLE: **Berkeley Dorchester Interconnect Div. 1**

IFB NUMBER: **BCWS-10-20/21**

CLOSING DATE AND TIME: **July 29, 2021 at 11:00 AM local time**

In compliance with this Invitation for Bids and subject to the term's conditions therein (including subsequently received written addenda if any) the undersigned offers and agrees, if selected by the County, to execute the entire work in the solicitation documents. The Total Base Bid Amount as indicated herein, is inclusive of all costs, including all labor, supervision, materials, supplies, equipment, taxes, insurance, permits and any other costs incidental or otherwise.

A. EROSION CONTROL, SITE WORK, & TRAFFIC CONTROL					
Item No.	Item Description	Unit	Qty	Unit Price	Total Price
1	Sediment and Erosion Control	LS	1		
2	Site Preparation – Including Clearing, Grubbing, and debris removal within all project R/W	LS	1		
3	Grassing	AC	9		
4	Mobilization/Demobilization/Bonds	LS	1		
5	Construction Staking	LS	1		
6	Traffic Control	LS	1		
SUBTOTAL: A. EROSION CONTROL AND SITE WORK					**$**

B. WATER DISTRIBUTION SYSTEM					
Item No.	Item Description	Unit	Qty	Unit Price	Total Price
1	Install Owner-furnished 16" PVC C900 – DR 18 Water Main (with Appurtenances)	LF	15,200		
2	Install Owner-furnished 16" D.I. Water Main CL 250 (with Appurtenances)	LF	265		
3	Directional Drill Owner-furnished 16" FPVC C900 DR18 Water Main (with Contractor Furnished Appurtenances)	LF	485		
4	16" D.I.R.J. Butterfly Valve	EA	18		
5	2" Air Release Valve in Manhole	EA	6		
6	Fire Hydrant Assembly Valve	EA	21		
7	16" D.I.R.J. Cap	EA	2		
8	16" D.I.R.J. 45° Bend	EA	10		
9	16" x 16" D.I.R.J. Tee	EA	1		
10	Jack & Bore 36" Steel Casing Pipe (35,000 PSI Rated)	LF	105		

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11	Connect to Existing Water Mains	EA	2		
				SUBTOTAL: B. WATER DISTRIBUTION SYSTEM	

C. ADDITIVE ALTERNATES					
Item No.	Item Description	Unit	Qty	Unit Price	Total Price
1	Maintenance Stone Bedding/Backfill	CY	800		
				SUBTOTAL: C. ADDITIVE ALTERNATES	**$**
				TOTAL BASE BID (A. + B. + C.)	**$**

TOTAL BASE BID (A.+ B.+ C.) AMOUNT WRITTEN

Company Name Name of Authorized Representative

Signature of Authorized Representative Date

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PROPOSAL TRANSMITTAL AND AGREEMENT

The undersigned, having fully familiarized himself with the information contained within this solicitation, submit the attached proposal. I verify (to the best of my knowledge and belief) this proposal to be true and correct. All requirements of this solicitation are hereby incorporated into the proposal submitted and shall be incorporated into the contract.

The Offeror acknowledges the following Amendments have been received and incorporated into this proposal:

Amendment No._____ Dated_____,2021 Signature _____

Amendment No._____ Dated_____,2021 Signature _____

Amendment No._____ Dated_____,2021 Signature _____

Amendment No._____ Dated_____,2021 Signature _____

Respectfully submitted by: _____
(FIRM NAME)

Signature:_____

Representative Name:_____

Title: _____

Address: _____

_____

Date:_____

Telephone No:_____

Fax Number:_____

Email: _____

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DATE FOR COMMENCEMENT AND COMPLETION: The Date of Commencement shall be established in the Notice to Proceed. The County shall not be held liable for any expenses incurred by the successful Offeror until the Notice to Proceed has been executed. A contract award requires that both the County and the Contractor sign the Contract. All work shall be completed as established in the Notice to Proceed.

LISTING OF SUBCONTRACTORS: Any Offeror in response to this Invitation for Bids shall set forth in his proposal the names and locations of the places of business for each of the following subcontractors (if so specified) who may perform work or render services to the successful Offeror to or about the construction, or who will specifically fabricate or install a portion of the work.

If the Offeror determines to use his own employees to perform any portion of the work for which he would otherwise be required to list a subconsultant, and if the prime Contractor is qualified to perform such work under the terms of the Invitation for Bids, the prime Contractor shall indicate this in his proposal and not subcontract any of that work except with the approval of the County for good cause shown.

LISTING OF SUBCONTRACTORS:

Description of Work	*Subcontractor's Name*	*Value ($)*
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Failure to list specified subcontractors may render the Offeror's proposal nonresponsive. No Offeror whose proposal is accepted shall substitute any person as a subcontractor in place of the subcontractor listed in the original proposal, except as specified within the Contract Documents.

AFFIRMATIVE ACTION: The successful Offeror will take affirmative action in complying with all Federal and State requirements concerning fair employment of the disabled, and concerning the treatment of all employees, without regard or discrimination by reason of race, color, religion, sex, national origin, or physical disability.

PROPOSAL HOLDING TIME AND ACCEPTANCE: The undersigned agrees that this proposal may not be revoked or withdrawn after the time set for the opening for bids, but shall remain open for acceptance for a period of not less than ninety (90) days following the Solicitation opening date.

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RESPONSIBILITY: The undersigned understands that before awarding a Contract, the appropriate Council Committee may require additional information in order to ascertain the Offeror's capacity to meet the terms of the Contract. Failure to provide disclosure of this information to the County within five (5) days after having been duly notified and requested may be just cause for rejection of the proposal and Offeror will be considered noncompliant.

CERTIFICATION REGARDING DRUG-FREE WORKPLACE: The undersigned certifies that the contractor listed below will provide a "Drug-Free Workplace" as that term is defined in Section 44-107-30 of the Code of Laws of South Carolina, 1976, as amended, by complying with the requirements set forth in Title 44, Chapter 107.

ILLEGAL IMMIGRATION: By signing your offer, you certify that you will comply with the applicable requirements of Title 8, Chapter 14 of the South Carolina Code of Laws and agree to provide to the State upon request any documentation required to establish either: (a) that Title 8, Chapter 14 is inapplicable to you and your subcontractors or sub-subcontractors; or (b) that you and your subcontractors or sub-subcontractors are in compliance with Title 8, Chapter 14. Pursuant to Section 8-14-60, "A person who knowingly makes or files any false, fictitious, or fraudulent document, statement, or report pursuant to this chapter is guilty of a felony, and, upon conviction, must be fined within the discretion of the court or imprisoned for not more than five years, or both." You agree to include in any contracts with your subcontractors language requiring your subcontractors to (a) comply with the applicable requirements of Title 8, Chapter 14, and (b) include in their contracts with the sub-subcontractors language requiring the sub-subcontractors to comply with the applicable requirements of Title 8, Chapter 14. [07-7B097-1] (NOV. 2008) (An overview is available at www.procurement.sc.gov)

ETHICS CERTIFICATE: By submitting an offer, the offeror certifies that the offeror has and will comply with, and has not, and will not, induce a person to violate Title 8, Chapter 13 of the South Carolina Code of Laws, as amended (ethics act). The following statutes require special attention: Section 8-13-700, regarding use of official position for financial gain; Section 8-13-705, regarding gifts to influence action of public official; Section 8-13-720, regarding offering money for advice or assistance of public official; Sections 8-13-755 and 8-13-760, regarding restrictions on employment by former public official; Section 8-13-775, prohibiting public official with economic interests from acting on contracts; Section 8-13-790, regarding recovery of kickbacks; Section 8-13-1150, regarding statements to be filed by consultants; and Section 8-13-1342, regarding restrictions on contributions by contractor to candidate who participated in awarding of contract. The state may rescind any contract and recover all amounts expended as a result of any action taken in violation of this provision. If contractor participates, directly or indirectly, in the evaluation or award of public contracts, including without limitation, change orders or task orders regarding a public contract, contractor shall, if required by law to file such a statement, provide the statement required by Section 8-13-1150 to the procurement officer at the same time the law requires the statement to be filed. [02-2A075-2] (May 2008)

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CERTIFICATE OF INDEPENDENT PRICE DETERMINATION

GIVING FALSE, MISLEADING, OR INCOMPLETE INFORMATION ON THIS CERTIFICATION MAY RENDER YOU SUBJECT TO PROSECUTION UNDER SECTION 16-9-10 OF THE SOUTH CAROLINA CODE OF LAWS AND OTHER APPLICABLE LAWS. BY SUBMITTING AN OFFER, THE OFFEROR CERTIFIES COMPLIANCE. [02-2A032-1] (MAY 2008)

FEDERAL IDENTIFICATION NUMBER: _____

CONTRACTOR'S CLASSIFICATIONS AND SUBCLASSIFICATIONS WITH LIMITATIONS

_____ _____ _____
(Classification) (Subclassification) (Limitations)

_____
(S.C. Contractor's License Number)

AUTHORIZATION

_____
(Print Name of Contractor/Company)

_____
(Signature)

_____ _____
(Printed Signature) (Title)

_____
(Mailing Address)

_____ _____ _____
(City) (State) (Zip)

_____ _____
(Telephone Number) (Fax Number)

_____
(E-mail Address)

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NONCOLLUSION AFFIDAVIT OF OFFEROR

STATE OF _____)

COUNTY OF _____)

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

(1) He is _____ (owner, partner, officer, representative or agent) of _____, the Offeror that has submitted the attached Proposal;

(2) He is fully informed regarding the preparation and contents of the attached Proposal and of all pertinent circumstances regarding such Proposal;

(3) Such Proposal is genuine and is not a collusive or sham Proposal;

(4) Neither the said Offeror not any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affidavit, has in any way colluded, conspired, connived, or agreed, directly or indirectly with any other Offeror, firm or person to submit a collusive or sham Offer in connection with the Contract for which the attached Offer has been submitted or to refrain from quoting in connection with such Contract, or has in any manner directly or indirectly, sought by agreement or collusion or communication or conference with any other Offeror, firm or person to fix the price or prices in the attached Offer or of any other Offeror, or to fix any overhead, profit or cost element of the Offer price or the Offer price of any other Offeror or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against Berkeley County, or any person interested in the proposed contract; and

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

SIGNED: _____

TITLE: _____

Subscribed and sworn to before me this _____ day of _____, 2021

_____ My Commission Expires _____
Notary Public

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DELINQUENT TAX AFFIDAVIT

Please note the Procurement Department shall verify that all taxes have been paid to the County by vendors with which they intend to do business. If you owe delinquent taxes your bid may be disqualified from consideration. If you wish to inquire as to your tax status, you may contact the Berkeley County Delinquent Tax Office at one of the following numbers:

Moncks Corner	(843) 719-4029
Charleston	(843) 723-3800 extension 4029
St. Stephen	(843) 567-3136 extension 4029

IS YOUR BUSINESS DELINQUENT IN PAYING ANY TAXES OWED TO BERKELEY COUNTY? _____ (YES OR NO)

BIDDER SIGNATURE: _____

BIDDER NAME: _____

POSITION: _____

FIRM NAME: _____

ADDRESS: _____

_____

TELEPHONE: _____

Subscribed and sworn to before me this _____ day of _____, 2021

_____ My Commission Expires_____
Notary Public

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OFFEROR'S REFERENCES

A. Name and Address of Owner/Client:_____
_____
Contact Name:_____
Phone No.: _____

B. Name and Address of the Project:_____
_____

C. Name of the Architectural/Engineering Firm for the Project, if Applicable:_____
_____

Name of the Project Architect/Engineer, if Applicable:_____
_____ Phone No.: _____

D. Name of Job Superintendent: _____

E. Contract Date:_____ Date of Completion:_____

F. Project is on Schedule or has been completed on Time: Yes ____No ____
If no, number of days late: _____Explain:_____
_____
_____
_____

G. Contract dispute or failure to complete contract to Owner satisfaction: Yes ____ No ____
If Yes, Explain: _____
_____
_____
_____

H. Amount of Bid:_____ Final Project Cost: _____
Explain Difference, if any: _____
_____
_____
_____

BID FORM - Page 10 of 11

OFFEROR'S REFERENCES

A. Name and Address of Owner/Client:_____
_____
Contact Name:_____
Phone No.: _____

B. Name and Address of the Project:_____
_____

C. Name of the Architectural/Engineering Firm for the Project, if Applicable:_____
_____

Name of the Project Architect/Engineer, if Applicable:_____
_____ Phone No.: _____

D. Name of Job Superintendent: _____

E. Contract Date:_____ Date of Completion:_____

F. Project is on Schedule or has been completed on Time: Yes ____No ____
If no, number of days late: _____Explain:_____
_____
_____
_____

H. Contract dispute or failure to complete contract to Owner satisfaction: Yes ____ No ____
If Yes, Explain: _____
_____
_____
_____

H. Amount of Bid:_____ Final Project Cost: _____
Explain Difference, if any: _____
_____
_____
_____

BID FORM - Page 11 of 11

OFFEROR'S REFERENCES

A. Name and Address of Owner/Client:_____
_____
Contact Name:_____
Phone No.: _____

B. Name and Address of the Project:_____
_____

C. Name of the Architectural/Engineering Firm for the Project, if Applicable:_____
_____

Name of the Project Architect/Engineer, if Applicable:_____
_____ Phone No.: _____

D. Name of Job Superintendent: _____

E. Contract Date:_____ Date of Completion:_____

F. Project is on Schedule or has been completed on Time: Yes ____No ____
If no, number of days late: _____Explain:_____
_____
_____
_____

I. Contract dispute or failure to complete contract to Owner satisfaction: Yes ____ No ____
If Yes, Explain: _____
_____
_____
_____

H. Amount of Bid:_____ Final Project Cost: _____
Explain Difference, if any: _____
_____
_____
_____

SECTION 7
SPECIAL CONDITIONS

1. GENERAL GUARANTEE: The successful Bidder shall guarantee all workmanship and materials, to be free of defects of any type for a period of two (2) years after date of substantial completion. Upon written notice from Berkeley County, the successful Bidder shall, within five (5) calendar days, correct all defects without additional cost to the County.

2. BUSINESS LICENSE/PERMITS: The successful Bidder and all subcontractors, if any, shall obtain permits, as may be necessary, and required by City, County and State agencies.

3. ENGINEERING SERVICES: The successful Bidder shall provide all engineering and surveying control services needed to complete this project.

4. UNDERGROUND UTILITIES: It is required that the contractor notify Palmetto Utility Protection Services at 1-888-721-7877, three (3) working days in advance of commencing work. Also, if in areas where work that is not completed in ten (10) working days, the Contractor is required to contact Palmetto Underground Utilities and give them the original request number.

5. SAFETY/TRAFFIC REQUIREMENTS: The Contractor is required to follow the traffic controls for street and highway construction and maintenance operations in accordance with Part VI (6) of the Federal Highway Administration Manual on Uniform Traffic Control Devices – Millennium Edition and latest OSHA construction regulations. The Contractor is responsible for furnishing and installing all detour signs and pavement markings as required. The Contractor will be required to maintain or replace all Traffic Control Devices, (Signs, pavement markings, etc.) for the duration of the project as directed by the Engineer in order to maintain the detour in accordance with the South Carolina Manual of Uniform Traffic Control Devises (SCMUTCD). All traffic control devices shall be kept legible and plumb day and night during their use.
   The Contractor shall be required to provide individuals who are properly trained in traffic control practices. The job duties of these individuals shall be restricted to providing quality assurance of the traffic control installation. The Contractor shall be required to have a person in charge of the traffic control on the job site at all times when construction activities are in progress.

6. METERED WATER, FIRE HYDRANTS: If water is taken from a fire hydrant for any reason, the Contractor shall use a hydrant meter and backflow preventor as is required by the water provider. The successful Bidder would not be charged for construction water use within Berkeley County Water & Sanitation service area.

7. EXISITING IMPROVEMENTS: The successful Bidder shall be responsible for all damages to existing improvements resulting from successful Bidder's operations. Including but not limited to, protecting the downstream lake from construction debris and site restoration to include sod where disturbed.

SPECIAL CONDITIONS CONTINUED

8. PUBLIC RELEASE OF INFORMATION: Contractor shall not advertise, issue a press release or otherwise publish information concerning this solicitation or contract without prior written consent of the County. The County shall not unreasonably withhold permission. Contractor agrees not to refer to award of this solicitation/contract in commercial advertising in such manner as to state or imply that the products or services provided are endorsed or preferred by Berkeley County.

9. APPLICABLE REGULATIONS/POLICIES: The Revised Code of the Berkeley County Ordinances, Rules and Regulations and Policies shall apply. It shall be the responsibility of the Offeror to be familiar and comply with said regulations/policies.

10. PROVISIONS REQUIRED BY LAW: Each and every provision of law and any clause required by law to be in the contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon the application of either party the contract shall forthwith be physically amended to make such insertion or correction.

11. WAIVER: The County reserves the right to waive any provisions of this solicitation.

12. S.C. LAW CLAUSE: Upon award of a contract or Purchase Order under this bid, the person, partnership, association, or corporation to whom the award is made must comply with the laws of South Carolina which require such person or entity to be authorized and/or licensed to do business in this state. Notwithstanding the fact that applicable statutes may exempt or exclude the successful offeror from requirements that it be authorized and/or licensed to do business in this state, by submission of this signed bid, the offeror agrees to subject itself to the jurisdiction and process of the courts of the State of South Carolina, to all matters and disputes arising or to arise under the contract and performance thereof, including any questions as to the liability for taxes, licenses, or fees levied by the State.

13. ROYALTIES, PATENTS, NOTICES AND FEES: Offeror shall give all notices and pay all royalties and fees. S/he shall defend all suits or claims for infringement of any patent rights and shall hold the County harmless from loss on account thereof.

14. CONFIDENTIALITY: Contractor will maintain confidential any documents or information provided by the County and will not release, distribute or publish same to any third party without prior permission from the County, unless compelled by law or order of a court or regulatory body of competent jurisdiction. Such release will occur only after prior notice to the County.

15. OWNERSHIP OF MATERIAL: Ownership of all data, material, and documentation originated and prepared for the County pursuant to this contract shall belong exclusively to the County.

SPECIAL CONDITIONS CONTINUED

16. APPLICABLE LAW AND VENUE: The construction, interpretation and performance of any Final Agreement shall be governed by and construed in accordance with the laws of the State of South Carolina. The County and Contractor further agree that the Final Agreement shall be deemed to be made and performed in Berkeley County, South Carolina. For the purposes of venue, all suits or causes of action arising out of the Final Agreement shall be litigated only in the Circuit Court of Berkeley County, South Carolina (the Ninth Judicial Circuit).

17. CLIENT LITIGATION: Contractor agrees to produce documents, witnesses and/or general assistance to any litigation, arbitration or mediation involving the County, if the County requests such documents, witnesses and/or general assistance. The County shall reimburse Contractor for all direct expenses incurred and time according to Contractor's rate schedule as of the date of the execution of the Final Agreement.

18. SEVERABILITY: Should any section, paragraph, clause, phrase, or provision of any Final Agreement be determined invalid or held unconstitutional by a court of competent jurisdiction, such declaration shall not affect the validity of any Final Agreement as a whole or any part or provision thereof, other than the part so decided to be invalid or unconstitutional.

19. AUDIT: Contractor's records which pertain to this Contract must be open for inspection and/or audit by the County upon request for a period of five years after each contract year. For audit purposes, the County must verify that the material cost billed as a result of the contract are correct. Contractor must provide the County, upon its request, documentation of material purchase costs (e.g. copy of invoice from its supplier), and rental equipment is being invoiced properly.

20. PUBLIC RESPONSIBILITY: The County has a duty to conform to applicable codes, standards, regulations, and ordinances with regard to public health and safety. Contractor will at all times alert the County to any matter of which Contractor becomes aware and believes requires the County to issue a notice or report to certain public officials, or to otherwise conform with applicable codes, standards, regulations, or ordinances. If the County decides to disregard Contractor's recommendations in these respects, Contractor shall employ its best judgment in deciding whether or not it should notify public officials.

21. BRAND NAMES: Specifications contained herein may refer to brand names. Brand name(s) and number(s) are used ONLY to set forth and convey to prospective bidders the general style, type, character, and quality of equipment desired, unless otherwise indicated with the phrase "**No Exceptions**".

22. EQUAL EMPLOYMENT: The Contractor will comply with all Federal and State requirements concerning fair employment. During the performance of this Contract, the Consultant agrees to provide equal employment opportunities. The Consultant will not discriminate against any employee or applicant for employment because of race, creed, color, sex, age, national origin, physical handicap, or marital status.

SPECIAL CONDITIONS CONTINUED

23. INDEMNIFICATION: The contractor agrees to indemnify and save harmless the County of Berkeley and all County officers, agents and employees from any and all claims, suits, actions, legal proceedings, damages, costs, expenses & attorney fees of every name and description, arising out of or resulting from the use of any materials furnished by the contractor, or any work done in the performance of the contract arising out of a willful or negligent act or omission of the provider, its officers, agents and employees; provided that such liability is not attributable to a willful or negligent act or omission on the part of the County, its officers, agents and employees.

24. ILLEGAL IMMIGRATION REFORM ACT COMPLIANCE: By submitting an offer, Offeror certifies that it will comply with the applicable requirements of Title 8, Chapter 14 of the South Carolina code of Laws (originally enacted as Section 3 of The South Carolina Illegal Immigration act, 2008 S.C. Act No. 280) and agrees to provide upon request any documentation required to establish either: (a) the applicability of Title 8, Chapter 14 to Offeror and any subcontractor or sub-subcontractors; or (b) the compliance with Title 8, Chapter 14 by Offeror and any subcontractors or sub-subcontractors. Pursuant to Section 8-14-60, "A person who knowingly makes or files any false, fictitious, or fraudulent document, statement, or report pursuant to this chapter is guilty of a felony and, upon conviction, must be fined within the discretion of the court or imprisoned for not more than five years, or both". Offeror agrees to include in any contracts with its sub-contractors language requiring the subcontractors to (a) comply with the applicable requirements of Title 8, Chapter 14, and (b) include in any contracts with the sub-subcontractors language requiring the sub-subcontract to comply with the applicable requirements of Title 8, Chapter 14. In the event any contractor, subcontractor and/or sub-subcontractor is found not to be in compliance with the SC Immigration Reform Act [hereinafter "The Act"], the Contractor agrees to fully indemnify the County for any loss suffered by the County as a result of such contractor, subcontractor or sub-subcontractor's failure to comply with the Act.

25. FEDERAL, STATE AND LOCAL LAWS: The contractor assumes full responsibility and liability for compliance with any and all local, state and federal laws and regulations applicable to Contractor and his employees including, but not limited to, compliance with the EEO guidelines, the Occupational Safety and Health Act of 1970, and minimum wage guidelines. Contractor's professional services shall incorporate those federal, state and local laws, regulations, codes and standards that are applicable at the time Contractor rendered its services. Contractor shall not be responsible for any claim or liability for injury or loss allegedly arising from Contractor's failure to abide by federal, state or local laws, regulations, codes and standards that were not in effect or publicly announced at the time Contractor rendered its services

SECTION 8
TERMS & CONDITIONS
I - Contract Documents

1. THE CONTRACT*:* The Contract Documents form the Contract for Complete Construction. This Contract represents the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations, or agreement, either written or oral. The Contract may be amended or modified only by a written Modification as agreeable by both parties. Nothing contained in the Contract Documents shall create any Contractual relationship between the County and any subcontractor or sub-subcontractor.

2. CONTRACT DOCUMENTS: The Contract documents consist of the County-Contractor Contract, the Conditions of the Contract (General, Supplementary and other Conditions), the drawings, specifications, and all Addenda issued prior to and all Modifications issued after execution of the Contract. The Contract Documents include Bid Documents such as the Advertisement and Invitation for Bids, the Instructions to Bidders, Contractor's Bid and all Addenda relating to any of these, or any other documents, specifically enumerated in the County-Contractor Contract.

3. ENTIRE CONTRACT:

   The Entire Contract consists of the following:

   a) Invitation for Bids
   b) Instructions to Offerors
   c) Special Conditions
   d) General Terms and Conditions
   e) Bid Documents
   f) References
   g) Contract
   h) Notice of Award/Acceptance
   i) Notice to Proceed
   j) Change Order/Field Order (as applicable)
   k) Construction Schedule
   l) Forms (as applicable)
   m) Technical Specifications (as applicable)
   n) Construction Drawings (as applicable)
   o) Addenda (if any)
   p) All Bonds, Sureties, and Insurance Certificates

TERMS & CONDITIONS
I - Contract Documents Continued

4. CONTRACT SUM: The Contract Sum as stated in the County-Contractor Contract, including authorized change orders and modifications thereto, is the total amount payable by the County to the Successful Bidder for the performance of the Work under the Contract Documents.

5. THE WORK: The Work comprises the complete construction required by the Contract Documents and includes all labor necessary to produce such construction, and all material and equipment incorporated or to be incorporated in such construction.

   All Work indicated in the Contract Drawings and not mentioned in the specifications, or vice versa, and all work, materials and equipment usual and necessary to make the Work complete in all its parts, whether or not they are indicated in the Contract Drawings or mentioned in the specifications, shall be furnished and executed the same as if they were called for by both the Contract Drawings and the specifications. The performance of such Work shall not be considered as justification for any claim or extra compensation.

6. THE PROJECT: The project is the total construction of the Project described in the County-Contractor Contract, of which the Work performed under the Contract Documents may be the whole or only a part.

7. EXECUTION, COORELATION, INTENT: The Contract documents shall be signed by the County and the Successful Bidder. By executing the Contract, the Successful Bidder represents that he has visited the site, familiarized himself with the local conditions under which the Work is to be performed, and correlated his observations with the requirements of the Contract Documents.
   The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work. Work not covered in the Contract Documents will not be required unless it is consistent therewith and is reasonably inferable therefrom as being necessary to produce the intended results.
   Whenever the Successful Bidder wants detailed drawings or directions to settle any doubts in his mind as to requirement or requirements of Contract Drawings and Specifications, he shall apply to the County and the Construction Manager in ample time, so that the same may be prepared or given without causing any delay in the execution of Work.
   The organization of the specifications into division, section and articles, and the arrangement of Drawings shall not control the Successful Bidder in dividing the Work among subcontractors or in establishing the extent of Work to be performed by any trade.

8. NOTICE OF AWARD: The Successful Bidder, upon written notification, shall within five (5) calendar days execute and return the acknowledged Notice of Award to the County. Failure to comply within this time period may consider the Successful Bidder in default and subject the Bid Deposit to forfeiture.

TERMS & CONDITIONS
I - Contract Documents Continued

9. NOTICE TO PROCEED: The County, upon receipt of the Successful Bidder's Separate Performance and Labor and Material Payment Bonds, will issue a Notice to Proceed, providing that acceptable Certificates of Insurance have been received or included. Any cost incurred prior to the Notice to Proceed shall be the responsibility of the Successful Bidder.

10. COMMENCEMENT: The Successful Bidder shall commence actual physical Work on the project within five (5) calendar days from the Date of Commencement, as established in the Notice to Proceed. Failure by the Contractor to commence actual physical Work on the project within the allocated time will entitle the County to consider the Successful Bidder as irresponsible and in default.

11. TIME OF COMPLETION: Attention is called to the fact that the Work set forth in the Bid is urgently needed by the County and that time is of the essence. All completion dates are set forth in the Notice to Proceed.

10. OWNERSHIP AND USE OF DOCUMENTS: All drawings, specifications and copies thereof furnished by the County are and shall remain his property. They are to be used only with respect to this Project and are not to be used on any other project.

12. CONFLICT-CONTRACT DOCUMENTS: The following principles shall govern the settlement of disputes that may arise over discrepancies in the Contract documents:

    A) As between figures given on drawings and the scaled measurements, the figures shall govern. No measurements should be taken by scale as working dimensions except on large-scale drawings not dimensional in detail;
    B) As between large-scale drawings and small-scale drawings, the larger scale shall govern;
    C) As between drawings and specifications, requirements of the drawings shall govern;
    D) As between the form of Contract and the specifications, requirements of the form of Contract shall govern. Should a conflict occur in or between the drawings or specifications, between divisions or sections of the specifications or between details on the drawings, the SUCCESSFUL BIDDER SHALL BE DEEMED TO HAVE ESTIMATED THE MORE EXPENSIVE PRODUCT OR METHOD INDICATED.

13. RIGHTS AND REMEDIES: The duties and obligations imposed by the Contract Documents and the rights and remedies available thereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law or equity. No action or failure to act by the County, or Contractor shall constitute a waiver of any right or duty afforded any of them under the Contract, nor shall any such action or failure to act constitute an approval of or acquiescence in any breach thereunder, except as may be specifically agreed in writing.

TERMS & CONDITIONS
I - Contract Documents Continued

15. CONTROLLING LAW: Any Contract arising from this Bid, shall be governed by the laws of the State of South Carolina, and for the purposes of venue, all suits or causes of action arising out of the Final Agreement shall be litigated only in the Circuit Court of Berkeley County, South Carolina (the Ninth Judicial Circuit). The prevailing party shall be entitled to reasonable attorney's fees and all costs of said litigation.

16. SUCCESSOR: The County and the Successful Bidder each binds himself, his partners, successors, assigns and legal representatives to the other party hereto and to the partners, successors, assigns and legal representatives of such other party in respect to all covenants, Contracts and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract or sublet it as a whole without the written consent of the other.

TERMS & CONDITIONS
II – County

1. DEFINITION: The County is the person or entity identified as such in the County-Contractor Contract and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term County means the County or his authorized representative.

2. ADMINISTRATION OF THE CONTRACT: The County will provide administration of the Contract as hereinafter described.

3. COUNTY FINANCIAL RESPONSIBILITY: The County shall, at the request of the Successful Bidder, at the time of execution of the County-Contractor Contract, furnish to the Successful Bidder reasonable evidence that he has made financial arrangements to fulfill his obligations under the Contract. Unless such reasonable evidence is furnished, the Successful Bidder is not required to execute the County -Contractor Contract or to commence the Work.

4. COUNTY'S RIGHT TO STOP WORK: If the Successful Bidder fails to correct defective Work or persistently fails to carry out the Work in accordance with the Contract Documents, the County, by a written order signed personally or by an agent specifically so empowered by the County in writing, may order the Successful Bidder to stop the Work, or any portion thereof, until the cause for stoppage has been eliminated, corrected, or the County orders the Work be resumed. In such case, the Successful Bidder shall immediately obey such order.

5. COUNTY'S RIGHT TO CARRY OUT THE WORK: If the Successful Bidder defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within five (5) calendar days after receipt of written notice from the County to commence and continue correction of such default or neglect with diligence and promptness, the County may, by written notice to the Successful Bidder after five (5) calendar days, and without prejudice to any other remedy or right he may have, make good such deficiencies. In such case, an appropriate Change Order shall be issued, deducting from the payments then or thereafter due the Successful Bidder, the cost of correcting such deficiencies, including compensation for additional services made necessary by such default, neglect or failure. If the payments then or thereafter due the Successful Bidder are not sufficient to cover such amount, the Successful Bidder shall pay the difference to the County.

TERMS & CONDITIONS
III – Construction Administrator

1. DEFINITION: The Construction Administrator is the person delegated by the County to represent the County in all construction related matters of the project between the County and the Successful Bidder.

2. SERVICES PROVIDED BY THE CONSTRUCTION ADMINISTRATOR: The Construction Administrator shall decide any and all questions that arise as to the interpretation of Contract Drawings and Specifications, subject to review by the County.

   The Construction Administrator will have authority to act on behalf of the County only to the extent provided in the Contract Documents, unless otherwise modified by written instrument.

   The Construction Administrator will visit the site at intervals appropriate to the stage of construction to familiarize himself generally with the progress and quality of the Work and to determine in general if the Work is proceeding in accordance with the Contract Documents. However, the Construction Administrator will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. On the basis of his on-site observations as the Construction Administrator, he will endeavor to guard the County against defects and deficiencies in the Work of the Successful Bidder.

   The Construction Administrator will not be responsible for and will not have control or charge of construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, and he will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents. The Construction Administrator will not be responsible for or have control or charge over the acts or omissions of the Successful Bidder, Subcontractors, or any of their agents, or employees, or any other persons performing any of the Work.

   The Construction Administrator and County shall at all times have access to the Work wherever it is in preparation and progress. The Successful Bidder shall provide facilities for such access so the Construction Administrator may perform his functions under the Contract Documents.

   Based on the Construction Administrator’s observations and an evaluation of the Successful Bidder's Applications for Payment, the Construction Administrator will determine the amounts he believes to be owing to the Successful Bidder and will approve for payment such amounts, as provided in the Contract Documents.

TERMS & CONDITIONS
III – Construction Administrator Continued

2. SERVICES PROVIDED BY THE CONSTRUCTION ADMINISTRATOR CONTINUED: The Construction Administrator shall have the right to correct any errors and omissions in the Contract Drawings and Specifications when such correction is necessary for the proper fulfillment of their intention. The Successful Bidder shall perform in accordance with any such corrections. The Construction Administrator will render interpretations necessary for the proper execution or progress of the Work, with reasonable promptness and in accordance with any time limit agreed upon provided that Successful Bidder shall make a timely written request for such.

   The Construction Administrator will reject work that does not conform to the Contract Documents. Whenever, in his opinion, he considers it necessary or advisable for the implementation of the intent of the Contract Documents, he will require special inspection or testing of the work. Whether or not such Work be then fabricated, installed or completed.

   The Construction Administrator will review and approve or take other appropriate action upon Successful Bidder's submittals such as Shop Drawings, Product Data, and Samples, but only for conformance with the design concept of the Work and with the information given in the Contract Documents. Such action shall be taken with reasonable promptness so as to cause no delay. The Construction Administrator's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

   The Construction Administrator will conduct inspections to determine the dates of Substantial Completion and Final Completion; will receive and review written warranties and related documents required by the Contract and assembled by the Successful Bidder, and will recommend final payment upon compliance with the requirements of the Contract Documents.

   In case of the termination of the employment of the Construction Administrator, the County may appoint a Construction Administrator against whom the Contractor makes no reasonable objection whose status under the Contract Documents shall be that of the former Construction Administrator.

   Refer to Section XIII - Project Meeting for other responsibilities.

TERMS & CONDITIONS
IV – Contractor

1. DEFINITION: The Successful Bidder is the person or entity identified as such in the County-Contractor Contract and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Successful Bidder means the Successful Bidder or his authorized representative.

2. SITE CONDITIONS: The Successful Bidder accepts the conditions at the Work-Site as they eventually may be found to exist, and warrants and represents that the Contract can and will be performed under such conditions, and that all materials, equipment, labor and other facilities required because of any unforeseen conditions (physical or otherwise) shall be wholly at the Successful Bidder's own cost and expense, anything in his Contract to the contrary notwithstanding.

3. REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY SUCCESSFUL BIDDER: The Successful Bidder shall perform no part of the Work at any time without adequate Contract Documents or, as appropriate, approved Shop Drawings, Product Data or Samples for such portion of the Work. If the Successful Bidder performs any of the Work, knowing it involves a recognized error, inconsistency or omission in the Contract Documents, without such notice to the Construction Administrator, the Successful Bidder shall bear responsibility for such performance and shall bear the cost of correction.

   The Successful Bidder shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the Successful Bidder with the Contract Documents before commencing activities.

   The Successful Bidder shall perform the Work in accordance with the Contract Documents and submittals approved by the County.

4. CONDITIONS AFFECTING THE WORK: The Successful Bidder shall be responsible for having taken steps reasonably necessary to ascertain the nature and location of the work, and the general and local conditions that can affect the work or the cost thereof. Any failure by the Successful Bidder to do so will not relieve him from responsibility for successfully performing the work, without additional expense to the County. The County assumes no responsibility for any understanding or representations concerning conditions made by any of its officers or agents prior to the execution of this Contract, unless such understandings or representations by the County are expressly stated in the Contract.

TERMS & CONDITIONS
IV – Contractor Continued

4. CONDITIONS AFFECTING THE WORK CONTINUED: The Successful Bidder shall furnish and pay the costs, including sales tax and all other applicable taxes and fees, of all the necessary materials and shall furnish and pay for all the superintendents, labor, tools, equipment and transportation and perform all work required in strict accordance with this Contract, and any amendments thereto and such supplemental plans and specifications that may hereafter be approved.

   In any case, where there is a matter of discrepancy in opinion concerning any portion of the specifications, work methods, work to be accomplished, or any other matter concerning this Contract, the final decision shall be that of the County.

5. SUPERVISION AND CONSTRUCTION WORK PROCEDURES: The Successful Bidder shall supervise and direct the work, using his best skills and attention. He shall be solely responsible for all construction means, methods, techniques, sequences and procedures and for coordinating all portions of the work under the Contract.

   The Successful Bidder shall be responsible to the County for the acts and omissions of his employees, subcontractors and their agents and employees, and other persons performing any of the Work under a Contract with the Successful Bidder.

   The Successful Bidder shall employ a competent superintendent and necessary assistants who shall be in attendance at the Work-Site during the progress of the Work. The superintendent shall represent the Successful Bidder and all communications given to the superintendent shall be as binding as if given to the Successful Bidder. Important communications shall be so confirmed on written request in each case.

6. LABOR AND MATERIALS: Unless otherwise provided in the Contract documents, the Successful Bidder shall provide and pay for all labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for the proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the work.

   The Successful Bidder shall at all times enforce strict discipline and good order among his employees and shall not employ, on the Work Site, any unfit person or anyone not skilled in the task assigned to him.

TERMS & CONDITIONS
IV – Contractor Continued

7. DRUG-FREE WORKPLACE ACT REQUIREMENT: The Successful Bidder shall be responsible for initiating, maintaining and supervising all drug-free programs in connection with the performance of the Contract. The drug-free programs shall conform to Title 44, Chapter 107, Section 44-107-10 through 44-107-90 of the Code of Laws of South Carolina, 1976, as amended.

8. GUARANTEE; WARRANTIES:

   A) The Successful Bidder warrants to the County that all materials and equipment furnished under this Contract will be new unless otherwise specified, and that all work will be of good quality, free from faults and defects and in conformance with the Contract documents. All Work not conforming to these requirements, including substitutions not properly approved or authorized may be considered defective. If required by the County, the Successful Bidder shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

   B) Successful Bidder shall guarantee all workmanship and materials to be free of defects of any type for a period of two (2) years, or the time specified in the Manufacturer's Product Warranty, or the time reasonably expected by the discipline, or provided by the Statute of Limitations, whichever time is greater after the date of final payment.

   C) Any and all manufacturers' warranties on any equipment or materials will be passed on to the County and copies of said warranties will be furnished by the Successful Bidder to the County upon completion and final acceptance of the project.

   D) Upon written notice from the County, the Successful Bidder shall, within five (5) calendar days, correct all reported defects without any additional cost to the County.

9. TAXES: The Successful Bidder shall pay all sales, consumer, use and other similar taxes for the Work or portions thereof provided by the Successful Bidder which are legally enacted at the time Bids are received, whether or not yet effective.

   A) South Carolina: In accordance with Section 12-8-550 of the laws of the State of South Carolina, as amended, the County shall collect a two (2%) percent withholding tax from any out-of-state business, that enters into an agreement with the County in the amount of $10,000 or more, that has not registered with the Department of Revenue or the Secretary of State for South Carolina. Proof of registration must be provided to the County on the State of South Carolina Department of Revenue's Form I-312. The County sales tax rate is eight (8%) percent.

   B) Federal:
   The County is exempt from Federal Taxes.

TERMS & CONDITIONS
IV – Contractor Continued

10. PERMITS, FEES, AND NOTICES: Unless otherwise provided in the Contract Documents, the successful Bidder shall secure and pay for the building permits and for all other permits and governmental fees, licenses and inspections necessary for the proper execution and completion of the Work which are customarily secured after execution of the Contract. The County will waive building permit and impact fees for this project. No waivers can be made regarding Business License or the updating of the successful Bidder's current Business License requirements. The Successful Bidder shall give all notices and comply with all laws, ordinances, rules, regulations and lawful orders of any public authority bearing on the performance of the Work.

11. ALLOWANCES: The Successful Bidder shall include in the Contract Sum all allowances stated in the Contract Documents. Such persons shall supply for such amounts and items covered by these allowances as the County may direct, but the Contractor will not be required to employ persons against whom he makes a reasonable objection.

12. PROGRESS SCHEDULE: The Successful Bidder, immediately after being awarded the Contract, shall review the Progress Schedule as submitted with his Bid. Any changes or rearrangements found necessary for improvements, or otherwise, shall be reviewed with and by the County's Construction Administrator at the Pre-Construction Conference. The Progress Schedule shall be related to the entire Project and shall provide for expeditious and practical execution of the Work.

13. MONTHLY PROGRESS REPORT (EJCDC Form C-620): The Successful Bidder shall submit monthly, along with his Application for Payment, his actual Progress Schedule in the form of a bar graph relative to the Project schedule as approved by the County.

14. DOCUMENTS AND SAMPLES HELD AT THE SITE: The Successful Bidder shall maintain at the Work-Site for the County one (1) record copy of all Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to record all changes made during construction, and approved Shop Drawings, Product Data and Samples. These shall be available and shall be delivered to the County upon completion of the Work.

15. SHOP DRAWINGS, PRODUCT DATA AND SAMPLES: Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Successful Bidder or any subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work. Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Successful Bidder to illustrate a material, product, or system for some portion of the Work.

TERMS & CONDITIONS
IV – Contractor Continued

15. SHOP DRAWINGS, PRODUCT DATA AND SAMPLES CONTINUED: Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

    The Successful Bidder shall review, approve and submit, with reasonable promptness and in such sequence as to cause no delay in the Work or in the Work of the County or any separate Contractor, all Shop Drawings, Product Data and Samples required by the Contract Documents.

    By approving and submitting Shop Drawings, Product Data and Samples, the Contractor represents that he has determined and verified all materials, field measurements, and field construction criteria related thereto, or will do so, and that he has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

    The Successful Bidder shall not be relieved of responsibility for any deviation from the requirements of the Contract Documents by the County's approval of Shop Drawings, Product Data or Samples unless the Successful Bidder has specifically informed the County in writing of such deviation at the time of submission, and the County's Construction Administrator has given written approval to the specific deviation. The Successful Bidder shall not be relieved from responsibility for errors or omissions in the Shop Drawings, Product Data or Samples by the County's approval thereof.

    The Successful Bidder shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data or Samples, to revisions other than those requested by the County on previous submittals.

    No portion of the Work requiring submission of a Shop Drawing, Product Data or Samples shall be commenced until the submittal has been approved by the County. All such portions of the Work shall be in accordance with approved submittals.

16. USE AND CLEANING OF SITE: The Successful Bidder shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents and shall not unreasonably encumber the Work-Site with any materials or equipment. The Successful Bidder shall keep the Work-Site reasonably clean during performance of the Work. Upon final completion of the Work, the Successful Bidder shall clean the Work-Site and the Project and remove all waste, together with all of the Successful Bidder's property.

17. ACCESS TO WORK: The County and the Construction Administrator shall have access to the Work at all times from commencement of the Work through final completion. The Successful Bidder shall take whatever steps necessary to provide access when requested.

TERMS & CONDITIONS
IV – Contractor Continued

18. CUTTING AND PATCHING OF WORK: The Successful Bidder shall be responsible for all cutting, fitting, or patching that may be required to complete the Work or to make its several parts fit together properly.

    The Successful Bidder shall not damage or endanger any portion of the Work or the Work of the County or any separate contractors by cutting, patching, or otherwise altering any Work, or by excavation.

    The Successful Bidder shall not cut or otherwise alter the Work of the County or any separate contractor, except with the written consent of the County, and of such separate Contractor. The Successful Bidder shall not, unreasonably withhold from the County, or any separate contractor his consent to cutting or otherwise altering the Work.

19. COMMUNICATIONS: The Successful Bidder shall forward all communications to the County through the County's Project Manager and the County's Procurement Department.

TERMS & CONDITIONS
V – Protection of Person & Property

1. GENERAL: The Successful Bidder shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work, including that of any sub-contractors. The Successful Bidder's Safety Program shall incorporate the practices, procedures, and requirements described in this Section, as well as the requirements of any Federal, State, or Local laws, ordinances, applicable construction codes and regulations. Machinery equipment and other potential hazards shall be guarded in accordance with the safety provisions of the Manual of Accident Prevention in Construction, published by the Associated General Successful Bidders of America, to the extent that such provisions are not in contradiction of applicable laws, in which case the more stringent shall apply.

2. SAFETY OF PERSONS AND PROPERTY: The Successful Bidder shall take all reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury, or loss to:

   A) All employees on the Work Site and all other persons who may be affected thereby;

   B) All the Work and all materials and equipment to be incorporated therein, whether in storage on or off the site, under the care, custody, or control of the Successful Bidder or any of his subcontractors or sub-subcontractors; and

   C) Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, watercraft, and utilities not designated for removal, relocation, or replacement in the course of construction.

   The Successful Bidder shall give all notices and comply with all applicable laws, ordinances, rules, regulations, and lawful orders of any public authority bearing on the safety of persons or property or their protection from damage, injury, or loss.

   The successful Bidder shall erect and maintain, as required by existing conditions and progress of the Work, all reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations, and notifying County and users of adjacent utilities.

   When the use or storage of explosives or other hazardous materials or equipment is necessary for the execution of the Work, the Successful Bidder shall exercise the utmost care, shall notify the County in writing, shall carry on such activities under the supervision of properly qualified personnel, and shall comply with all applicable laws, rules and regulations and codes pertaining thereto.

TERMS & CONDITIONS
V – Protection of Person & Property Continued

2. SAFETY OF PERSONS AND PROPERTY CONTINUED: The Successful Bidder shall promptly remedy all damage or loss to any properties caused in whole or in part by the Successful Bidder, any subcontractor, and sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable and for which the Successful Bidder is responsible, except damage or loss attributable to the acts or omissions of the County's Construction Administrator, and not attributable to the fault or negligence of the Successful Bidder. The Successful Bidder shall designate a responsible member of his organization at the Work-Site whose duties shall be safety compliance and prevention of accidents. This person shall be the Successful Bidder's superintendent unless otherwise designated by the Successful Bidder, in writing, to the County and the Construction Administrator.

   The Successful Bidder shall designate a responsible member of his organization at the Work-Site whose duty shall be safety compliance and prevention of accidents. This person shall be the Successful Bidder's superintendent unless otherwise designated by the Successful Bidder in writing to the County and the Construction Administrator.

   The Successful Bidder shall not load or permit any part of the Work to be loaded so as to endanger its safety.

   The Successful Bidder shall provide, at the several locations of active Work, such equipment and medical facilities as are necessary for first-aid treatment of anyone who may be injured on the Work. He shall have standing arrangements for the removal and hospital treatment of any person who shall be injured while engaged in the performance of the Work.

   The Successful Bidder shall report promptly, in writing, to the Construction Administrator all accidents occurring in the performance of the Work whether on, adjacent to, or remote from the Work-Site that caused death, personal injuries, or property damage, and shall give full details and statements of witnesses.

   The Successful Bidder shall furnish, as required by any applicable laws, rules, regulations and codes, safe shoring, enclosed confinement safeguard requirements, scaffolding, and protection against accidents. Failure on the part of the Successful Bidder to carry out the above regulations after notification by the County shall be just cause for the County to afford all necessary protection and charge the cost of the same to the Successful Bidder.

   Should hurricane or other emergency warnings be issued during the construction period, the Successful Bidder shall take every precaution to minimize danger to persons and damage to the Work and property. He shall take similar and appropriate action in the event of warnings of other such natural occurrences, storms, earthquakes, etc.

TERMS & CONDITIONS
V – Protection of Person & Property Continued

2. SAFETY OF PERSONS AND PROPERTY CONTINUED: During the construction period, the Successful Bidder shall provide and maintain at all times in a neat and sanitary condition, at his expense, such toilet accommodations, for the use of his employees as are necessary to comply with the requirements of any Federal, State, or Local laws, ordinances, or regulations. All such accommodations and connections shall be removed upon completion of the Contract and the premises shall be left clean.

   Care shall be taken to keep all parts of the Work in sanitary condition and free from refuse and decaying or other objectionable, unsafe, or unhealthy matter.

   Failure to perform and meet the requirements of this Section or any apparent danger to persons or property shall be grounds for the County or the County's Construction Administrator to suspend the Work until the conditions creating the hazard has been removed.

3. EMERGENCIES: In any emergency affecting the safety of persons or property at the Work Site and vicinity, the Successful Bidder shall act, at his discretion, to prevent threatened damage, injury, or loss and notify the County immediately.

4. NEIGHBORHOOD SAFETY: The successful Bidder shall be responsible and exercise necessary safety implementation at all times within the neighborhoods for the duration of each project. This includes, but is not limited to, safety barriers, flagmen, etc., necessary during working and non-working hours or days. The successful Bidder is required to follow the traffic control specifications for street and highway construction and maintenance operations as set forth in Division 600, Traffic Control, of the South Carolina Department of Transportation (SCDOT) Standard Specifications for Highway Construction, Edition of 2000, Federal Highway Administration (FHWA) Manual of Uniform Traffic Control Devices, latest Edition, and latest Occupational Safety and Health Administration (OSHA) construction regulations.

TERMS & CONDITIONS
VI – Subcontractors

1. DEFINITION: A subcontractor is a person or entity that has a direct Contract with the Successful Bidder to perform any of the Work at the Work-Site. The term subcontractor is referred to throughout the Contract Documents as if singular in number and masculine in gender and means a subcontractor or his authorized representative.

2. AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK: Unless otherwise required by the Contract Documents or the Bidding Documents, the Successful Bidder, as soon as practical after the award of the Contract, shall furnish to the County, in writing, the names of the persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each of the principal portions of the Work. The County will promptly reply to the Successful Bidder, in writing, stating whether or not the County, after due investigation, has reasonable objection to any such proposed person or entity. Failure of the County to reply promptly shall constitute notice of no reasonable objection.
   The Successful Bidder shall not Contract with any such proposed person or entity to whom the County has made reasonable objection. The Successful Bidder shall not be required to Contract with anyone to whom he has a reasonable objection. If the County has reasonable objection to any such proposed person or entity, the Successful Bidder shall submit a substitute to whom the County has no reasonable objection.

3. SUBCONTRACTUAL RELATIONS: By an appropriate Contract, written where legally required for validity, the Successful Bidder shall require each subcontractor, to the extent of the Work to be performed by the subcontractor, to be bound to the Successful Bidder by the terms of the Contract Documents, and to assume toward the Successful Bidder all the obligations and responsibilities which the Successful Bidder, by these Documents, assumes toward the County. Where appropriate, the Successful Bidder shall require each subcontractor to enter into similar Contracts with his Sub-subcontractors. The Successful Bidder shall make available to each proposed subcontractor, prior to the execution of the subcontract, copies of the Contract Documents to which the subcontractor will be bound. Each subcontractor shall similarly make copies of such Documents available to his sub-subcontractors.

TERMS & CONDITIONS
VII – Work By The County or Separate Contractor

1. COUNTY'S RIGHT: The County reserves the right to perform work related to the Project with his own forces, and to award separate Contracts in connection with other portions of the Project or other work on the site under these or similar Conditions of the Contract. If the Successful Bidder claims that delay or additional cost is involved because of such action by the County, he shall make such claim as provided elsewhere in the Contract Documents. The County will provide for the coordination of the work of his own forces and of each separate Contractor with the Work of the Successful Bidder.

2. MUTUAL RESPONSIBILITY: The Successful Bidder shall afford the County and separate Contractors reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their work and shall connect and coordinate his Work with theirs as required by the Contract Documents.

   If any part of the Successful Bidder's Work depends, for proper execution or results, upon the work of the County or any separate contractor, the Successful Bidder shall, prior to proceeding with the Work, promptly report to the County any apparent discrepancies or defects in such other work that render it unsuitable for such proper execution and results. Failure of the Successful Bidder to so report shall constitute an acceptance of the County's or separate contractors' work as fit and proper to receive his Work, except as to defects that may subsequently become apparent in such work by others.

   Any costs caused by defective or ill-timed work shall be borne by the party responsible, therefore.

   Should the Successful Bidder wrongfully cause damage to the Work or property of the County or any separate contractor, the Successful Bidder shall, upon due notice promptly attempt to settle with such other contractor by Contract, or otherwise to resolve the dispute. If such separate contractor sues or initiates any action or proceeding against the County on account of any damage alleged to have been caused by the Successful Bidder, the County shall notify the Successful Bidder who shall defend such action or proceedings at the County's expense, and if any judgment or award against the County arises therefrom, the Successful Bidder shall pay or satisfy it and shall reimburse the County for all attorneys' fees and court or mediation/arbitration costs that the County may incur as a result of any action taken.

TERMS & CONDITIONS
VIII – Bond & Insurance

1. BONDS: Required; amount. When a construction contract is awarded in excess of $100,000.00, the following bond or security shall be delivered to the county and shall become binding on the parties upon the execution of the contract:

   Performance Bond (EJCDC Form C-610): A performance bond satisfactory to the county, executed by a surety company authorized to do business in this state or otherwise secured in a manner satisfactory to the county, in an amount equal to 100 percent of the price specified in the contract; and

   Payment Bond (EJCDC Form C-615): A payment bond satisfactory to the county, executed by a surety company authorized to do business in this state or otherwise secured in a manner satisfactory to the county, for the protection of all persons supplying labor and materials to the contractor or its subcontractors for the performance of the work provided for in the contract. The bond shall be in amount equal to 100 percent of the price specified in the contract.

2. INSURANCE REQUIREMENTS: The successful bidder shall procure, maintain, and provide proof of, insurance coverage for injuries to persons and/or property damage as may arise from or in conjunction with, the work performed on behalf of the County by the bidder, his agents, representatives, employees or subcontractors. Proof of coverage as contained herein shall be submitted ten (10) days prior to the commencement of work and such coverage shall be maintained by the bidder for the duration of the contract period; for occurrence policies.

2.1 General Liability

Coverage shall be as broad as: Comprehensive General Liability endorsed to include Broad Form, Commercial General Liability form including Products/Completed Operations.

Minimum Limits General Liability:
$5,000,000 General Aggregate Limit
$2,000,000 Products & Completed Operations
$1,000,000 Personal and Advertising Injury
$1,000,000 Each Occurrence Limit
$50,000 Fire Damage Limit
$5,000 Medical Expense Limit

2.2 Automobile Liability

Coverage sufficient to cover all vehicles owned, used, or hired by the bidder, his agents, representatives, employees or subcontractors.

Minimum Limits Automobile Liability:

$1,000,000 Combined Single Limit
$1,000,000 Each Occurrence Limit
$5,000 Medical Expense Limit

TERMS & CONDITIONS
VIII – Bond & Insurance Continued

2. INSURANCE REQUIREMENTS CONTINUED:

2.3 Workers' Compensation
Limits as required by the Workers' Compensation Act of SC. Employers Liability, $1,000,000.

2.4 Professional Liability
Minimum limits are $1,000,000 per occurrence.

2.5 Coverage Provisions
All deductibles or self-insured retention shall appear on the certificate(s).
The County of Berkeley, its' officers/ officials, employees, agents, and volunteers shall be added as "additional insured" as their interests may appear. This provision does not apply to Professional Liability or Workers' Compensation/Employers' Liability.
The Offeror's insurance shall be primary over any applicable insurance or self-insurance maintained by the County.
Shall provide 30 days written notice to the County before any cancellation, suspension, or void of coverage in whole or part, where such provision is reasonable.
All coverage for subcontractors of the bidder shall be subject to all of the requirements stated herein.
All deductibles or self-insured retention shall appear on the certificate(s) and shall be subject to approval by the County. At the option of the County, either; the insurer shall reduce or eliminate such deductible or self-insured retention; or the bidder shall be required to procure a bond guaranteeing payment of losses and related claims expenses.
Failure to comply with any reporting provisions of the policy(s) shall not affect coverage provided the County, its officers/officials, agents, employees, and volunteers.
The insurer shall agree to waive all rights of subrogation against the County, its' officers/officials, agents, employees or volunteers for any act, omission, or condition of premises which the parties may be held liable by reason of negligence.
The bidder shall furnish the County certificates of insurance including endorsements affecting coverage. The certificates are to be signed by a person authorized by the insurance company(s) to bind coverage on its' behalf, if executed by a broker, notarized copy of authorization to bind, or certify coverage must be attached.
All insurance shall be placed with insurers maintaining an A.M. Best rating of no less than an "A".

TERMS & CONDITIONS
VIII – Bond & Insurance Continued

2.6 Property Insurance

A. Builder's Risk: Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the full insurable replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the County and Contractor as named insureds, and all Subcontractors, and any individuals or entities required by the Supplementary Conditions to be insured under such builder's risk policy, as insureds or named insureds. For purposes of the remainder of this Paragraph 2.6, Paragraphs 2.7 and 2.8, and any corresponding Supplementary Conditions, the parties required to be insured shall collectively be referred to as "insureds."

2. be written on a builder's risk "all risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire; lightning; windstorm; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; flood; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; water damage (other than that caused by flood); and such other perils or causes of loss as may be specifically required by the Supplementary Conditions. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; or flood, are not commercially available under builder's risk policies, by endorsement or otherwise, such insurance may be provided through other insurance policies acceptable to County and Contractor.

3. cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including County-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form work, fences, shoring, falsework, and temporary structures.

4. cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects).

5. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier).

6. extend to cover damage or loss to insured property while in transit.

7. allow for partial occupation or use of the Work by County, such that those portions of the Work that are not yet occupied or used by County shall remain covered by the builder's risk insurance.

TERMS & CONDITIONS
VIII – Bond & Insurance Continued

2.6 Property Insurance Continued

8. allow for the waiver of the insurer's subrogation rights, as set forth below.

9. provide primary coverage for all losses and damages caused by the perils or causes of loss covered.

10. not include a co-insurance clause.

11. include an exception for ensuing losses from physical damage or loss with respect to any defective workmanship, design, or materials exclusions.

12. include performance/hot testing and start-up.

13. be maintained in effect, subject to the provisions herein regarding Substantial Completion and partial occupancy or use of the Work by County, until the Work is complete.

B. Notice of Cancellation or Change: All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 2.6 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured.

C. Deductibles: The purchaser of any required builder's risk or property insurance shall pay for costs not covered because of the application of a policy deductible.

D. Partial Occupancy or Use by County: If County will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work, then County (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide notice of such occupancy or use to the builder's risk insurer. The builder's risk insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy; rather, those portions of the Work that are occupied or used by County may come off the builder's risk policy, while those portions of the Work not yet occupied or used by County shall remain covered by the builder's risk insurance.

E. Additional Insurance: If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 2.6, it may do so at Contractor's expense.

F. Insurance of Other Property: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, such as tools, construction equipment, or other personal property owned by Contractor, a Subcontractor, or an employee of Contractor or a Subcontractor, then the entity or individual owning such property item will be responsible for deciding whether to insure it, and if so in what amount.

TERMS & CONDITIONS
VIII – Bond & Insurance Continued

2.7 Waiver of Rights

A. All policies purchased in accordance with Paragraph 2.6, expressly including the builder's risk policy, shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any insureds thereunder, or against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors. County and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all Subcontractors, all individuals or entities identified in the Supplementary Conditions as insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by County or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.

B. County waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and
2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial occupancy, after Substantial Completion, or after final payment .

C. Any insurance policy maintained by the County covering any loss, damage or consequential loss referred to in Paragraph 2.7 B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them.

D. Contractor shall be responsible for assuring that the agreement under which a Subcontractor performs a portion of the Work contains provisions whereby the Subcontractor waives all rights against the County, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by builder's risk insurance and any other property insurance applicable to the Work.

TERMS & CONDITIONS
VIII – Bond & Insurance Continued

2.8 Receipt and Application of Property Insurance Proceeds

A. Any insured loss under the builder's risk and other policies of insurance required by Paragraph 2.6 will be adjusted and settled with the named insured that purchased the policy. Such named insured shall act as fiduciary for the other insureds and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.

B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 2.6 shall distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.

C. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the money so received applied on account thereof, and the Work and the cost thereof covered by Change Order, if needed.

TERMS & CONDITIONS
IX – Testing Requirements

1. GENERAL: Required inspection and testing services are intended to assist in determination of probable compliance of the Work with requirements, but do not relieve Successful Bidder of responsibility for compliance, or for general fulfillment of requirements of Contract documents. Specified inspections and tests are not intended to limit Successful Bidder's quality control program. The Successful Bidder shall afford reasonable access to agencies performing tests and inspections.

   The technical specifications establish only a minimum testing criteria as to the type of test and number of tests required, and do not intend to limit the number of tests that the Successful Bidder may feel necessary to ascertain that he is in compliance with the specifications. It remains the responsibility of the Successful Bidder to ensure complete compliance, and; therefore, he may elect to provide more tests than the minimum set out in the specifications, but all at no additional cost to the County.

   Neither the presence of and the testing performed by the testing laboratory, nor the review of the test results by the County implies in any way a warranty of the work performed by the Contractor. It remains the responsibility of the Successful Bidder to ensure that all work is performed in accordance with the plans and specifications.

   Refer to all sections of the technical specifications for more detailed information of type, if any, and number of tests required for minimum submittals.

   A) Laboratory Selection and Approval

   The Successful Bidder shall engage an independent testing laboratory, one that is experienced and specializing in the type of testing services required and will submit that name to the County for approval before beginning any scheduling of tests.

   B) Reports

   The Successful Bidder shall distribute copies of all test reports immediately to the Project Engineer and the County (and any other party at his discretion).

   C) Costs

   The Successful Bidder will be required to pay for any and all tests required of the technical specification’s sections, and for any and all other tests he may desire to make, over and above the minimum required by the technical specifications.

TERMS & CONDITIONS
IX – Testing Requirements Continued

D) Special Tests/Costs

The County may at any time, upon suspicion of deficient Work or materials, elect to have tests made by an independent testing laboratory. If it is determined by these tests that the work or the materials supplied by the Successful Bidder do not conform to the specifications, the Successful Bidder will be required to pay for all corrective action, replacement costs, extra fees (hired by County), and for all subsequent testing of that deficiency, and for other indirect costs to the County that may have resulted from the deficiency. Otherwise the County shall reimburse the Successful Bidder for reasonable costs incurred.

E) Access

The Successful Bidder shall provide access for testing laboratory personnel to the Work-Site at all times and cooperate to the fullest with their requirements.

F) Taking of Specimens

All specimens and samples for testing will be taken by the testing laboratory (unless specified otherwise in the various related sections). All sampling equipment and personnel will be provided by the testing laboratory (except where noted otherwise in the various related sections of specifications).

G) Schedule

If applicable, the Successful Bidder shall prepare a schedule of tests to be made and submit to the Construction Administrator.

The Successful Bidder shall be responsible for notifying the testing laboratory, and with enough advance time to allow for them to make arrangements for testing as required. The Successful Bidder shall also notify County's Construction Administrator when he notifies the testing laboratory.

When changes in the construction schedule cause any change in the testing schedule, the Successful Bidder shall notify the testing laboratory and County’s Construction Administrator and revise the testing schedule accordingly.

H) Items Requiring Testing

The Successful Bidder is responsible for reviewing every section of the specifications for verification in determining the actual testing and reports required for the project.

TERMS & CONDITIONS
X – Time

1. DEFINITION: Unless otherwise provided, the Contract Time is the period of time allotted in the Contract Documents for Completion of the Work.

   The date of commencement of the Work is the date established in the Notice to Proceed. The Date of Completion of the Work or designated portion thereof is the Date certified by the County when construction is sufficiently complete, in accordance with the Contract Documents, so the County can occupy or utilize the Work or designated portion thereof for the use for which it is intended. The term day as used in the Contract Documents shall mean calendar day unless otherwise specifically designated.

2. PROGRESS AND COMPLETION: All time limits stated in the Contract Documents are of the essence of the Contract. The Successful Bidder shall begin the Work on the date of the commencement as defined in the Notice to Proceed. He shall carry the Work forward expeditiously with adequate forces and shall achieve Completion within the Contract Time.

3. INCLEMENT WEATHER: In the event of temporary suspension of work or during inclement weather, or whenever the Construction Administrator shall direct, the Contractor will, and will cause his subcontractors to protect carefully his and their work and materials against damage or injury from the weather. If, in the opinion of the Construction Administrator, any work or materials are damaged or injured by reason of failure of the Contractor or his subcontractors to protect their work, such materials shall be removed and replaced at the expense of the Contractor.
   The Owner has reviewed weather data available from the National Oceanic and Atmospheric Administration (NOAA) station at the Charleston International Airport and determined a Standard Baseline of average climatic range for the project site.
   A) Standard Baseline shall be regarded as the normal and anticipatory number of calendar days for each month during which construction activity shall be expected to be prevented and suspended by cause of precipitation in excess of 0.10-inch liquid measure. Suspension of construction activity for the number of days each month as listed in the Standard Baseline is included in the Work and is not eligible for extension of Contract Time.

Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
6	5	5	5	5	7	8	9	6	4	4	5

   B) Adverse Weather is defined as the occurrence of one or more of the following conditions which prevents exterior construction activity or access to the site within twenty-four (24) hours:
   1. Precipitation (rain, snow, ice, etc.) that prevents construction activities on the critical path.
   2. Temperatures which do not rise above that specified for the day's construction activity by 12:00 PM, if any is specified.
   3. Standing snow in excess of 1 inch.
   4. Any day that the Owner has requested no work to be performed.

TERMS & CONDITIONS
X – Time Continued

C) A Weather Delay may be counted if adverse weather prevents work on the project for 50 percent or more of the Contractor's scheduled workday, including a weekend day or holiday if the Contractor has scheduled construction activity that day.

D) Adverse Weather may include "dry-out" or "mud" days, as determined by the Construction Administrator such as:

1. If the Contractor's activity is limited to approximately 50 percent of the Contractor's activity before the Adverse Weather occurrence, then one half of a Weather Delay Day will be counted. For example if the Contractor is disking excavation and embankment areas to dry in situ moisture in the soils or hauling and placing unclassified excavation or borrow material to the embankment before an Adverse Weather occurrence, but is able to continue disking excavation and embankment areas or placing unclassified excavation or borrow material, one half of a Weather Delay Day will be allowed.
2. If the Contractor's activity is limited to minor activity when compared to the Contractor's activity before the Adverse Weather occurrence, then one Weather Delay Day will be counted. For example, if the Contractor is disking excavation and embankment areas to dry in situ soils, hauling borrow material to embankment before an Adverse Weather occurrence, but is only able to disk excavation and embankment areas to dry them due to the Adverse Weather occurrence, one Weather Delay Day will be allowed.

E) All weather data used to determine Adverse Weather for the project site during the course of work shall be data from the NOAA station at the Charleston International Airport. Therefore, the contractor shall on a monthly basis submit to the Construction Administrator a summary showing the Adverse Weather incurred for the month and the supporting documentation from the NOAA station at the Charleston International Airport confirming the Adverse Weather experienced.

4. TIME OF WORK:

A) The normal time of work for this Contract is limited to 40 hours per week and shall generally be between the hours of 7:00 a.m. and 5:30 p.m., Monday through Friday. No work shall be scheduled on weekends or on holidays. Work outside of the normal time of work shall be allowed only with prior written approval from the Owner and the Engineer. Should the Contractor be allowed to work beyond the normal Monday through Friday hours or on weekends or holidays, he shall bear all costs incurred by the Owner for associated additional engineering and inspection services. The Owner shall deduct the cost of additional engineering costs from monies due the Contractor.

B) The following BCWS holidays shall be observed each year:

1. New Year's Day (January 1st)
2. Martin Luther King, Jr. Day (third Monday in January)
3. Good Friday

TERMS & CONDITIONS
X – Time Continued

4. Memorial Day (last Monday in May)
5. Independence Day (July 4th)
6. Labor Day (first Monday in September)
7. Veterans Day
8. Thanksgiving Day (fourth Thursday in November)
9. Day after Thanksgiving Day
10. Christmas (December 23rd to 27th)

C) If it shall become imperative to perform work at night, the Owner and Engineer shall be informed within a reasonable time in advance of the beginning of such work. Temporary lighting and all other necessary facilities for performing and inspecting the work shall be provided and maintained by the Contractor.

TERMS & CONDITIONS
XI – Payment & Completion

1. CONTRACT SUM: The Contract sum shall be as stated elsewhere herein.

2. SCHEDULE OF VALUES: Within ten (10) calendar days of the commencement of Work, the Successful Bidder shall submit to the County a Schedule of Values allocated to the various portions of the Work, prepared in such form and supported by such data to substantiate its accuracy as the County may require. This schedule, unless objected to by the County, shall be used only as a basis for the Successful Bidder's Applications for Payments.

3. APPLICATIONS FOR PAYMENT: On or before the 25th of each month, the Successful Bidder shall submit to the Construction Administrator an itemized Application for Payment, notarized if required, supported by such data substantiating the Successful Bidder's right to payment as the County may require, and reflecting retainage, if any, as provided elsewhere in the Contract Documents.

   Unless provided in the Contract Documents, payments will be made on account of materials or equipment not incorporated in the Work but delivered and suitably stored at the site and, if approved in advance by the County, payments may similarly be made for materials or equipment suitably stored at some other location agreed upon in writing.

   Payments for materials or equipment stored on or off the site shall be conditioned upon submission by the Successful Bidder of bills of sale or such other procedures satisfactory to the County to establish the County's title to such materials or equipment or otherwise protect the County's interest, including applicable insurance and transportation to the Work-Site for those materials and equipment stored off of the Work-Site.

   The Successful Bidder warrants that title to all Work, materials and equipment covered by an Application for Payment will pass to the County either by incorporation in the construction or upon the receipt of payment by the Successful Bidder, whichever occurs first; free and clear of all liens, claims, security interests or encumbrances, hereinafter referred to as "liens", and that no Work, materials or equipment covered by an Application for Payment will have been acquired by the Successful Bidder, or by any other person performing Work at the site or furnishing materials and equipment for the Project, subject to a Contract under which an interest therein or an encumbrance thereon is retained by the seller or otherwise imposed by the Successful Bidder or such other person.

   Contractor's Application for Payment should be submitted to the County on EJCDC Documents C-620 and supported by an actual progress schedule and the Contract Schedule of Values.

   The period covered by each Application shall be not less than one (1) calendar month for Work completed for the period ending the 15th day of the same month.

TERMS & CONDITIONS
XI – Payment & Completion Continued

4. PROGRESS PAYMENTS: The County shall make progress payments to the Successful Bidder, less retainage on undisputed amounts certified by the County's Construction Administrator for the County within thirty (30) days from receipt of the Application for Payment by the County, in accordance with Title 29, Chapter 6 of the Code of Laws of South Carolina, 1976, as amended.

   The County will retain from each progress payment an amount equal to ten (10%) percent of the value of work covered by the progress payment. At Substantial Completion the total amount of payment will be ninety-five (95%) percent of the Contract sum, less those amounts that are withheld to cover incomplete work, incorrect work and unsettled claims.

   The Successful Bidder shall promptly pay each subcontractor, upon receipt of payment from the County, out of the amount paid to the Successful Bidder on account of such subcontractor's Work, the amount to which said subcontractor is entitled, reflecting the percentage actually retained if any, from payments to the Successful Bidder on account of such subcontractor's work. The Successful Bidder shall, by an appropriate Contract with each subcontractor, require each subcontractor to make payments to his sub-subcontractors in a similar manner.

   The County may, on request and at his discretion, furnish to any subcontractor, if practical, information regarding the percentages of completion or the amounts applied for by the Successful Bidder and the action taken thereon by the County on account of Work done by such subcontractor.

   The County shall not have any obligation to pay or to see to the payment of any monies to any subcontractor except as may otherwise be required by law.

   No Certificate for a progress payment, nor any progress payment, nor any partial or entire use or occupancy of the Project by the County, shall constitute an acceptance of any Work not in accordance with the Contract Documents.

TERMS & CONDITIONS
XI – Payment & Completion Continued

5. PAYMENTS WITHHELD: The County may decline payment and may withhold it in whole or in part, from loss because of:

   A) Defective work not remedied

   B) Third party claims filed, or reasonable evidence indicating probable filing of such claims.

   C) Failure of the Successful Bidder to make payments properly to subcontractors for labor, materials or equipment.

   D) Reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum

   E) Damage to the County or another Contractor

   F) Persistent failure to carry out the Work in accordance with the Contract Documents.

   When the above grounds are removed, payment shall be made for amounts withheld because of them.

6. SUBSTANTIAL COMPLETION (EJCDC Form C-625): When the Successful Bidder considers that the Work, or a designated portion thereof, which is acceptable to the County, is substantially complete, the Successful Bidder shall prepare for submission to the County a list of items to be completed or corrected. The failure to include any items on such list does not alter the responsibility of the Successful Bidder to complete all Work in accordance with the Contract Documents. If the County, on the basis of an inspection, determines that the Work or designated portion thereof is substantially complete, he will make payment, reflecting adjustment in retainage, if any, for such Work or portion thereof, as provided in the Contract Documents.

7. FINAL COMPLETION AND FINAL PAYMENT: Upon receipt of written notice that the Work is ready for final inspection and acceptance, and upon receipt of a final Application for Payment, the County will promptly make such inspection to ascertain if the Work is acceptable under the Contract Documents and the Contract is fully performed.

TERMS & CONDITIONS
XI – Payment & Completion Continued

7. FINAL COMPLETION AND FINAL PAYMENT CONTINUED: Neither the final payment nor the remaining retained percentage shall become due until the Successful Bidder submits to the County and his Construction Administrator, the following:

   A) Final list of subcontractors

   B) Instruction books for all equipment

   C) Manufacturers' Warranties

   D) Successful Bidder's release or waiver of liens (conditional upon receipt of final payment) submitted on the Successful Bidder's letterhead and notarized

   E) Successful Bidder's Affidavit of Payment of Debts and Claims, AIA Form G706

   F) Successful Bidder's Affidavit of Release of Liens, AIA Form G706A

   G) Consent of surety to final payment, AIA Document F707, or latest edition equipment suppliers, if specifically requested by the County

   H) Separate Release or Waiver of Liens from subcontractors and Material and Equipment Suppliers, if specifically requested by County

   I) ~~Termite Warranties~~

   J) Copies of testing reports

   K) As-built drawings

   L) Certificates: Submit to the County and his Construction Administrator certificates of approval, acceptance and compliance from all authorities and agencies having jurisdiction over the Work. The Work will not be deemed complete, nor will final payment be made, until such certificates have been delivered.

   The Successful Bidder shall provide one (1) original paper copy and one digital copy of each of the specified documents to the County in a close-out document book consisting of a three ring binders with a Table of Contents and tabbed for each category unless otherwise specified in the specifications.

TERMS & CONDITIONS
XI – Payment & Completion Continued

The making of final payment shall constitute a waiver of all claims by the **County** except those arising from:

A) Unsettled liens
B) Faulty or defective Work appearing after Substantial Completion
C) Failure of the Work to comply with the requirements of the Contract Documents, or
D) Terms of any special warranties required by the Contract Documents.

The acceptance of final payment shall constitute a waiver of all claims by the Successful Bidder, except those previously made in writing and identified by the Successful Bidder as unsettled at the time of the final Application for Payment.

8. NON-RESIDENT CONTRACTORS: Any Successful Bidder, who is a non-resident, shall be aware of Section 12-9-310, Article 3, of the South Carolina Income Tax Act of 1926, as amended. This article requires the County entering into a Contract with a non-resident taxpayer, where such Contract exceeds Ten Thousand and 00/100, ($10,000.00) Dollars, to withhold two (2%) percent of each payment made to the non-resident. The funds deducted from the payment made to the non-resident Contractor are funds deemed to be held in trust for the State of South Carolina and will be reported by the County to the South Carolina Tax Commission. This Deduction is in addition to the retainage deductions specified in the General Conditions.

   Modifications to the South Carolina Income Tax Act made January 1, 1993, allowing a non-resident Contractor to apply for an exemption or partial exemption from the two (2%) percent withholding rule. The non-resident Contractor must complete a "Nonresident Taxpayer Request for Exemption Affidavit" (Form WH 303), "Nonresident Taxpayer Affidavit" (Form I-312) and a subcontractors list. The South Carolina Tax Commission will make the determination and notify both Contracting parties of the qualified exempt or partially exempt Contracts.

   All Contracts for Ten Thousand and 00/100, ($10,000.00) Dollars or more with non-residents which do not qualify for exemption will require the withholding of two (2%) percent from each payment as described above. The non-resident Contractor may elect to post a surety bond with the South Carolina Tax Commission to eliminate this withholding requirement. The non-resident must complete and submit the Bond (Form L-2074) and a "Nonresident Taxpayer Affidavit" (Form I-312) to the South Carolina Tax Commission for review and approval. The County must receive verification from the South Carolina Tax Commission if this deduction is to be waived.

TERMS & CONDITIONS
XII – Changes In The Work

1. CHANGE ORDERS: A Change Order is a written order to the Successful Bidder signed by the County and issued after execution of the Contract, authorizing a change in the Work or an adjustment in the Contract Sum or the Contract Time. The Contract Sum and the Contract Time may be changed only by a Change Order. A Change Order signed by the Successful Bidder indicates his Contract therewith, including adjustment in the Contract Sum or the Contract Time.

   If, during the progress of the Work it should be necessary, in order to complete the Contract fully and satisfactorily, to provide for substitutions or make alterations in the character or limits of the Work or materials called for in the Contract, a change in Contract (Change Order) shall be prepared by the County under prescribed form and shall be signed by the County and the Successful Bidder. Such change in Contract (Change Order) shall not become effective or binding until approved by the County, in writing.

   The County, without invalidating the Contract may order changes within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly. All such changes in the Work shall be authorized by Change Order and shall be performed under the applicable conditions of the Contract Documents.

   The basis for any equitable adjustment of the Contract for extra or reduced Work authorized shall be as follows:

   A. When changes are made in the character or limits of the Work or materials called for in the Contract Drawings or Specifications to provide for extra Work ordered by the County that cause an increase in the amount due to the Successful Bidder and such changes consist of Work that is similar to that called for in the Contract Documents and for which unit prices are quoted in the Bid, or for which unit prices were previously submitted to County and approved by County, the additional cost for such Work shall be paid for on the basis of said unit prices quoted by the Successful Bidder's Bid or approved price list for the item of Work affected. Any reduction of the Contract Sum for subcontracted charges shall be computed on the same basis.

TERMS & CONDITIONS
XII – Changes In The Work Continued

1. CHANGE ORDERS CONTINUED: When any change which, in the opinion of the County, is dissimilar to that called for in the Contract Drawings and Specifications and for which unit prices were not quoted in the Bid, causes such increase or decrease in the amount due the Successful Bidder the increase or decrease in the Successful Bidder's compensation shall be determined as follows:

(1) To the direct cost of labor and materials incorporated in the extra or subtractive Work and a rental cost for equipment used in the prosecution thereof there shall be added fifteen (15%) percent to cover indirect costs and the Successful Bidder's profit [when items are to be apportioned with eight (8%) percent to the subcontractor and seven (7%) percent to Successful Bidder], all as hereinafter stipulated.

B. The items used in the previous paragraphs of this Section only are defined as follows:

(1) "Labor" means laborers, mechanics, and workmen directly engaged in the performance of the extra or subtractive Work, whether employed by the successful Bidder or by the subcontractor.

(2) "Cost of Labor" means the proportion of the wages that will actually be or would have actually been paid to or received by such laborers, mechanics, and workmen and the proportion of the premiums that would actually be or would have actually been paid for workman's compensation, insurance, social security, unemployed or any other fringe benefit required by an agreement or customary to the trade upon the basis of such wages.

(3) "Cost of Materials" means the prices for which materials are sold by the manufacturers or producers thereof, or by regular dealers therein, whether or not such materials are purchased directly from the manufacturer, producer, dealer, or (if the Successful Bidder is a manufacturer or producer thereof), reasonable cost to the Successful Bidder for the manufacturer or production, plus the reasonable cost of delivering such materials to the Work-Site in the event that the price paid to the manufacturer, producer or dealer does not include delivery. If such State or other taxes are applicable to materials, the cost of this tax shall be added to the above cost.

(4) "Rental of Equipment" means the total rental for the time the equipment will be or would have been used in the prosecution of the extra or subtractive Work, computed in accordance with the schedule recommended by the Associated General Contractors of America, Inc.

TERMS & CONDITIONS
XII – Changes In The Work Continued

1. CHANGE ORDERS CONTINUED:

(5) "Indirect Costs" mean overhead, superintendent, insurance (other than workman's compensation), taxes (other than taxes on materials), materials used for temporary structures, allowances made by the successful Bidder to the subcontractor, additional premiums on the Successful Bidder's bond and all miscellaneous items of cost and expense to the Successful Bidder.

In computing increases and decreases in the Successful Bidder's compensation to cover such extra or subtractive Work, no consideration shall be given to any items of cost or expense not specifically set forth in this Section, and it is expressly agreed that the percentage addition of fifteen (15%) percent hereinbefore provided covers all items of indirect cost and expense with fair and reasonable profit to the Successful Bidder and any subcontractor for the performance or omission of performance of such extra or subtractive Work.

Upon claim for payment under a change in Contract (Change Order), the County may call for and shall be furnished with paid bills or other supporting data that may be required.

No compensation shall be allowed under a change in Contract (Change Order) for any person not actively or exclusively engaged in the performance of the specified Work.

No Work shall be started or performed under the approved change in Contract (Change Order) until the County directs the Successful Bidder to commence Work thereon.

Any change in the Time of Completion shall be as agreed between the Successful Bidder and the County and shall be shown on the change in Contract (Change Order) approved by the County. If no adjustment is made on the change in Contract (Change Order) form, any increase or decrease in the Time of Completion shall be considered waived by the Successful Bidder.

If none of the methods set forth hereto is agreed upon, the Successful Bidder, provided he receives a written order signed by the County which directs him to proceed, shall promptly proceed with the changed Work involved. The cost of such Work shall then be determined by the Construction Administrator on the basis of the reasonable expenditures and savings of those performing the Work attributable to the change, including, in the case of an increase in the Contract Sum, a reasonable allowance for overhead and profit. In such case, the Successful Bidder shall present, in such form as the County and Construction Administrator may prescribe an itemized accounting together with appropriate supporting data for inclusion in a Change Order.

TERMS & CONDITIONS
XII – Changes In The Work Continued

2. CHANGE ORDERS CONTINUED:

Unless otherwise provided in the Contract Documents, cost shall be limited to the following: cost of materials, including sales tax and cost of delivery; cost of labor, workers' or workman's compensation insurance; bond premiums; rental value of equipment and machinery; and the additional costs of supervision and field office personnel directly attributable to the change. The amount of credit to be allowed by the Successful Bidder to the County for any deletion or change which results in a net decrease in the Contract Sum will be the amount of the actual net cost as confirmed by the Construction Administrator. When both additions and credits covering related work or substitutions are involved in any one change, the allowance for overhead and profit shall be figured on the basis of the net increase, if any, with respect to that change. In no event shall any expenditure or savings associated with the Successful Bidder's home office or other non-worksite overhead expense be included in any change in the Contract Price.

If unit prices are stated in the Contract Documents or subsequently agreed upon, and if the quantities originally contemplated are so changed in a proposed Change Order that application of the agreed unit prices to the quantities of work proposed will cause substantial inequity to the County or the Successful Bidder, the applicable unit prices shall be equitably adjusted.

2. FIELD ORDERS (EJCDC Form C-942): A Field Order shall be an agreement between the Construction Administrator and the Successful Bidder which if implemented shall have no cost effect upon the Contract Price or in the Contract Time.

A Field Order may be initiated by the Construction Administrator or the Successful Bidder. All Field Orders shall be approved in writing by the Construction Administrator prior to implementation by the Successful Bidder. All approved field orders shall be on the form as provided by the Construction Administrator. The Field Orders shall be signed by the Construction Administrator and the Successful Bidder or their authorized representative. Such changes by Field Orders shall be binding upon the Successful Bidder or their authorized representative. Such changes by Field Orders shall be binding upon the Successful Bidder and carried out promptly.

3. CONSEALED CONDITIONS: Should concealed conditions be encountered in the performance of the Work below the surface of the ground or should concealed or unknown conditions in an existing structure be at variance with the conditions indicated by the Contract Documents, or should unknown physical conditions below the surface of the ground or should concealed or unknown conditions in an existing structure of an unusual nature, differ materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this Contract, be encountered, and when the condition could not have been determined by the Successful Bidder by careful examination of the site

TERMS & CONDITIONS
XII – Changes In The Work Continued

3. CONSEALED CONDITIONS CONTINUED:
or the structure prior to commencement of the Contract, the Contract Sum shall be equitably adjusted by Change Order upon claim by either party made within seven (7) days after the first observance of the conditions.

4. CLAIMS FOR ADDITIONAL COST: If the Successful Bidder wishes to make a claim for an increase in the Contract Sum, he shall give the County written notice thereof within seven (7) days after the occurrence of the event, giving rise to such claim. This notice shall be given by the Successful Bidder before proceeding to execute the Work. No such claim shall be valid unless documented and submitted to the County within allocated time period. The amount of the adjustment in the Contract Sum shall be determined by the Construction Administrator. Any change in the Contract Sum resulting from such claim must be authorized by Change Order.

   Failure to maintain and make available documentation as required by the Contract Documents, or failure to provide appropriate supporting data requested under the provisions of the Contract Documents, shall be a basis for denying any claim for additional cost and shall constitute a waiver of any claim for additional cost.

5. OTHER CHANGES IN THE WORK: Except as hereinbefore specified, any extra work done or any changes made without written authority on the prescribed change in Contract (Change Order) form shall be considered unauthorized unless otherwise directed by County, and at the expense of the Successful Bidder, and shall not be paid for by the County. At the option and direction of the County, work so done may be ordered removed, or removed and replaced at the Successful Bidder's expense.

6. UNCOVERING WORK: If any of the Work is covered contrary to the Construction Administrator's request or to any provision of this Contract, it shall, if required by the Construction Administrator or the County, be uncovered for the Construction Administrator's inspection and shall be properly replaced at the Successful Bidder's expense without change in the Contract Time.

   If any of the Work is covered in a manner not consistent with the aforementioned paragraph above, it shall, if required by the Construction Administrator or County, be uncovered for the Construction Administrator's inspection. If such Work conforms strictly to this Contract, costs of uncovering and proper replacement shall be by Change Order and be charged to the County. If such Work does not strictly conform to this Contract, the Successful Bidder shall pay the costs of uncovering and proper replacement.

TERMS & CONDITIONS
XIII – Project Meetings

1. PRE-CONSTRUCTION PROJECT MEETINGS: After award, prior to commencement of any Work, a Pre-Construction Meeting shall be scheduled by the County. The Successful Bidder shall see that responsible company management representatives and key project personnel attend this meeting.

   At this Meeting the Successful Bidder shall be oriented with respect to the County's procedures and lines of authority and with respect to contractual administration, and construction matters. The Successful Bidder shall make known his key personnel and their respective duties and responsibilities. Additionally, a schedule of required submittals will be discussed.

2. PROJECT PROGRESS MEETNGS: A Progress Meeting will be held bi-weekly to determine the overall progress of the Work; to review the Successful Bidder's schedule; to discuss any problems which have arisen or are anticipated. These meetings shall be attended by the Successful Bidder, the County's Construction Administrator, the County's Project Manager, the County's Contract Administrator, and any other persons or parties, which might be involved in this project, directly or indirectly.

   In addition to the regular meetings to be held bi-weekly, special meetings will be held when a situation arises, which in the opinion of the County's Construction Administrator, deems such action.

   The Construction Administrator shall coordinate meetings, prepare agenda, preside at meetings, record minutes, and distribute copies to County, Successful Bidder and those affected by the decisions made unless otherwise agreed by all parties.

   Successful Bidder shall afford the County copies of minutes of meetings held with Subcontractors as it relates to decisions and performance, which effect the project and the County.

TERMS & CONDITIONS
XIV – Termination

1. TERMINATION: Subject to the provisions below, the County may terminate the solicitation/contract by providing a thirty (30) day written advance notice to Contractor.

   1.1 Termination for Convenience: In the event this solicitation/contract is terminated or cancelled for the convenience of the County, the County will negotiate reasonable termination costs, if any.

   1.2 Non-Appropriations: Any contract entered into by the County shall be subject to cancellation without damages or further obligation when funds are not appropriated or otherwise made available to support continuation of performance in a subsequent fiscal period or appropriated year. Any final agreement accepted by the County MUST include the following language:

   > **This contract is approved and funded contingent upon annual appropriations being established by Berkeley County Council to provide funding necessary to meet the requirements of the contract. Such funding is approved on a fiscal year basis with the fiscal year commencing on July 1st and terminating on June 30th of the following year. In order for the contract to remain in effect, such appropriation must be approved on an annual basis throughout the term of the contract. In the event that an annual appropriation is not approved, Berkeley County shall not be held responsible for any liabilities beyond the remaining annual term prior to the new budget year.**

   1.3 Termination for Cause: The County may terminate the contract at any time for the failure of the Contractor to perform any obligation under this solicitation/contract, or for any other good and sufficient cause. The County shall only pay Contractor for services rendered prior to the termination notice date, less any liquidation costs assessed for Contractor non-performance.

   1.4 Mitigation of Termination Costs: In the event that the contract is terminated, Contractor will be liable for any costs in excess of contract pricing incurred by the County to complete the contract or provide for continuity of services. The County reserves the right to purchase any or all services and materials on the open market. The County will not entertain subsequent offers from the terminated Contractor until these liquidation costs are paid by Contractor.

   Such costs may include, but are not limited to, the cost of using the County's employees or employees of any other entity to perform the obligations of the contract. The County may obtain any such reimbursement by deduction from payments otherwise due to Contractor or by any other proper and lawful means. All deductions from any money due Contractor are to be as liquidated damages

TERMS & CONDITIONS
XIV – Termination Continued

1.4 Mitigation of Termination Costs Continued:

and not as a penalty. It is the County's intent to give Contractor a reasonable opportunity, whenever practicable, to correct any such failure to perform or satisfactorily perform its responsibilities and duties. In no circumstances shall any uncorrected situation extend for more than five days. The County will make the following deductions from the contract sum in the event that the contractor fails to perform any of the required work within the required time limits in the event the County carries out the work using its forces or another contractor.

1.4.1 For use of County's forces – actual cost involved.
1.4.2 For use of another contractor – the amount charged by said Contractor.

The County reserves the right to hold back and/or withhold part of complete payments for unsatisfactory work, deficiencies, etc. until said defects are satisfactorily corrected or cleared.

1.5 Excusable Delay: Contractor will not be liable for any excess costs if the failure to perform the contract arises out of causes beyond the control and without the fault or negligence of the contractor. However, to the extent an event arises beyond the control and without the fault or negligence of contractor, contractor shall notify the Construction Administrator and the County's Procurement Department in writing within twenty-four hours of such event. Otherwise, the event shall not serve as an excusable delay. Such causes may include, but are not restricted to acts of God or of the public enemy, acts of the Government in either its sovereign or contractual capacity, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and unusually severe weather; but in every case the failure to perform must be beyond the control and without the fault or negligence of the contractor. If the failure to perform is caused by the fault of a subcontractor, and if such default arises out of control of causes beyond the control of both Contractor and subcontractor, and without the fault or negligence of either of them, Contractor will not be liable for any excess costs for failure to perform, unless the supplies or services to be furnished by the subcontractor were obtainable from other sources in sufficient time to permit Contractor to meet the required delivery schedule.

TERMS & CONDITIONS
XV – Miscellaneous

1. COUNTY FURNISHED MATERIAL: County-Furnished materials for contractor installation are identified in the drawings. The Successful Bidder shall notify the County at least fourteen (14) days in advance that the required material should be delivered to the Work-Site.

2. SALVAGED ITEMS: There will be no salvaged items under this Contract unless otherwise specified in the plans and technical specifications.

3. WORK-SITE SECURITY: The Successful Bidder shall be responsible for security on the Work-Site against such acts as mischief, violence, burglary, arson, vandalism, etc. In addition, the Successful Bidder shall secure the Work-Site, including materials delivered or stored thereon, against damage by acts of nature and man. The County assumes no responsibility for Work-Site security.

4. FIELD OFFICES AND SHEDS:

   A) Field Office: Work-Site field office by the Successful Bidder is not considered a requirement in the performance of this Contract. This does not exclude the Successful Bidder from having such an office, but no cost directly or indirectly shall be applicable to the Contract costs.

   B) Temporary Sheds: If determined necessary, any temporary facilities shall be the responsibility of the Successful Bidder and subcontractors, at no cost to the County in the performance of this Contract. Location of temporary storage facilities, if any, shall be approved and coordinated through the County's Construction Administrator and County Project Manager or appropriate representative.

   C) Removal: At the completion of the Contract, or as directed by the County, remove all temporary buildings, sheds and trailers from the Work-Site and leave grounds in condition as specified in other sections.

5. TEMPORARY UTILITES AS MAY BE APPLICABLE: The Successful Bidder shall make arrangements to provide all water or any other utilities that may be required during the entire construction period. If water is taken from a fire hydrant for any reason, the Successful Bidder shall use a hydrant meter as required by Berkeley County Water & Sanitation.

6. TEMPORARY SANITARY FACILITIES: The Successful Bidder shall provide and maintain temporary toilet facilities for use by all personnel on the project site. Toilets shall be the temporary types, complete with water and sewage connections, or shall be a portable type approved by jurisdictional authority. Temporary toilet facilities shall be removed from premises upon completion of project.

TERMS & CONDITIONS
XV – Miscellaneous Continued

7. CONSTRUCTION ACCESS: If applicable, the Successful Bidder and his subcontractors shall enter and exit through the Work-Site as shown on the Drawings, or as designated by the Construction Administrator. The Successful Bidder shall construct and maintain construction access to the Work, construct roads, place fill, and install geogrid or fabric as necessary to perform the Work, and rework roads during and after inclement weather as necessary to maintain construction areas.

   The Successful Bidder shall become familiar with the drainage characteristics of the Site; maintain existing ditches or create new, temporary ditches as necessary to maintain construction access; and grade or regrade Site as necessary to divert surface runoff away from work areas.

8. HISTORICAL OR ARCHAEOLOGICAL SITES: Should the Successful Bidder's operations uncover artifacts of possible historical or archaeological significance, he shall temporarily discontinue operations in such area, or areas, and immediately advise the County. The County may make arrangements with archaeological authorities, for immediate investigations of such area, or areas. The Successful Bidder is cautioned that such artifacts are property of the County and are not to be removed from the project whether or not determined to be of historical or archaeological value.

9. PROTECTION OF EXISTING TREES, BUFFER ZONES, AND UNDISTURBED AREAS: Any "Buffer Zones" of vegetation so designated on the drawings shall be protected and no construction activity shall be permitted in any such areas, unless specifically indicated on the drawings.

   The Successful Bidder will be held liable for damaged or destroyed trees. Damage assessment shall be based on replacement value of equivalent, installed trees that are satisfactory to the governing agencies.

   In the event of an intrusion into a buffer zone, the Successful Bidder will be responsible for all costs associated with restoration, including fines, legal fees, etc. The Successful Bidder gives up any right to perform the restoration work, but instead will be required to pay all costs associated with retaining experts with appropriate skills.

10. EXISTING FACILITIES AND CONDITIONS: The Successful Bidder should be advised that numerous underground obstructions might exist within the area of work. The Successful Bidder shall use reasonable care when excavating.

    Locate existing underground utilities in the areas of work. If utilities are to remain in place, provide adequate means of protection during all operations.

TERMS & CONDITIONS
XV – Miscellaneous Continued

10. EXISTING FACILITIES AND CONDITIONS CONTINUED: Should uncharted or incorrectly charted utilities be encountered during excavation, contact the County's Construction Administrator immediately for directions as to procedure. Cooperate with County's Construction Administrator and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to the satisfaction of utility companies. Do not interrupt existing utilities serving facilities occupied and used by others, except when permitted in writing by the County and then only after acceptable temporary utility services have been provided.

    Any damage to existing facilities will be repaired at the Successful Bidder's expense. This includes damages to above ground or underground utilities owned by third party operators.

    The Successful Bidder shall verify the existing topographic and existing utility locations, both horizontal and vertical, prior to beginning any work. Should the Successful Bidder find any discrepancies, he shall immediately notify the County's Construction Administrator.

11. PRECONSTRUCTION PHOTOGRAPHS: Prior to the beginning of any work, and if considered necessary by the County's Construction Administrator, the Contractor shall take project photographs of the work area to record existing conditions. All conditions that might later be subject to disagreement shall be shown in sufficient detail to provide a basis for decisions. The photographs shall include the date and time marking of the recording. All photographs shall be labeled on a tab connected to the bottom of the photo to indicate date and description of work shown.

12. PROTECTION OF IN-PLACE WORK: Protect in-place Work during all stages of construction from damage due to inclement weather, vandalism, theft, and adjacent work activities performed by others as may be applicable. Grade, dig ditches, and provide pumping, as necessary to prevent damage or delay from inclement weather, and to ensure that the Work-Site remains in satisfactory condition for work at all times. Erect temporary barricades, security fences, and provide watchmen, as may be necessary to prevent damage or delay from vandalism, theft, and any other potential loss, or public hazard. If applicable, coordinate with others performing Work on the County's property by becoming familiar with the activities of others that could impact the Work under this Contract. Schedule and make arrangements with others as necessary to prevent damage or delay caused by the Work activities of others.

13. DISPOSAL OF MATERIALS, OFF THE COUNTY'S PROPERTY**:** The Successful Bidder shall indemnify and hold harmless the County from any and all losses, expenses, damages, demands, and claims asserted against or sustained by the County as a result of or alleged to be the result of illegal, improper, or unauthorized disposal of material off of the County's property.

TERMS & CONDITIONS
XV – Miscellaneous Continued

14. ENVIRONMENTAL PROTECTION MEASURES: Pollutants such as fuels, lubricants, bitumen, and other harmful materials shall not be discharged on the ground or into the existing area drainage system. Likewise, wash water or wastes from concrete or other mixing operations shall not be allowed to enter live streams or rivers, or stream or riverbeds. The Successful Bidder shall comply with guidelines of the South Carolina Coastal Council's (O.C.R.M.) *"Storm Water Management and Sediment Control Handbook (latest edition)* during the entire construction period. Sediment and erosion control practices may include temporary sediment basins, silt fence, etc.

    If it is necessary during the prosecution of the Work to interrupt existing natural surface drainage patterns, the Successful Bidder shall take all necessary measures to protect and preserve the natural drainage-ways or to provide temporary drainage routing until the natural drainage pattern can be restored. The Successful Bidder will, at all times, maintain proper drainage within the limits of construction. The Successful Bidder is urged to use tracked equipment where possible to prevent rutting and displacement of the existing natural grade.

    The County's Construction Administrator may temporarily suspend the Work when satisfactory results cannot be obtained because of unfavorable field conditions.

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

16. CLAIMS FOR DAMAGES: Should either party to the Contract suffer injury or damage to person or property because of any act or omission of the other party or of any of his employees, agents or others for whose acts he is legally liable, claim shall be made in writing to such other party within a reasonable time after the first observance of such injury or damage.

17. MATERIAL AND WORKMANSHIP:

    A) All equipment, materials and articles incorporated in the Work covered by the Contract and supplied by the Successful Bidder are to be new and of the most suitable grade for the purpose intended. Unless otherwise specifically provided in this Contract, reference to any equipment, material article or patented process, by trade name, make or catalog number, shall not be construed as limiting competition. When requested, the Successful Bidder shall furnish to the County for approval, the name of the manufacturer, the model number, and other identifying data and information respecting the performance, capacity, nature and rating of the machinery and

TERMS & CONDITIONS
XV – Miscellaneous Continued

17. MATERIAL AND WORKMANSHIP CONTINUED:

mechanical and other equipment that the Successful Bidder contemplates incorporating in the Work. When required by this Contract or when called for by the County for approval, full information concerning the material or articles, which he contemplates incorporating in the Work. When so directed, samples shall be submitted for approval at the Successful Bidder's expense, with all shipping charges prepaid. Machinery, equipment, materials and articles installed or used without required approval shall be at the risk of subsequent rejection.

B) All Work under this Contract shall be performed in a skillful and workmanlike manner. The County may, in writing, require the Successful Bidder to remove from the Work any employee the County deems incompetent, careless or otherwise objectionable.

18. REMOVAL AND REPLACEMENT OF UNSUITABLE MATERIAL: This section applies to Site Preparation and includes the mucking of unsuitable materials and replacement with suitable type materials and compacted in place.

The Successful Bidder must notify the County, in writing, prior to undertaking such work and provide verification that recommended removal and replacement is necessary. The notification shall include cross-sections showing original ground-line and line of removal and replacement of the topsoil, which is included in the estimated price. An estimate of the amount of mucking replacement shall be included in the notification. Final amount to be paid shall be based on the cross-sections prepared by the Successful Bidder with the final excavation included.

The Successful Bidder shall request mucking of unsuitable materials on a Change Order. No claims for additional cost shall be valid unless executed as set forth herein. The Successful Bidder's cubic yard fill cost shall be for mucking of unsuitable material, replacement and compaction with suitable material.

19. INSPECTION AND ACCEPTANCE:

A) All Work (which term includes, but is not restricted to materials, workmanship, manufacture and fabrication of components) shall be subject to inspection and test by the County at all reasonable times and places prior to acceptance. Any such inspection and test is for the sole benefit of the County and shall not relieve the Successful Bidder of the responsibility of providing quality supplies to comply with the Contract requirements. No inspection or tests by the County shall be construed as constituting or implying acceptance. Inspection or test shall not relieve the Successful Bidder of the responsibility for damage to or loss of the material prior to acceptance or in any way affect the continuing rights of the County after acceptance of the completed Work.

TERMS & CONDITIONS
XV – Miscellaneous Continued

19. INSPECTION AND ACCEPTANCE CONTINUED:

    B) The Successful Bidder shall, without charge, replace any material or correct any workmanship found by the County not to conform to the requirements, unless the County consents to accept such material and workmanship with an appropriate adjustment in price. The Successful Bidder shall promptly remove rejected material from the premises.

20. RETENTION OF RECORDS: The Successful Bidder agrees to maintain for three (3) years from the date of final payment, and when all other pending matters are closed under this Contract, all books, documents, papers, and records pertinent to this Contract. The Successful Bidder agrees to provide to the County, the Federal Grantor Agency, the Comptroller General of the United States, or any of their duly authorized representatives access to such books, documents, papers, and records for the purpose of examining, auditing, and copying them. The Successful Bidder further agrees to include these provisions in any Subcontracts issued by him in connection with this Contract.

21. LICENSES/PERMITS: The Successful Bidder or subcontractor must comply with the regulations promulgated in the State of South Carolina General and Mechanical Contracting Act as enforced by the South Carolina Licensing Board for Contractors. Both the Successful Bidder and his subcontractors are responsible at all times for obtaining applicable work permits, at no cost to the Successful Bidder or his subcontractors. Contractor's License Number and Person's Name, and Business Name must be shown together on the License.

22. GRATUITIES AND KICKBACKS:

    A) Gratuities: It shall be unethical for any person to offer, give or agree to give any employee or former employee, or for any employee or former employee to solicit, demand, accept, or agree to accept from another person a gratuity or an offer of employment in connection with any decision, approval, disapproval, recommendation, preparation or any part of a program requirement or a purchase request, influencing the content of any specification or procurement standard, rendering of advice, investigation, auditing, or in any other advisory capacity in any proceeding or application, request for ruling, determination, claim or controversy, or other particular matter pertaining to any program requirement or a contract or subcontract, or to any solicitation or proposal therefore.

TERMS & CONDITIONS
XV – Miscellaneous Continued

22. GRATUITIES AND KICKBACKS CONTINUED:

    B) Kickbacks: It shall be unethical for any payment, gratuity, or offer of employment to be made by or on behalf of a subcontractor under a contract to the Successful Bidder, or to hire any subcontractor or any person associated therewith, as an inducement for the award of a subcontract or order.

23. CLEAN UP WORK:

    A) During construction the Successful Bidder and subcontractors shall keep the Work-Site, areas adjacent to the Work-Site, and access roads in an orderly condition, free and clear from debris and discarded materials. Care shall be taken to prevent spillage when hauling is being done. Any spillage or debris resulting from the Successful Bidder's operations shall be immediately removed.

    B) Upon completion of the work, the Successful Bidder and subcontractor shall remove from the work site, areas adjacent to the Work-Site and access roads all plant, buildings, debris, unused materials, concrete forms and other like material belonging to him or used under his direction during the construction.

    C) If the Successful Bidder or subcontractors fail to clean up at the completion of the work, the County may do so as provided in the County's right to carry out the work, and the cost therefore shall be charged to the Successful Bidder.

24. INDEPENDENT CONTRACTOR: The Successful Bidder and all subcontractors are independent contractors and shall not be deemed the agent or employee of the County for any purpose whatsoever. The Successful Bidder shall not hold himself out as an employee of the County, and shall have no power or authority to bind or obligate the County in any manner, except the County shall make payment to Successful Bidder for services and expenses as herein provided. The Successful Bidder shall obtain and maintain all licenses and permits required by law for performance of this Contract by him or his employees, agents, and servants. The Successful Bidder shall be liable for and pay all taxes required by Local, State or Federal governments, including but not limited to Social Security, Workers' Compensation Employment Security, and any other taxes and licenses required by law. The County shall pay no employee benefits of any kind to or for the benefit of Successful Bidder or his employees, agents, and servants by reason of this Contract.

25. DEBRIS REMOVAL: The Successful Bidder shall remove all debris by hauling in an acceptable manner and disposing of it at an approved site. The Successful Bidder shall comply with all local, County or State laws and regulations applicable to debris removal and disposal in effect at the time of the Contract award. Burning of debris will not be permitted.

STATE OF SOUTH CAROLINA)
)
COUNTY OF BERKELEY)

SAMPLE CONTRACT

THIS CONTRACT made and entered into this the ____ day of _____, 2021 by and between Berkeley County Government, South Carolina, hereinafter referred to as the "County" and _____, hereinafter referred to as the "Contractor".

WITNESSETH

WHEREAS, the County has determined that it is necessary and in the best public interest to construct the Berkeley Dorchester Interconnect Division 1 located in Berkeley County along Autonomous Drive from SC Highway 27 to Volvo Car Drive in Ridgeville, SC, and

WHEREAS, the County has solicited bids for said construction, all as more clearly defined within the Contract Documents; and

WHEREAS, the Contractor hereby agrees to provide construction services as contracted for in the Contract Documents and in accordance with the terms, conditions and specifications thereof.

NOW, THEREFORE, AND IN CONSIDERATION of the mutual covenants herein contracted, the County and Contractor do hereby mutually agree as follows:

The County agrees to pay the Contractor _____ ($_____) Dollars to provide construction services:

1) According to the terms, conditions and specifications hereinafter provided.

2) The Contractor agrees to and accepts all the terms and conditions contained in the Contract Documents. The Contract Documents consist of the following:

a) Invitation for Bids;
b) Table of Contents;
c) Instructions to Offerors;
d) Submittal Form;
e) References
f) Special Conditions
h) General Terms and Conditions;
i) Model Contract;
j) Notice of Award;
k) Notice to Proceed;
l) Performance Bond (EJCDC Form C-610)
m) Payment Bonds (EJCDC Form C-615)
n) Certificate of Insurance
o) Addenda (as applicable)
p) Technical Specifications (as applicable)
q) Drawings

NOTWITHSTANDING any provisions to the contrary, the Contractor further represents to the County that he is qualified to act as the Contractor for the project and is licensed by all appropriate agencies and entities having authority over the Contractor and the project. The Contractor further agrees that he will maintain all necessary licenses, permits or other authorizations necessary to act as the Contractor for the project until all the obligations herein have been satisfied. The Contractor shall further assume full responsibility to the County for the improper acts and omissions of his sub-contractors or others employed or retained by him in connection with the project. By execution of this contract the Contractor represents that they have become familiar with the project and the local conditions under which the work is to be implemented.

IN WITNESS WHEREOF, the parties hereto have caused this instrument to be executed on the day first written above.

BERKELEY COUNTY GOVERNMENT

BY: _____
JOHN CRIBB
COUNTY SUPERVISOR

ATTEST: _____

CONTRACTOR

BY: _____
PRINTED SIGNATURE
TITLE

ATTEST: _____

BID BOND

Any singular reference to Bidder, Surety, Owner or other party shall be considered plural where applicable.

BIDDER *(Name and Address)*:

SURETY *(Name, and Address of Principal Place of Business)*:

OWNER *(Name and Address)*:
Berkeley County
P.O. Box 6122
Moncks Corner, SC 29461

BID
Bid Due Date:
Description *(Project Name— Include Location)*: Berkeley-Dorchester Reach Interconnect – Division I, along Autonomous Drive in Berkeley County, SC.

BOND
Bond Number:
Date:
Penal sum _____ $ _____
(Words) (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.

BIDDER	**SURETY**
_____ (Seal)	_____ (Seal)
Bidder's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	By: _____
Signature	Signature (Attach Power of Attorney)
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	Attest: _____
Signature	Signature
Title	Title

Note: Addresses are to be used for giving any required notice.
Provide execution by any additional parties, such as joint venturers, if necessary.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such

penal sum under the terms of this Bond shall be Owner's sole and exclusive remedy upon default of Bidder.

2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.

3. This obligation shall be null and void if:

3.1 Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or

3.2 All Bids are rejected by Owner, or

3.3 Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).

4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from the Bid due date without Surety's written consent.

6. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

7. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

8. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.

9. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

10. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

QUALIFICATIONS STATEMENT

THE INFORMATION SUPPLIED IN THIS DOCUMENT IS CONFIDENTIAL TO THE EXTENT PERMITTED BY LAWS AND REGULATIONS

1. SUBMITTED BY:

Official Name of Firm: _____

Address: _____

_____

_____

2. SUBMITTED TO: _____

3. SUBMITTED FOR: _____

Owner: _____

Project Name: _____

_____

_____

_____

TYPE OF WORK: _____

_____

_____

4. CONTRACTOR'S CONTACT INFORMATION

Contact Person: _____

Title: _____

Phone: _____

Email: _____

5. AFFILIATED COMPANIES:

Name: _____

Address: _____

6. **TYPE OF ORGANIZATION:**

☐ SOLE PROPRIETORSHIP

Name of Owner: _____

Doing Business As: _____

Date of Organization: _____

☐ PARTNERSHIP

Date of Organization: _____

Type of Partnership: _____

Name of General Partner(s): _____

_____

_____

☐ CORPORATION

State of Organization: _____

Date of Organization: _____

Executive Officers:

- President: _____

- Vice President(s): _____

_____

_____

- Treasurer: _____

- Secretary: _____

☐ LIMITED LIABILITY COMPANY

State of Organization: _____

Date of Organization: _____

Members: _____

_____

☐ JOINT VENTURE

Sate of Organization: _____

Date of Organization: _____

Form of Organization: _____

Joint Venture Managing Partner

- Name: _____

- Address: _____

_____

_____

Joint Venture Managing Partner

- Name: _____

- Address: _____

_____

Joint Venture Managing Partner

- Name: _____

- Address: _____

_____

7. LICENSING

Jurisdiction: _____

Type of License: _____

License Number: _____

Jurisdiction: _____

Type of License: _____

License Number: _____

8. CERTIFICATIONS CERTIFIED BY:

Disadvantage Business Enterprise: _____

Minority Business Enterprise: _____

Woman Owned Enterprise: _____

Small Business Enterprise: _____

Other (_____): _____

9. BONDING INFORMATION

Bonding Company: _____

Address: _____

_____

Bonding Agent: _____

Address: _____

_____

_____

Contact Name: _____

Phone: _____

Aggregate Bonding Capacity:

_____

Available Bonding Capacity as of date of this submittal: _____

10. FINANCIAL INFORMATION

Financial Institution: _____

Address: _____

_____

Account Manager: _____

Phone: _____

INCLUDE AS AN ATTACHMENT AN AUDITED BALANCE SHEET FOR EACH OF THE LAST 3 YEARS

11. CONSTRUCTION EXPERIENCE:

Current Experience:

List on **Schedule A** all uncompleted projects currently under contract (If Joint Venture list each participant's projects separately).

Previous Experience:

List on **Schedule B** all projects completed within the last 5 Years (If Joint Venture list each participant's projects separately).

Has firm listed in Section 1 ever failed to complete a construction contract awarded to it?

☐YES ☐ NO

If YES, attach as an Attachment details including Project Owner's contact information.

Has any Corporate Officer, Partner, Joint Venture participant or Proprietor ever failed to complete a construction contract awarded to them in their name or when acting as a principal of another entity?

☐ YES ☐ NO

If YES, attach as an Attachment details including Project Owner's contact information.

Are there any judgments, claims, disputes or litigation pending or outstanding involving the firm listed in Section 1 or any of its officers (or any of its partners if a partnership or any of the individual entities if a joint venture)?

☐YES ☐ NO

If YES, attach as an Attachment details including Project Owner's contact information.

12. SAFETY PROGRAM:

Name of Contractor's Safety Officer:_____

Include the following as attachments:

Provide as an Attachment Contractor's (and Contractor's proposed Subcontractors and Suppliers furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid) OSHA No. 500- Log & Summary of Occupational Injuries & Illnesses for the past 5 years.

Provide as an Attachment Contractor's (and Contractor's proposed Subcontractors and Suppliers furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid) list of all OSHA Citations & Notifications of Penalty (monetary or other) received within the last 5 years (indicate disposition as applicable) - IF NONE SO STATE.

Provide as an Attachment Contractor's (and Contractor's proposed Subcontractors and Suppliers furnishing or performing Work having a value in excess of 10 percent of the total

amount of the Bid) list of all safety citations or violations under any state all received within the last 5 years (indicate disposition as applicable) - IF NONE SO STATE.

Provide the following for the firm listed in Section V (and for each proposed Subcontractor furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid) the following (attach additional sheets as necessary):

Workers' compensation Experience Modification Rate (EMR) for the last 5 years:

YEAR	_____	EMR	_____
YEAR	_____	EMR	_____
YEAR	_____	EMR	_____
YEAR	_____	EMR	_____
YEAR	_____	EMR	_____

Total Recordable Frequency Rate (TRFR) for the last 5 years:

YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____

Total number of man-hours worked for the last 5 Years:

YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____
YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____
YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____
YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____
YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____

Provide Contractor's (and Contractor's proposed Subcontractors and Suppliers furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid) Days Away From Work, Days of Restricted Work Activity or Job Transfer (DART) incidence rate for the particular industry or type of Work to be performed by Contractor and each of Contractor's proposed Subcontractors and Suppliers) for the last 5 years:

YEAR	_____	DART	_____
YEAR	_____	DART	_____
YEAR	_____	DART	_____
YEAR	_____	DART	_____
YEAR	_____	DART	_____

13. EQUIPMENT:

MAJOR EQUIPMENT:

List on **Schedule C** all pieces of major equipment available for use on Owner's Project.

I HEREBY CERTIFY THAT THE INFORMATION SUBMITTED HEREWITH, INCLUDING ANY ATTACHMENTS, IS TRUE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

NAME OF ORGANIZATION: _____

BY: _____

TITLE: _____

DATED: _____

NOTARY ATTEST:

SUBSCRIBED AND SWORN TO BEFORE ME

THIS _____ DAY OF _____, 20___

NOTARY PUBLIC - STATE OF _____

MY COMMISSION EXPIRES: _____

REQUIRED ATTACHMENTS

1. Schedule A (Current Experience).
2. Schedule B (Previous Experience).
3. Schedule C (Major Equipment).
4. Audited balance sheet for each of the last 3 years for firm named in Section 1.
5. Evidence of authority for individuals listed in Section 7 to bind organization to an agreement.
6. Resumes of officers and key individuals (including Safety Officer) of firm named in Section 1.
7. Required safety program submittals listed in Section 13.
8. Additional items as pertinent.

SCHEDULE A

CURRENT EXPERIENCE

Project Name	Owner's Contact Person	Design Engineer	Contract Date	Type of Work	Status	Cost of Work
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				

SCHEDULE B

PREVIOUS EXPERIENCE (Include ALL Projects Completed within last 5 years)

Project Name	Owner's Contact Person	Design Engineer	Contract Date	Type of Work	Status	Cost of Work
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				

SCHEDULE B

PREVIOUS EXPERIENCE (Include ALL Projects Completed within last 5 years)

Project Name	Owner's Contact Person	Design Engineer	Contract Date	Type of Work	Status	Cost of Work
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				

SCHEDULE C - LIST OF MAJOR EQUIPMENT AVAILABLE

ITEM	PURCHASE DATE	CONDITION	ACQUIRED VALUE

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

NOTICE OF AWARD

Date of Issuance:			
Owner:	Berkeley County	Owner's Contract No.:	
Engineer:	Thomas & Hutton Engineering Co.	Engineer's Project No.:	26926.0000
Project:	Berkeley- Dorchester Reach Interconnect – Division I	Contract Name:	
Bidder:			
Bidder's Address:			

TO BIDDER:

You are notified that Owner has accepted your Bid dated [_____] for the above Contract, and that you are the Successful Bidder and are awarded a Contract for:

_____ .

[Describe Work, alternates, or sections of Work awarded]

The Contract Price of the awarded Contract is: $_____ *[note if subject to unit prices, or cost-plus]*

[ ] unexecuted counterparts of the Agreement accompany this Notice of Award, and one copy of the Contract Documents accompanies this Notice of Award, or has been transmitted or made available to Bidder electronically.

☐ a set of the Drawings will be delivered separately from the other Contract Documents.

You must comply with the following conditions precedent within 15 days of the date of receipt of this Notice of Award:

1. Deliver to Owner [____]counterparts of the Agreement, fully executed by Bidder.
2. Deliver with the executed Agreement(s) the Contract security and insurance documentation as specified in the Instructions to Bidders and General Conditions, Articles 2 and 6.
3. Other conditions precedent (if any):

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award, and declare your Bid security forfeited.

Within ten days after you comply with the above conditions, Owner will return to you one fully executed counterpart of the Agreement, together with any additional copies of the Contract Documents as indicated in Paragraph 2.02 of the General Conditions.

Owner

Authorized Signature

By:

Title:

Copy: Engineer

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NOTICE TO PROCEED

Owner:	Berkeley County	Owner's Contract No.:	
Contractor:		Contractor's Project No.:	
Engineer:	Thomas & Hutton Engineering Co.	Engineer's Project No.:	26926.0000
Project:	Berkeley-Dorchester Reach Interconnect – Division I	Contract Name:	
		Effective Date of Contract:	

TO CONTRACTOR:

Owner hereby notifies Contractor that the Contract Times under the above Contract will commence to run on [_____, 20__]. *[see Paragraph 4.01 of the General Conditions]*

On that date, Contractor shall start performing its obligations under the Contract Documents. No Work shall be done at the Site prior to such date. In accordance with the Agreement, [the date of Substantial Completion is _____, and the date of readiness for final payment is_____] ***or*** [the number of days to achieve Substantial Completion is _____, and the number of days to achieve readiness for final payment is _____].

Before starting any Work at the Site, Contractor must comply with the following:

[Note any access limitations, security procedures, or other restrictions]

Owner:

Authorized Signature

By:

Title:

Date Issued:

Copy: Engineer

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PERFORMANCE BOND

CONTRACTOR *(name and address)*:

SURETY *(name and address of principal place of business)*:

OWNER *(name and address)*:
Berkeley County
P.O. Box 6122
Moncks Corner, SC 29461

CONSTRUCTION CONTRACT
Effective Date of the Agreement:
Amount:
Description *(name and location)*: Berkeley-Dorchester Reach Interconnect – Division I, along Autonomous Drive in Berkeley County, SC.

BOND
Bond Number:
Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:
Amount:
Modifications to this Bond Form: ☐ None ☐ See Paragraph 16

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

_____ *(seal)*
Contractor's Name and Corporate Seal

By: _____
Signature

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

SURETY

_____ *(seal)*
Surety's Name and Corporate Seal

By: _____
Signature *(attach power of attorney)*

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, including the two year warranty obligation, which is incorporated herein by reference.

2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after:

3.1 The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

3.2 The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:

5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to

the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:

7.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

7.2 additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and

7.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.

9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.

10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

12. Notice to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

14. Definitions

14.1 Balance of the Contract Price: The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

14.2 Construction Contract: The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

14.3 Contractor Default: Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

14.4 Owner Default: Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

14.5 Contract Documents: All the documents that comprise the agreement between the Owner and Contractor.

15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

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Contractor's Application for Payment No.

	Application Period:	Application Date:
To (Owner):	From (Contractor):	Via (Engineer): Thomas & Hutton Engineering
Project: Berkeley-Dorchester Reach Interconnect - Division I	Contract:	
Owner's Contract No.:	Contractor's Project No.:	Engineer's Project No.: 26926

Application For Payment

Change Order Summary

Approved Change Orders		
Number	Additions	Deductions
TOTALS		
NET CHANGE BY CHANGE ORDERS		

1. ORIGINAL CONTRACT PRICE	**$**
2. Net change by Change Orders	**$**
3. Current Contract Price (Line 1 ± 2)	**$**
4. TOTAL COMPLETED AND STORED TO DATE (Column F total on Progress Estimates)	**$**
5. RETAINAGE:	
a. X _____ Work Completed	**$**
b. X _____ Stored Material	**$**
c. Total Retainage (Line 5.a + Line 5.b)	**$**
6. AMOUNT ELIGIBLE TO DATE (Line 4 - Line 5.c)	**$**
7. LESS PREVIOUS PAYMENTS (Line 6 from prior Application)	**$**
8. AMOUNT DUE THIS APPLICATION	**$**
9. BALANCE TO FINISH, PLUS RETAINAGE (Column G total on Progress Estimates + Line 5.c above)	**$**

Contractor's Certification

The undersigned Contractor certifies, to the best of its knowledge, the following:
(1) All previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with the Work covered by prior Applications for Payment;
(2) Title to all Work, materials and equipment incorporated in said Work, or otherwise listed in or covered by this Application for Payment, will pass to Owner at time of payment free and clear of all Liens, security interests, and encumbrances (except such as are covered by a bond acceptable to Owner indemnifying Owner against any such Liens, security interest, or encumbrances); and
(3) All the Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

Contractor Signature

By:	Date:

Payment of: $ _____
(Line 8 or other - attach explanation of the other amount)

is recommended by: _____ _____
(Engineer) (Date)

Payment of: $ _____
(Line 8 or other - attach explanation of the other amount)

is approved by: _____ _____
(Owner) (Date)

Approved by: _____ _____
Funding or Financing Entity (if applicable) (Date)

Progress Estimate - Unit Price Work

Contractor's Application

For (Contract):	Application Number:
Application Period:	Application Date:

A					B	C	D	E	F		
Item		Contract Information									
Bid Item No.	Description	Item Quantity	Units	Unit Price	Total Value of Item ($)	Estimated Quantity Installed	Value of Work Installed to Date	Materials Presently Stored (not in C)	Total Completed and Stored to Date (D + E)	% (F / B)	Balance to Finish (B - F)
	Totals										

Stored Material Summary

Contractor's Application

For (Contract):								Application Number:			
Application Period:								Application Date:			
A		B	C		D		E		F		G
Bid Item No.	Supplier Invoice No.	Submittal No. (with Specification Section No.)	Storage Location	Description of Materials or Equipment Stored	Stored Previously		Amount Stored this Month ($)	Subtotal Amount Completed and Stored to Date (D + E)	Incorporated in Work		Materials Remaining in Storage ($) (D + E - F)
					Date Placed into Storage (Month/Year)	Amount ($)			Date (Month/ Year)	Amount ($)	
				Totals							

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CERTIFICATE OF SUBSTANTIAL COMPLETION

Owner:	Berkeley County	Owner's Contract No.:	
Contractor:		Contractor's Project No.:	
Engineer:	Thomas & Hutton Engineering Co.	Engineer's Project No.:	26926.0000
Project:	Berkeley-Dorchester Reach Interconnect Division I	Contract Name:	

This [preliminary] [final] Certificate of Substantial Completion applies to:

☐ All Work ☐ The following specified portions of the Work:

Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Work or portion thereof designated above is hereby established, subject to the provisions of the Contract pertaining to Substantial Completion. The date of Substantial Completion in the final Certificate of Substantial Completion marks the commencement of the contractual correction period and applicable warranties required by the Contract.

A punch list of items to be completed or corrected is attached to this Certificate. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance, and warranties upon Owner's use or occupancy of the Work shall be as provided in the Contract, except as amended as follows:

Amendments to Owner's responsibilities: ☐ None ☐ As follows

Amendments to Contractor's responsibilities: ☐ None ☐ As follows:

The following documents are attached to and made a part of this Certificate: *[punch list; others]*

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents, nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract.

EXECUTED BY ENGINEER:	RECEIVED:	RECEIVED:
By: _____ (Authorized signature)	By: _____ Owner (Authorized	By: _____ Contractor (Authorized
Title: _____	Title: _____	Title: _____
Date: _____	Date: _____	Date: _____

NOTICE OF ACCEPTABILITY OF WORK

PROJECT: Berkeley-Dorchester Reach Interconnect – Division I

OWNER: Berkeley County

CONTRACTOR:

OWNER'S CONSTRUCTION CONTRACT IDENTIFICATION:

EFFECTIVE DATE OF THE CONSTRUCTION CONTRACT:

ENGINEER: Thomas & Hutton Engineering Co.

NOTICE DATE:

To: **Berkeley County**
Owner

And To: _____
Contractor

From: **Thomas & Hutton Engineering Co.**
Engineer

The Engineer hereby gives notice to the above Owner and Contractor that Engineer has recommended final payment of Contractor, and that the Work furnished and performed by Contractor under the above Construction Contract is acceptable, expressly subject to the provisions of the related Contract Documents, the Agreement between Owner and Engineer for Professional Services dated _____, and the following terms and conditions of this Notice:

CONDITIONS OF NOTICE OF ACCEPTABILITY OF WORK

The Notice of Acceptability of Work ("Notice") is expressly made subject to the following terms and conditions to which all those who receive said Notice and rely thereon agree:

1. This Notice is given with the skill and care ordinarily used by members of the engineering profession practicing under similar conditions at the same time and in the same locality.

2. This Notice reflects and is an expression of the Engineer's professional opinion.

3. This Notice is given as to the best of Engineer's knowledge, information, and belief as of the Notice Date.

4. This Notice is based entirely on and expressly limited by the scope of services Engineer has been employed by Owner to perform or furnish during construction of the Project (including observation of the Contractor's work) under Engineer's Agreement with Owner, and applies only to facts that are within Engineer's knowledge or could reasonably have been ascertained by Engineer as a result of carrying out the responsibilities specifically assigned to Engineer under such Agreement.

5. This Notice is not a guarantee or warranty of Contractor's performance under the Construction Contract, an acceptance of Work that is not in accordance with the related Contract Documents, including but not limited to defective Work discovered after final inspection, nor an assumption of responsibility for any failure of Contractor to furnish and perform the Work thereunder in accordance with the Construction Contract Documents, or to otherwise comply with the Construction Contract Documents or the terms of any special guarantees specified therein.

6. This Notice does not relieve Contractor of any surviving obligations under the Construction Contract, and is subject to Owner's reservations of rights with respect to completion and final payment.

7.

By: _____

Title: _____

Dated: _____

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Work Change Directive No.

Date of Issuance:	Effective Date:
Owner: Berkeley County	Owner's Contract No.:
Contractor:	Contractor's Project No.:
Engineer: Thomas & Hutton Engineering Co.	Engineer's Project No.: 26926.0000
Project: Berkeley-Dorchester Reach Interconnect – Division I	Contract Name:

Contractor is directed to proceed promptly with the following change(s):

Description:

Attachments: *[List documents supporting change]*

Purpose for Work Change Directive:

Directive to proceed promptly with the Work described herein, prior to agreeing to changes on Contract Price and Contract Time, is issued due to: *[check one or both of the following]*

☐ Non-agreement on pricing of proposed change.

☐ Necessity to proceed for schedule or other Project reasons.

Estimated Change in Contract Price and Contract Times (non-binding, preliminary):

Contract Price $ [increase] [decrease].

Contract Time days [increase] [decrease].

Basis of estimated change in Contract Price:

☐ Lump Sum ☐ Unit Price

☐ Cost of the Work ☐ Other

RECOMMENDED:	AUTHORIZED BY:	RECEIVED:
By:	By:	By:
Engineer (Authorized Signature)	Owner (Authorized Signature)	Contractor (Authorized Signature)
Title:	Title:	Title:
Date:	Date:	Date:

Approved by Funding Agency (if applicable)

By: Date:

Title:

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Change Order No. _____

Date of Issuance:		Effective Date:	
Owner:	Berkeley County	Owner's Contract No.:	
Contractor:		Contractor's Project No.:	
Engineer:	Thomas & Hutton Engineering Co.	Engineer's Project No.:	26926.0000
Project:	Berkeley-Dorchester Reach Interconnect Division I	Contract Name:	

The Contract is modified as follows upon execution of this Change Order:

Description:

Attachments: *[List documents supporting change]*

CHANGE IN CONTRACT PRICE	**CHANGE IN CONTRACT TIMES** ***[note changes in Milestones if applicable]***
Original Contract Price: $_____	Original Contract Times: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
[Increase] [Decrease] from previously approved Change Orders No. ___ to No. ___: $_____	[Increase] [Decrease] from previously approved Change Orders No. ___ to No. ___: Substantial Completion: _____ Ready for Final Payment: _____ days
Contract Price prior to this Change Order: $_____	Contract Times prior to this Change Order: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
[Increase] [Decrease] of this Change Order: $_____	[Increase] [Decrease] of this Change Order: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
Contract Price incorporating this Change Order: $_____	Contract Times with all approved Change Orders: Substantial Completion: _____ Ready for Final Payment: _____ days or dates

RECOMMENDED:	ACCEPTED:	ACCEPTED:
By: _____	By: _____	By: _____
Engineer (if required)	Owner (Authorized	Contractor (Authorized
Title: _____	Title: _____	Title: _____
Date: _____	Dat _____	Dat _____

Approved by Funding Agency (if applicable)

By: _____ Date:

Title: _____

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Field Order No. _____

Date of Issuance:	Effective Date:
Owner:	Owner's Contract No.:
Contractor:	Contractor's Project No.:
Engineer: Thomas & Hutton Engineering	Engineer's Project No.: 26926.0000
Project: Berkeley-Dorchester Reach Interconnect Division I	Contract Name:

Contractor is hereby directed to promptly execute this Field Order, issued in accordance with General Conditions Paragraph 11.01, for minor changes in the Work without changes in Contract Price or Contract Times. If Contractor considers that a change in Contract Price or Contract Times is required, submit a Change Proposal before proceeding with this Work.

Reference: _____

Specification(s) Drawing(s) / Detail(s)

Description:

Attachments:

ISSUED:	RECEIVED:
By:	By:
Engineer (Authorized Signature)	Contractor (Authorized Signature)
Title:	Title:
Date:	Date:

Copy to: Owner

INDEX TO

SECTION 01011

SUMMARY OF WORK

SECTION 01011

SUMMARY OF WORK

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Contract Description.

B. Work required by Contract.

C. Contract Drawings.

D. Contract Technical Specifications.

1.2 CONTRACT DESCRIPTION

A. Contract Type: 00506 – Agreement

1.3 WORK REQUIRED

A. Consists of Contractor furnishing all labor, materials, tools, equipment and incidentals to complete the Work generally described below:

1. The installation of approximately 15,250 linear feet of 16" Owner-furnished PVC water main, 485 linear feet of directionally drilled, Owner-furnished 16" FPVC water main, approximately 265 linear feet of 16" Owner-furnished ductile iron water main, pavement replacement, all necessary site work and appurtenances; and incidental construction in accordance with the plans and specifications.

B. All work shall be performed as shown on the Drawings and as described in the Contract Documents and Technical Specifications.

C. All work shall comply with standards described by the Department of Labor, Occupational Safety and Health Administration, 29 CFR Part 1926, Subpart P, latest revision.

1.4 CONTRACT DRAWINGS

Sheet	Description	Job No.	Date
C0	COVER SHEET	26926.0000	
G0.1	GENERAL NOTES & INDEX	26926.0000	
C1.0	OVERALL SITE PLAN	26926.0000	
C2.1-C2.12	WATER MAIN PLAN & PROFILE	26926.0000	
C3.1-C3.3	WATER MAIN DETAILS	26926.0000	
EC1.0	EROSION CONTROL NOTES	26926.0000	
EC1.1	EROSION CONTROL CHARTS	26926.0000	
EC1.2-EC1.3	EROSION CONTROL DETAILS	26926.0000	

1.5 CONTRACT TECHNICAL SPECIFICATIONS

See Table of Contents.

PART 2 – PRODUCTS

Not used

PART 3 – EXECUTION

Not used

END OF SECTION

INDEX TO

SECTION 01025

MEASUREMENT AND PAYMENT

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Measurement and payment criteria applicable to the Work performed under a unit price payment method.

1.2 AUTHORITY

A. Measurement methods delineated in the individual specification sections complement the criteria of this section. In the event of conflict, the requirements of the individual specification section govern.

B. Take all measurements and compute quantities. The Engineer will verify measurements and quantities.

C. Assist by providing necessary equipment, workers, and survey personnel as required.

1.3 UNIT QUANTITIES SPECIFIED

A. Quantities indicated in the Bid Form are for bidding and contract purposes only. Quantities and measurements supplied or placed in the Work and verified by the Engineer determine payment.

B. If the actual Work requires more or fewer quantities than those quantities indicated, provide the required quantities at the unit sum/prices contracted.

1.4 MEASUREMENT OF QUANTITIES

A. Measurement by Weight: Concrete reinforcing steel, rolled or formed steel or other metal shapes will be measured by handbook weights. Welded assemblies will be measured by handbook or scale weight.

B. Measurement by Volume: Measured by cubic dimension using mean length, width and height or thickness.

C. Measurement by Area: Measured by square dimension using mean length and width or radius.

D. Linear Measurement: Measured by linear dimension, at the item centerline or mean chord.

E. Stipulated Sum/Price Measurement: Items measured by weight, volume, area, or linear means or combination, as appropriate, as a completed item or unit of the Work.

1.5 PAYMENT

A. Payment Includes: Full compensation for all required labor, products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work including overhead and profit.

B. Final payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities accepted by the Engineer multiplied by the unit sum/price for Work which is incorporated in or made necessary by the Work.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

INDEX TO

DIVISION I – GENERAL REQUIREMENTS

SECTION 01300

SUBMITTALS

DIVISION I – GENERAL REQUIREMENTS

SECTION 01300 – SUBMITTALS

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Submittal procedures.

B. Construction progress schedules.

C. Product Data.

D. Shop Drawings.

E. Samples.

F. Design data.

G. Test reports.

H. Certificates.

I. Manufacturer's instructions.

J. Manufacturer's field reports.

K. Erection drawings.

1.2 RELATED SECTIONS

A. Section 01400 – Quality Control: Manufacturers' field services and reports.

B. Section 01702 – Closeout Procedures: Contract warranties, bonds, manufacturers' certificates, and closeout submittals.

1.3 SUBMITTAL PROCEDURES

A. Transmit each submittal with Engineer accepted form.

B. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix. Resubmit as specified for initial submittal. Indicate on revised drawings all changes that have been made other than those requested by the Engineer.

C. Identify Project, Contractor, Subcontractor, or supplier; pertinent drawing and detail number, and specification section number, as appropriate.

D. Apply Contractor's stamp, signed or initialed verifying review, approval, products required, field dimensions, adjacent construction Work, and coordination of

information is in accordance with the requirements of the Work and Contract Documents. Submittal without the Contractor's stamp will be returned to Contractor without Engineer's review.

E. Make all submittals far enough in advance of scheduled dates for installation to provide all required time for reviews, for securing necessary approvals, for possible revision and resubmittal, and for placing orders and securing delivery. In scheduling, allow sufficient time for the Engineer's review following the receipt of the submittal. Coordinate submission of related items. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.

F. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed Work.

G. Provide space for Contractor and Architect/Engineer review stamps.

H. When revised for resubmission, identify all changes made since previous submission.

I. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

1.4 CONSTRUCTION PROGRESS SCHEDULES

A. Submit initial schedule in duplicate within 15 days after date established in Notice to Proceed.

B. Revise and resubmit as required.

C. Submit revised schedules with each Application for Payment, identifying changes since previous version.

D. Submit a computer generated or horizontal bar chart with separate line for each major portion of Work or operation identifying first workday of each week.

E. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.

F. Indicate estimated percentage of completion for each item of Work at each submission.

G. Indicate submittal dates required for shop drawings, product data, samples, and product delivery dates, including those furnished by Owner and required by allowances.

1.5 PRODUCT DATA

A. Product Data For Review:

1. Submitted to Engineer for review and conformance with information given in specifications and the design concept expressed in contract documents.

2. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article above.

B. Submit the number of copies Contractor and Owner require, plus two copies retained by Engineer.

C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

D. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

E. After review, distribute in accordance with the Submittal Procedures article above.

1.6 SHOP DRAWINGS

A. Contractor shall submit a minimum 6 copies of each shop drawing to the Engineer for review.

B. Submitted to Engineer for review and conformance with information given in specifications and design concept expressed in contract documents. Review of shop drawings by Engineer shall not relieve Contractor of its responsibility for accuracy of shop drawings nor for furnishing of all materials and equipment required by the contract even though such items may not be indicated on shop drawings reviewed by Engineer.

C. Shop drawings shall include applicable technical information, drawings, diagrams, performance curves, schedules, templates, calculations, instructions, measurements, and similar information as applicable to the specific item for which shop drawing is prepared.

D. Do not use Engineer's Drawings for shop or erection purposes.

E. Each shop drawing copy shall bear a Contractor's stamp showing they have been checked. Shop drawings submitted to the Engineer without Contractor's stamp will be returned to Contractor without review.

No review will be given to partial submittals of shop drawings for items which interconnect and/or are interdependent. It is the Contractor's responsibility to assemble shop drawings for all such interconnecting and/or interdependent items, check them and then make one submittal to Engineer.

Schedule of Submittals: Within 30 days of Contract award and prior to any shop drawing submittal, Contractor shall submit a schedule showing the estimated submittal date and desired acceptance date for each shop drawing

anticipated. Time lost due to unacceptable submittals shall be the Contractor's responsibility.

1.7 SAMPLES

A. Samples For Review:

1. Submitted to Engineer for review and conformance with information given in specifications and design concept expressed in contract documents.

2. After review, produce duplicates and distribute in accordance with SUBMITTAL PROCEDURES article above.

B. Samples For Information:

1. Submitted for Engineer's knowledge as contract administrator or for the Owner.

C. Include identification on each sample, with full product information.

D. Submit the number of samples specified in individual specification sections; one of which will be retained by Engineer.

E. Reviewed samples which may be used in the Work are indicated in individual specification sections.

F. Samples will not be used for testing purposes unless specifically stated in the specification section.

1.8 DESIGN DATA

A. Submit for Engineer's knowledge as contract administrator or for the Owner.

B. Submit for information and conformance with information given in specifications and design concept expressed in contract documents.

1.9 TEST REPORTS

A. Submit for Engineer's knowledge as contract administrator or for the Owner.

B. Submit test reports for information and assessing conformance with information given in specifications and design concept expressed in contract documents.

1.10 CERTIFICATES

A. When specified in individual specification sections, submit certification by manufacturer, installation/application subcontractor, or the Contractor to Engineer, in quantities specified for Product Data.

B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or product, but must be acceptable to Engineer.

1.11 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Engineer for delivery to Owner in quantities specified for product Data.

B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

C. Refer to Section 01400 – Quality Control, Manufacturers' Field Services article.

1.12 MANUFACTURER'S FIELD REPORTS

A. Submit reports for Engineer's benefit as contract administrator or for the Owner.

B. Submit report within 30 days of observation to Engineer for information.

C. Submit for information and assessing conformance with information given in specifications and design concept expressed in contract documents.

1.13 ERECTION DRAWINGS

A. Submit drawings for Engineer's benefit as contract administrator or for the Owner.

B. Submit for information and assessing conformance with information given in specifications and design concept expressed in contract documents.

C. Data indicating inappropriate or unacceptable Work may be subject to action by the Engineer or Owner.

1.14 REVIEWED SHOP DRAWINGS

A. Engineer Review.

1. Acceptable submittals will be marked “No Exceptions Taken.” A minimum of three copies will be retained by the Engineer for Engineer’s and Owner’s use and remaining copies will be returned to Contractor.

2. Submittals requiring minor corrections before the product is acceptable will be marked “Furnish as Corrected.” Contractor may order, fabricate, and ship items included in submittals, provided the indicated corrections are made.

3. Submittals marked “Revise and Resubmit” must be revised to reflect required changes and the initial review procedure repeated.

4. The “Rejected” notation is used to indicate products not acceptable. Upon return of a submittal so marked, Contractor shall repeat the initial review procedure utilizing acceptable products.

5. Only two copies of items marked "Revise and Resubmit" and "Rejected" will be reviewed and marked. One copy will be retained by Engineer and the other copy with all remaining unmarked copies will be returned to Contractor for resubmittal.

B. No Work or products shall be installed without a drawing or submittal bearing the "No Exceptions Taken" or "Furnish as Corrected" notation. Contractor shall maintain at the job site a complete set of shop drawings bearing Engineer's stamp.

C. Substitutions: In the event Contractor obtains Engineer's acceptance for use of products other than those listed first in Contract Documents, Contractor shall, at Contractor's own expense and using methods accepted by Engineer, make any changes to structures, piping and electrical work necessary to accommodate these products.

D. Use of "No Exceptions Taken" or "Furnish as Corrected" notation on shop drawings or other submittals is general and shall not relieve Contractor of the responsibility of furnishing products of proper dimension, size, quality, quantity, materials, all performance characteristics, and to efficiently perform requirements and intent of Contract Documents. Engineer's review shall not relieve Contractor of the responsibility of errors of any kind on shop drawings. Review is intended only to assure conformance with design concept of the project and compliance with information given in Contract Documents.

1.15 SUBMITTAL CHECKLIST

A. This checklist is not necessarily complete. Contractor is responsible to submit all items and materials as specified in each section.

Section	Submittal	Date Received by T & H	Accepted Submittal Returned to Owner/Contractor	Submittal Rejected & Returned	Comments
02210 – Soil Erosion Control					
	Silt Fence				
02231 – Aggregate Base Course					
	Aggregate				
	Prime				
02275 – Rip-Rap					
	Stone				
02511 – Asphaltic Concrete Base Courses					

Section	Submittal	Date Received by T & H	Accepted Submittal Returned to Owner/Contractor	Submittal Rejected & Returned	Comments
	Asphalt Cement				
	Anti-Stripping Agent				
	Mix Design				
02512 – Asphaltic Concrete Binder/Surface Courses					
	Tack Coat				
	Asphalt Cement				
	Anti-Stripping Agent				
	Mix Designs				
02667 – Water Distribution System					
	PVC Pipe – 4" Diameter and Larger				
	D.I. Pipe				
	Fittings - PVC				
	Fittings – Compact D.I.				
	Butterfly Valve				
	2" Ball Valves				
	Air Release Valve				
	Magnetic Marking Tape				
	Valve Boxes				
	Valve Box Collar				
	Hydrant Tees				
	Fire Hydrants				
	Restrained Joint Fittings				

Section	Submittal	Date Received by T & H	Accepted Submittal Returned to Owner/Contractor	Submittal Rejected & Returned	Comments
	Tapping Sleeves/Crosses				
	Tapping Valves				
	Backflow Prevention Devices				
	Tracing Wire				
	Casing Pipe				
02720 – Storm Drainage					
	Reinforced Concrete Pipe				
02902 – Grassing					
	Seed Mix – Temporary				
	Seed Mix – Permanent				
	Fertilizer				
	Lime				
03305 – Site Concrete					
	Mix Design				
	Curing Compounds				
	Joint Filler				
	Reinforcing Steel				
	Welded Wire Fabric				
	Dowels				
	Fiber Reinforcement				
03310 – Cast-In-Place Concrete					
	Mix Design				

Section	Submittal	Date Received by T & H	Accepted Submittal Returned to Owner/Contractor	Submittal Rejected & Returned	Comments
	Reinforcing Steel				
	Welded Wire Fabric				
	Curing Compound				
	Fiber Reinforcement				
	Non-Shrink Grout				
	Joint Filler				
05110 – Miscellaneous Metal-Bulkhead					
	Tie Rods				
	Bearing Plates				
	Turnbuckles				
	Curing Compound				
	Bolts				
	Coating Certification				
05120 – Structural Steel					
	Materials				
	Design Loads				
	Mill Certificate				
	Mill Test Reports				
	Welder's Certificates				
09900 – Painting					
	Paint				

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

END OF SECTION

INDEX TO

SECTION 01400 – QUALITY CONTROL

SECTION 01400

QUALITY CONTROL

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Quality assurance - control of installation.

B. Tolerances

C. References and standards.

D. Testing laboratory services.

E. Manufacturer's field services.

1.2 RELATED SECTIONS

A. Section 01300 - Submittals: Submission of manufacturer's instructions and certificates.

B. Section 01410 - Testing Services.

1.3 QUALITY ASSURANCE - CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturer's instructions, including each step in sequence.

C. Should manufacturer's instructions conflict with Contract Documents, request clarification from Engineer before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform Work by persons qualified to produce required and specified quality.

F. Verify field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.4 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturer's tolerances. Should manufacturer's tolerances conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

C. Adjust products to appropriate dimensions and position before securing in place.

D. Accessible routes shall not exceed maximum ADA allowable slopes.

1.5 REFERENCES AND STANDARDS

A. For products or workmanship specified by association, trade, or other consensus standards, complies with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current with date specified in the individual specification sections, except where a specific date is established by code.

C. Obtain copies of standards where required by product specification sections.

D. Neither the contractual relationships, duties, nor responsibilities of the parties in Contract or those of the Architect/Engineer shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.6 TESTING SERVICES

A. Contractor will appoint and employ services of an independent firm to perform testing. Contractor shall pay for testing services required by the specifications.

B. The independent firm will perform tests and other services specified in individual specification sections and as required by the Owner.

C. Testing and source quality control may occur on or off the project site. Perform off-site testing as required by the Owner.

D. Reports will be submitted by the independent firm to the Engineer and Contractor, in duplicate indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.

E. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.

1. Notify Architect/Engineer and independent firm 48 hours prior to expected time for operations requiring services.

2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.

F. Testing does not relieve Contractor to perform Work to contract requirements.

G. Re-testing required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the Engineer. Payment for re-testing will be made by the Contractor.

1.7 MANUFACTURER'S FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.

B. Submit qualifications of observer to Engineer 30 days in advance of required observations. Observer subject to approval of Engineer.

C. Report observations and site decisions or instructions given to applicators or installers supplemental or contrary to manufacturer's written instructions.

D. Refer to Section 01300 - SUBMITTALS, MANUFACTURER'S FIELD REPORTS article.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify existing substrate is capable of structural support or attachment of new Work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Verify utility services are available, of the correct characteristics, and in the correct locations.

3.2 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

END OF SECTION

INDEX TO

SECTION 01410 - TESTING SERVICES

SECTION 01410

TESTING SERVICES

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Selection and payment.

B. Contractor submittals.

C. Testing agency responsibilities.

D. Testing agency reports.

E. Limits on testing authority.

F. Contractor responsibilities.

G. Schedule of tests.

1.2 RELATED SECTIONS

A. Testing and approvals required by public authorities.

B. Section 01300 – Submittals: Manufacturer's certificates.

C. Section 01702 – Contract Closeout: Project record documents.

1.3 REFERENCES (LATEST REVISION)

A. ASTM C 802 – Practice for Conducting an Interlaboratory Test Program to Determine the Precision of Test Methods for Construction Materials.

B. ASTM C 1077 – Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.

C. ASTM C 1093 – Practice for Accreditation of Testing Agencies for Masonry.

D. ASTM D 3740 – Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.

E. ASTM D 4561 – Practice for Quality Control Systems for Organizations Producing and Applying Bituminous Paving Materials.

F. ASTM E 329 – Specification for Agencies Engaged in Construction Inspection and/or Testing.

G. ASTM E 543 – Practice for Agencies Performing Nondestructive Testing.

H. ASTM E 548 – Guide for General Criteria Used for Evaluating Laboratory Competence.

I. ASTM E 699 – Practice for Evaluation of Agencies Involved in Testing, Quality Assurance, and Evaluating of Building Components.

1.4 SELECTION AND PAYMENT

A. Employment and payment by Contractor for services of an independent testing agency or laboratory to perform specified testing.

B. Employment of testing agency or laboratory in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

1.5 QUALITY ASSURANCE

A. Comply with requirements of practices listed in paragraph 1.3.

B. Laboratory: Authorized to operate in State in which project is located.

C. Laboratory Staff: Maintain a full-time registered Engineer on staff to review services.

D. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.

1.6 CONTRACTOR SUBMITTALS

A. Prior to start of Work, submit testing laboratory name, address, and telephone number, and names of full-time registered Engineer and responsible officer.

B. Submit copy of report of laboratory facilities inspection made by Materials Reference Laboratory of National Bureau of Standards during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.

1.7 TESTING AGENCY RESPONSIBILITIES

A. Test samples of mixes submitted by Contractor.

B. Provide qualified personnel at site. Cooperate with Engineer and Contractor in performance of services.

C. Perform specified sampling and testing of products in accordance with specified standards.

D. Ascertain compliance of materials and mixes with requirements of Contract Documents.

E. Promptly notify Engineer and Contractor of observed irregularities or non-conformance of Work or products.

F. Perform additional tests required by Engineer.

G. Attend preconstruction meetings and progress meetings.

1.8 TESTING AGENCY REPORTS

A. After each test, promptly submit two (2) copies of report to Engineer and to Contractor.

B. Include:

1. Date issued.
2. Project title and number.
3. Name of inspector.
4. Date and time of sampling or inspection.
5. Identification of product and specifications section.
6. Location in the Project.
7. Type of inspection or test.
8. Date of test.
9. Results of tests.
10. Conformance with Contract Documents.

C. When requested by Engineer, provide interpretation of test results.

1.9 LIMITS ON TESTING AUTHORITY

A. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.

B. Agency or laboratory may not approve or accept any portion of the Work.

C. Agency or laboratory may not assume any duties of Contractor.

D. Agency or laboratory has no authority to stop the Work.

1.10 CONTRACTOR RESPONSIBILITIES

A. Deliver to agency or laboratory at designated location, adequate samples of materials proposed to be used requiring testing, along with proposed mix designs.

B. Cooperate with laboratory personnel, and provide access to the Work.

C. Provide incidental labor and facilities:

1. To provide access to Work to be tested.
2. To obtain and handle samples at the site or at source of products to be tested.
3. To facilitate tests.
4. To provide storage and curing of test samples.

D. Notify Engineer and laboratory 48 hours prior to expected time for operations requiring testing services.

E. Employ services of an independent qualified testing laboratory pay for additional samples and tests required by Contractor beyond specified requirements.

1.11 SCHEDULE OF TESTS

Section	Test	Frequency	Date	Performed By	Notes
02231 – Aggregate Base Course					
	Base Density	1 test per 5,000 sf			
02511 – Asphaltic Concrete Base Course					
	Asphalt Extraction & Gradation	1 test for each 250 tons placed			
	Marshall Stability	1 test for each 250 tons placed			
	Field Density	1 test per 5,000 sf			
	Cores	1 test for each 250 tons placed			
02512 – Asphaltic Concrete Binder/Surface courses					Cores
	Asphalt Extraction & Gradation	1 test for each 250 tons placed			
	Marshall Stability	1 test for each 250 tons placed			
	Field Density	1 test for each 250 tons placed			
	Cores	1 test for each 250 tons placed			
02667 – Water Distribution System					
	Hydrostatic & Leakage	1.5 times the working pressure (no less than 150 psi). Conducted for 2 hours with maintained pressure of 150 psi (200 psi on fire main)			
	Bacteriological Samples	2 taken 24 hours apart after disinfection			
	Compaction				
	Traffic Areas	1 per 100 lf or less for each 4 ft. of depth			
	Non-Traffic Areas	1 per 500 lf or less for each 4 ft. of depth			
	Fire Flow	1 per permit			
03305 – Site Concrete					
	Mix Designs	1 per mix design			
	Compressive Strength	3 test cylinders for every 50 cubic yards or less of each mix design placed daily			

Section	Test	Frequency	Date	Performed By	Notes
		1 cylinder broken at 7 days			
		2 cylinders broken at 28 days			
	Slump	1 test for each set of cylinders taken			
03310 – Cast-in-Place Concrete					
	Materials	As necessary			
	Mix Designs	1 per mix design			
	Strength	4 Test Cylinders for each 50 cy or less or each mix design placed daily			
	Slump	1 test per each set of cylinders			
	Air Content	1 test per each set of cylinders			
	Temperature	1 test per each set of cylinders			

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

END OF SECTION

INDEX TO

SECTION 01702 – CONTRACT CLOSEOUT

SECTION 01702

CONTRACT CLOSEOUT

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Closeout procedures.

B. Project record documents.

C. Operation and maintenance data.

D. Warranties and bonds.

E. Maintenance service.

1.2 RELATED SECTIONS

A. Section 01300 - Submittals

B. Operation and Maintenance Data.

C. Warranties.

D. Bonds.

1.3 CLOSEOUT PROCEDURES

A. Submit written verification Contract Documents being reviewed, Work has been observed at appropriate times, and Work is complete in accordance with Contract Documents and ready for Engineer's review.

B. Provide submittals to Engineer required by governing or other authorities.

C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

1.4 FINAL CLEANING

A. Execute final cleanup prior to final project assessment.

B. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.5 ADJUSTING

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

1.6 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:

1. Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other modifications to the Contract.
5. Reviewed Shop Drawings, Product Data, and Samples.
6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Equipment Specifications: Legibly mark and record at each product section description of actual products installed, including the following:

1. Manufacturer's name and product model and number.
2. Product substitutions or alternates utilized.
3. Changes made by Addenda and modifications.

F. Project Record Drawings: Legibly mark each item to record actual construction including:

1. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
2. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
3. Where proposed and existing utilities cross, the Contractor shall measure and record the horizontal location and vertical separation between each crossing. Separation shall be measured between exteriors and pipes.
4. Field changes of dimension and detail.
5. Details not on original Contract drawings.
6. Piling data locations, tip and cut-off elevations, and driving records.

G. Submit documents to Engineer with claim for final Application for Payment.

1.7 OPERATION AND MAINTENANCE DATA

A. Submit data on 8-1/2 x 11-inch text pages, bound in 3-inch D ring binders with durable plastic covers.

B. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS," title of project and indicate subject matter of binder when multiple binders are required.

C. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

D. Contents: Prepare a Table of Contents for each volume, with each Product or system description identified, typed on white paper, in three parts as follows:

1. Part 1: Directory, listing names, addresses, and telephone numbers of Engineer, Contractor, Subcontractors, and major equipment suppliers.

2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:

    a. Significant design criteria.
    b. List of equipment.
    c. Parts list for each component.
    d. Operating instructions.
    e. Maintenance instructions for equipment and systems.
    f. Maintenance instructions for [special] finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.

3. Part 3: Project documents and certificates, including the following:

    a. Shop drawings and product data.
    b. Air and water balance reports.
    c. Certificates.
    d. Originals of warranties and bonds.

E. Submit one (1) draft copy of completed volumes 30 days with prior to final walk through. This copy will be reviewed and returned [after final inspection], with Engineer comments. Revise content of all document sets as required prior to final submission.

F. Submit six (6) sets of revised final volumes, within 15 days after final walk through.

1.8 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Provide spare parts, maintenance, and extra products in quantities specified in individual specification sections.

B. Deliver to Project Site and place in location as directed; obtain receipt prior to final payment.

1.9 WARRANTIES AND BONDS

A. Provide duplicate notarized copies.

B. Execute and assemble transferable warranty documents from Subcontractors, suppliers, and manufacturers.

C. Provide Table of Contents and assemble in three D side ring binder with durable plastic cover.

D. Submit prior to final Application for Payment.

E. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within 10 days after acceptance, listing date of acceptance as start of warranty period.

1.10 MAINTENANCE SERVICE

A. Furnish service and maintenance of components indicated in specification sections during the warranty period.

B. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

D. Maintenance service shall not be assigned or transferred to any agent or Subcontractor without prior written consent of the Owner.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

END OF SECTION

INDEX TO

SECTION 01730 - OPERATION AND MAINTENANCE

SECTION 01730

OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Format and content of manuals.

B. Instruction of Owner's personnel.

C. Schedule of submittals.

1.2 RELATED SECTIONS

A. Section 01300 – Submittals.

B. Section 01400 - Quality Control.

C. Section 01702 - Contract Closeout.

D. Section 01740 - Warranties.

E. Section 01741 - Bonds.

F. Individual Specifications Sections: Specific requirements for operation and maintenance data.

1.3 QUALITY ASSURANCE

A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

1.4 FORMAT

A. Prepare data in the form of an instructional manual.

B. Binders: Commercial quality, 8-1/2 x 11, 3-inch three D side ring binders with durable plastic covers; 2 maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

C. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

D. Provide tabbed dividers for each separate product and system, with typed description of product and major component parts of equipment.

E. Text: Manufacturer's printed data, or typewritten data on 24-pound paper.

F. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

G. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.

1.5 CONTENTS OF EACH VOLUME

A. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Architect/Engineer, Subconsultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

B. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

C. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

D. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

E. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

F. Warranties: Bind in copy of each.

1.6 MANUAL FOR MATERIALS AND FINISHES

A. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Provide information for re-ordering custom manufactured Products.

B. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

C. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

D. Additional Requirements: As specified in individual Product specification sections.

E. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

1.7 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.

B. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.

C. Include color-coded wiring diagrams as installed.

D. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

E. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

F. Provide servicing and lubrication schedule, and list of lubricants required.

G. Include manufacturer's printed operation and maintenance instructions.

H. Include sequence of operation by controls manufacturer.

I. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

J. Provide control diagrams by controls manufacturer as installed.

K. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.

L. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

M. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

N. Include test and balancing reports.

O. Additional Requirements: As specified in individual product specification sections.

P. Provide a listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.

1.8 INSTRUCTION OF OWNER PERSONNEL

A. Before final walk through, instruct Owner's designated personnel in operation, adjustment, and maintenance of products, equipment, and systems, at agreed upon times.

B. For equipment requiring seasonal operation, perform instructions for other seasons within six (6) months.

C. Use operation and maintenance manuals as basis for instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.

D. Prepare and insert additional data in Operation and Maintenance Manual when need for such data becomes apparent during instruction.

1.9 SUBMITTALS

A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect/Engineer will review draft and return one copy with comments.

B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.

C. Submit 1 copy of completed volumes 15 days prior to final walk through. This copy will be reviewed and returned, with Architect/Engineer comments. Revise content of all document sets as required prior to final submission.

D. Submit two (2) sets of revised final volumes in final form within 10 days after final walk through.

1.10 SCHEDULE OF SUBMITTALS

OMITTED

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

INDEX TO

SECTION 01740 – WARRANTIES

SECTION 01740

WARRANTIES

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Preparation and submittal of warranties.

B. Time and schedule of submittals.

1.2 RELATED SECTIONS

A. General Conditions - EJCDC: Warranties and correction of work.

B. Section 01702 - Contract Closeout: Contract closeout procedures.

C. Section 01730 - Operation and Maintenance Data.

D. Individual Specifications Sections: Warranties required for specific Products or Work.

1.3 FORM OF SUBMITTALS

A. Bind in commercial quality 8-1/2 x 11, 3-inch three D side ring binders with durable plastic covers.

B. Cover: Identify each binder with typed or printed title WARRANTIES with title of Project; name, address and telephone number of Contractor and name of responsible company principal.

C. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of Product or work item.

D. Separate each warranty with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

1.4 PREPARATION OF SUBMITTALS

A. Obtain warranties executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within ten (10) days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.

B. Verify documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties until time specified for submittal.

1.5 TIME OF SUBMITTALS

A. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten (10) days after acceptance.

B. Make other submittals within ten (10) days after Date of Substantial Completion, prior to final Application for Payment.

C. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within ten (10) days after acceptance, listing the date of acceptance as the beginning of the warranty period.

1.6 SCHEDULE OF SUBMITTALS

OMITTED

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

END OF SECTION

INDEX TO

SECTION 02110 – SITE CLEARING

SECTION 02110

SITE CLEARING

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Removal of surface debris.

B. Removal of paving, curbs, and gutters.

C. Removal of trees, shrubs, and other plant life.

D. Topsoil excavation.

1.2 RELATED SECTIONS

A. Section 02204 - Earthwork.

1.3 MEASUREMENT AND PAYMENT

A. Site Clearing: Clearing, grubbing and other items to be removed will be included in the lump sum price in the proposal for clearing work. Includes clearing site, removing stumps, loading and removing waste materials from site.

1.4 REGULATORY REQUIREMENTS

A. Conform to applicable code for disposal of debris.

B. Coordinate clearing Work with utility companies.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Provide tree protection materials as detailed on the construction drawings.

PART 3 – EXECUTION

3.1 PREPARATION

A. Verify existing plant life designated to remain is tagged or identified.

B. Identify a waste area and salvage area for placing removed materials.

3.2 PROTECTION

A. Trees within the permanent easement shall be removed. Trees located within the temporary easement shall be saved unless previously approved by the engineer. All trees not to be removed will be protected from injury to their roots and to their top to a distance three feet beyond the drip-line and no grading, trenching, pruning, or storage of materials may go in this area except as provided by an Owner's representative stakeout. Contractor will pay a penalty for any tree removed from the site that has not been deemed applicable for removal as specified above. Contractor also will pay for any tree that dies due to damage during construction. This applies to all trees on site whether or not they are shown on the plans.

B. Contractor shall not be held accountable for damages to trees resulting from placement of fill or removal of soils where such action is required by the contract documents. Any tree, the trunk of which is within 10 feet of any footing or trench, shall be exempt from these penalties except Contractor shall exercise all reasonable precautions to preserve even these trees. Contractor agrees to pay fines as established below in the event he or any of his subcontractors causes loss or removal of trees designated to be saved under provisions of this contract.

The fines are as follows:

Caliper	Fine
1" - 2"	$ 150.00
2" - 3"	200.00
3" - 4"	250.00
4" - 5"	400.00
5" - 6"	500.00
6" - 7"	600.00
7" - 8"	750.00
8" - 11"	1,500.00
12" - 20"	2,000.00
21" & larger	$ 2,500.00

C. Trees shall be graded by Owner's representative as to variety, condition, and site importance, with above figures acting as a maximum fine. Lowest assessment amount shall be no less than one-half of the above fine figures.

D. Protect benchmarks, survey control points, and existing structures from damage or displacement.

E. Protect all remaining utilities.

F. Clearing operations shall be conducted to prevent damage by falling trees to trees left standing, to existing structures and installations, and to those under construction, and to provide for the safety of employees and others.

3.3 CLEARING

A. Clear areas required for access to site and execution of work. Clearing shall consist of felling and cutting trees into sections, and satisfactory disposal of trees and other vegetation designated for removal, including downed timber, snags, brush, and rubbish occurring within area to be cleared. Trees, stumps, roots, brush, and other vegetation in areas to be cleared shall be removed completely from the site, except such trees and vegetation as may be indicated or directed to be left standing. Trees designated to be left standing within cleared areas shall be trimmed of dead branches 1-1/2 inch or more in diameter. Limbs and branches to be trimmed shall be neatly cut close to the trunk of the tree or main branches. Cuts more than 1-1/2 inches in diameter shall be painted with an accepted treewound paint. Trees and vegetation to be left standing shall be protected from damage incident to clearing, grubbing, and construction operations, by the erection of timber barriers or by such other means as circumstances require. Such barriers must be placed and be checked by the OWNER before construction observations can proceed (See 3.2). Clearing shall also include removal and disposal of structures obtruding, encroaching upon, or otherwise obstructing the work.

3.4 REMOVAL

A. Where indicated or directed, trees and stumps shall be removed from areas outside those areas designated for clearing and grubbing. Work shall include felling of such trees and removal of their stumps and roots. Trees shall be disposed of as hereinafter specified.

B. Remove debris, rock, and other extracted plant life from site.

C. Partially remove paving, curbs, and gutters, as indicated. Neatly saw cut edges at right angle to surface.

3.5 DISPOSAL

A. Disposal of trees, branches, snags, brush, stumps, etc., resulting from clearing and grubbing shall be the Contractor's responsibility and shall be disposed of by burning, removal from site, or a combination of both. All costs in connection with disposing of materials will be at the Contractor's expense. Material disposed of by burning shall be burned in a manner avoiding all hazards, such as damage to existing structures, construction in progress, trees, and vegetation. Contractor shall be responsible for compliance with all local and State laws and regulations relative to the building of fires. Disposal by burning shall be kept under constant attendance until fires have burned out or extinguished. All liability of any nature resulting from disposal of cleared and grubbed material shall become the Contractor's responsibility. Disposal of all materials cleared and grubbed will be in accordance with rules and regulations of the State of South Carolina. No material will be burned unless directed to do so by the OWNER. Contractor shall obtain a permit to burn on site from local fire department, before beginning the work.

3.6 GRUBBING

A. Grubbing shall consist of removal and disposal of stumps, roots larger than one inch in diameter, and matted roots from designated grubbing areas. This material, together with logs and other organic or metallic debris not suitable for building of pavement subgrade or building pads, shall be excavated and removed to a depth of not less than 18 inches below original surface level of the ground in embankment areas and not less than 2 feet below finished earth surface in excavated areas. Depressions made by grubbing shall be filled with suitable material and compacted to make the surface conform to original adjacent ground.

END OF SECTION

INDEX TO

SECTION 02204 – EARTHWORK

SECTION 02204

EARTHWORK

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Grading

B. Excavation

C. Backfilling

D. Compaction

E. Remove and Replace Topsoil

F. Dressing of Shoulders and Banks

G. Stone Drainage Filter

H. Water Control

I. Testing

1.2 RELATED SECTIONS

A. Section 01400 – Quality Control

B. Section 01410 – Testing Services

C. Section 02110 – Site Clearing

1.3 MEASUREMENT AND PAYMENT

A. No separate measurement and payment will be made for the work performed under this section. Grading to subgrades, construction of ditches, dressing of disturbed areas, removing and replacing topsoil, excavating, backfilling and compacting to required elevations, testing, staking, and construction supervision shall be included under the sections to which this pertains.

B. Unsuitable Material - Payment will be included in the item in which it pertains. Payment will include excavation and disposal of unsuitable material.

C. Borrow - Payment will be included in the item in which it pertains. Payment will include furnishing materials required in excess of suitable materials available on site.

D. Earthwork - All earthwork associated with the installation of bulkheads, headwalls, wingwalls, weir structures, drainage filters, rip-rap, etc. shall not be measured for direct payment. Payment for the earthwork shall be included in the item to which it pertains.

E. Dewatering - No direct payment shall be made for dewatering. Dewatering shall be included in the item to which it pertains.

F. Proof Rolling - Payment will be included in the item to which it pertains. Payment will include furnishing a loaded truck, truck driver, fuel and rolling the designated areas.

1.4 REFERENCES (LATEST REVISION)

A. ASTM D 448 – Sizes of Aggregate for Road and Bridge Construction.

B. ASTM D 1557 – Laboratory Compaction Characteristics of Soil Using Modified Effort.

C. ASTM D 2487 – Classification of Soils for Engineering Purposes (Unified Soil Classification System).

D. ASTM D 6938 – In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

E. ASTM D 3740 – Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.

F. ASTM E 329 – Agencies Engaged in Construction Inspection and/or Testing.

1.5 SUBMITTALS

A. Section 01300 - Submittals: Procedures for submittals.

B. Materials Source: Submit gradation analysis, proctor results, and soil classification for all borrow material.

1.6 QUALITY ASSURANCE

A. Perform work in accordance with Federal, State of South Carolina, and County of Berkeley standards.

1.7 TESTING

A. Laboratory tests for moisture density relationship for fill materials shall be in accordance with ASTM D 1557, (Modified Proctor).

B. In place density tests in accordance with ASTM D 6938.

C. Testing laboratory shall operate in accordance with ASTM D 3740 and E 329 and be acceptable to the Engineer.

D. The testing laboratory and Project Engineer/Project Representative shall be given a minimum of 48 hours notice prior to taking any of the tests.

E. Testing shall be Contractor's responsibility and performed at Contractor's expense by a commercial testing laboratory operating in accordance with subparagraph C above.

F. Test results shall be furnished to the Engineer prior to continuing with associated or subsequent work.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Borrow shall consist of sand or sand-clay soils capable of being readily shaped and compacted to the required densities, and shall be reasonably free of roots, trash, rock larger than 2 inches, and other deleterious material.

B. All soils used for structural fills shall have a PI (plastic index) of less than 10, and a LL (liquid limit) of less than 30. Fill soils shall be dried or wetted to appropriate moisture contents prior to compaction. Additionally, fill soils used for the top 2 feet of fill beneath roads and parking lots shall have no more than 15% passing the #200 sieve. Fill soils used for house lots shall have no more than 25% passing the #200 sieve.

C. Contractor shall furnish all borrow material.

D. Contractor shall be responsible for and bear all expenses in developing borrow sources including securing necessary permits, drying the material, haul roads, clearing, grubbing, excavating the pits, placing, compaction and restoration of pits and haul roads to a condition satisfactory to property owners and in compliance with applicable federal, state, and local laws and regulations.

2.2 SOURCE QUALITY CONTROL

A. If tests indicate materials do not meet specified requirements, change material and retest.

B. Provide materials of each type from same source throughout the Work.

PART 3 – EXECUTION

3.1 TOPSOIL

A. Contractor shall strip topsoil and stockpile on site at a location determined by the Owner at the Contractor's expense.

B. Topsoil shall be placed to a depth of 4 inches over all disturbed or proposed landscaped areas.

C. Topsoil shall be provided at Contractor's expense if it is not available from site.

D. Any remaining topsoil will be hauled off site at the Contractors expense.

E. Do not excavate wet topsoil.

3.2 EXCAVATION

A. Suitable excavation material shall be transported to and placed in fill areas within limits of the work.

B. Unsuitable material encountered in areas to be paved and under building pads, shall be excavated 2 feet below final grade and replaced with suitable material from site or borrow excavations. Contractor shall notify Engineer if more than 2 feet of excavation is needed to replace unsuitable material.

C. Unsuitable and surplus excavation material not required for fill shall be disposed of off site.

D. Proper drainage, including sediment and erosion control, shall be maintained at all times. Methods shall be in accordance with the National Pollutant Discharge Elimination System standards and other local, state, and federal regulations.

E. Unsuitable materials as stated herein are defined as highly plastic clay soils, of the CH and MH designation, border line soils of the SC-CH description, and organic soils of the OL and OH description based on the Unified Soils Classification System. Further, any soils for the top two feet of pavement subbase shall have no more than 15% passing the #200 sieve.

3.3 GROUND SURFACE PREPARATION FOR FILL

A. All vegetation, roots, brush, heavy sods, heavy growth of grass, decayed vegetable matter, rubbish, and other unsuitable material within the areas to be filled shall be stripped and removed prior to beginning the fill operation.

B. Sloped ground surfaces steeper than 1 vertical to 4 horizontal, on which fill is to be placed shall be plowed, stepped, or benched, or broken up as directed, in such a manner where fill material will bond with the existing surface.

C. Surfaces on which fill is to be placed and compacted shall be wetted or dried as may be required to obtain the specified compaction.

3.4 FILL

A. Shall be placed in successive horizontal layers 8 inches to 12 inches in loose depth for the full width of the cross-section and compacted as required.

3.5 FINISHED GRADING

A. All areas covered by the project including excavated and filled sections and adjacent transition areas shall be smooth graded and free from irregular surface changes.

B. Degree of finish shall be that ordinarily obtainable from either blade-grader or scraper operations, supplemented with hand raking and finishing, except as otherwise specified.

C. Unpaved areas to within 0.1 feet of elevations shown on the drawings provided such deviation does not create low spots that do not drain.

D. Paved Areas - Subgrade to within 0.05 feet of the drawing elevations less the compacted thickness of the base and paving.

E. Building Pads - Subgrade to within 0.05 feet of the drawing elevations less the thickness of the concrete slab.

F. Ditches and lagoon banks shall be finished graded, dressed, and seeded within 14 calendar days of work to reduce erosion and permit adequate drainage.

3.6 DISPOSAL OF WASTE MATERIAL

A. All vegetation, roots, brush, sod, broken pavements, curb and gutter, rubbish, and other unsuitable or surplus material stripped or removed from limits of construction shall be disposed of by the Contractor.

3.7 PROTECTION

A. Graded areas shall be protected from traffic, erosion, settlement, or any washing away occurring from any cause prior to acceptance.

B. Contractor shall be responsible for protection of below grade utilities shown on the drawings or indicated by the Owner at all times during earthwork operations.

C. Repair or re-establishment of graded areas prior to final acceptance shall be at the Contractors expense.

D. Site drainage shall be provided and maintained by Contractor during construction until final acceptance of the project. Drainage may be by supplemental ditching, or pumping if necessary, prior to completion of permanent site drainage.

3.8 DRAINAGE

A. Contractor shall be responsible for providing surface drainage away from all construction areas. This shall include maintenance of any existing ditches or those constructed in the immediate vicinity of the work. Contractor shall provide proper and effective measures to prevent siltation of wetlands, streams, and ditches on both the Owner's property, and those properties downstream.

3.9 FIELD QUALITY CONTROL

A. Compaction testing shall be performed in accordance with ASTM D 6938. Where tests indicate the backfill does not meet specified requirements, the backfill shall

be reworked or removed and replaced, and then retested at the Contractor's expense.

B. Unpaved areas - at least 90% of maximum laboratory density within 2% optimum moisture content unless otherwise approved by the Engineer.

C. Paved Areas and Under Structures - top 6-inch layer of subbase to at least 98% of maximum laboratory density within 2% optimum moisture content. Layers below top 6 inches shall be compacted to 95% of maximum laboratory density within 2% optimum moisture content.

D. Rolling and compaction equipment and methods shall be subject to acceptance by the Engineer. Acceptance in no way relieves Contractor of the responsibility to perform in correct and timely means.

E. Number of Tests - Under paved areas, no less than one density test per horizontal layer per 5,000 square feet of subbase shall be made. In unpaved areas, no less than one density test per horizontal layer per 10,000 square feet of fill area shall be made. Under curb and gutter, no less than one density test per every 300 linear feet. On building pads, no less than one density test per horizontal layer per 1,500 square feet of fill area shall be made.

3.10 PROOF ROLLING

A. Shall be required on the subbase of all curb and gutter and paved areas and on the base of all paved areas where designated by the Engineer. Proof rolling shall take place after all underground utilities are installed and backfilled. The operation shall consist of rolling the subbase or base with a fully loaded 10 wheeled dump truck. A full load shall consist of 10 to 12 cubic yards of soil or rock. The dump truck shall be capable of traveling at a speed of two to five miles per hour and be in sound mechanical shape with no exhaust leaks or smoking from burning oil. The Engineer shall determine number of passes and areas rolled.

END OF SECTION

INDEX TO

SECTION 02210 – SOIL EROSION CONTROL

SECTION 02210

SOIL EROSION CONTROL

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions apply to this section.

1.2 DESCRIPTION OF WORK

A. Extent of soil erosion control work includes all measures necessary to meet the requirements of this section.

Erosion and sediment control measures shall be installed prior to any construction activity.

Soil erosion and sediment control measures shall include all temporary and permanent means of protection and trapping soils of the construction site during land disturbing activity. Activity covered in this contract shall meet standards of NPDES General Permit for the state where work is performed.

1.3 PURPOSES

A. Contractor is to achieve the following goals:

1. Minimize soil exposure by proper timing of grading and construction.
2. Retain existing vegetation whenever feasible.
3. Vegetate and mulch denuded areas as soon as possible.
4. Divert runoff away from denuded areas.
5. Minimize length and steepness of slopes when it is practical.
6. Reduce runoff velocities with sediment barriers or by increasing roughness with stone.
7. Trap sediment on site.
8. Inspect and maintain erosion control measures.

1.4 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Firms regularly engaged in the manufacture of soil erosion control systems products of types and sizes required, whose materials have been in satisfactory use for not less than 5 years.

B. Codes and Standards: Comply with all applicable Local, State and Federal Standards pertaining to soil erosion control.

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's technical product data and installation instruction for soil erosion control materials and products.

1.6 MEASUREMENT AND PAYMENT

A. No unit measurements will be made for soil erosion control. Payment will be made at the lump sum price as shown on the bid proposal. The cost of soil erosion control shall include all equipment, labor and materials necessary to comply with the State of South Carolina Erosion and Sediment Control Program.

PART 2 – PRODUCTS

2.1 GRASSING MATERIALS

A. Refer to Section 02902 - Grassing.

1. General: All grass seed shall be free from noxious weeds, grade A recent crop, recleaned and treated with appropriate fungicide at time of mixture. Deliver to site in original sealed containers with dealer's guarantee as to year grown, percentage of purity, percentage of germination and date of the test by which percentages of purity and germination were determined. All seed sown shall have a date of test within six months of the date of sowing.

2. Type of Seed: Either Annual Rye or Common Bermuda Grass seed will be used depending on time of year in which seeding is to occur.

3. Mulch: Straw.

4. Fertilizer: Commercial balanced 4-12-12 fertilizer.

2.2 HAY BALES

OMITTED

2.3 SILT FENCE

A. Silt fence shall be a woven geotextile fabric sheet. Fabric shall be a synthetic polymer composed of at least 85% by weight propylene, ethylene, amide, ester, or vinylidene chloride, and shall contain stabilizer and/or inhibitors added to the base plastic to make filaments resistant to deterioration due to ultra-violet and/or heat exposure. Fabric should be finished so the filaments will retain their relative position with respect to each other. Fabric shall be free of defects, rips, holes, or flaws.

Fabric shall meet the following requirements:

Woven Fabrics	
Grab Strength	90 lbs.
Burst Strength	175 PSI
UV Resistance	80%

2.4 CHEMICALS FOR DUST CONTROL

A. Calcium Chloride, Anionic Asphalt Emulsion, latex Emulsion or Resin-in-Water Emulsion may be used for dust control.

2.5 RIP-RAP

A. Shall be hard quarry or field stone of such quality the pieces will not disintegrate on exposure to water, sunlight, or weather. Stone shall range in weight from a minimum of 25 pounds to a maximum of 125 pounds. At least 50 percent of the stone shall weigh more than 60 pounds. The stone shall have a minimum dimension of 12 inches.

2.6 PRODUCT REVIEW

A. Contractor shall provide the Engineer with a complete description of all products before ordering. Engineer will review all products before they are ordered.

PART 3 – EXECUTION

3.1 GENERAL

A. All disturbed soil areas except those to support paving shall be graded and protected from erosion by grassing. Disturbed areas must be grassed within 14 days of work ending unless work is to begin again before 21 days. Storm water conveyance systems shall have sediment barriers installed at all entrances, intersections, change in direction and discharge points.

3.2 GRASSING

A. Refer to Section 02902 - Grassing.

3.3 SEDIMENT BARRIERS

A. Rock Ditch Check

1. Excavate a 6-inch-deep trench the width and length of proposed barrier. Install a non-woven geotextile fabric in the trench before placing rock for the ditch check.

2. The body of the ditch check shall be constructed of 12-inch rip-rap. The upstream face may be covered with 1-inch washed stone.

3. Ditch checks shall not exceed a height of 2 feet at centerline of the channel and have a minimum top flow length of 2 feet.

4. Rip-rap shall be placed over the channel banks to prevent water from flowing around ditch check. Rock must be installed by hand or mechanical placement (no dumping of rock) to achieve complete coverage of the ditch and ensure the center of the check is lower than the edges.

5. The maximum spacing between ditch checks shall be where the toe of the upstream check is at the same elevation as the top of the downstream check.

6. Contractor shall maintain ditch checks as required by State regulations.

3.4 SILT FENCE

A. Silt fence shall be placed at approximate location shown and installed in accordance with the detail on the construction drawings. Contractor shall maintain silt fence as required by state regulations.

3.5 DUST CONTROL

A. Dust raised from vehicular traffic will be controlled by wetting down access road with water or by the use of a deliquescent chemical, such as calcium chloride, if relative humidity is over 30%. Chemicals shall be applied in accordance with manufacturer's recommendations.

B. Contractor shall use all means necessary to control dust on and near the work, or off-site borrow areas when dust is caused by operations during performance of work or if resulting from the condition in which any subcontractor leaves the site. Contractor shall thoroughly treat all surfaces required to prevent dust from being a nuisance to the public, neighbors, and concurrent performance of work on site.

3.6 SEDIMENT BASIN

OMITTED

3.7 RIP-RAP

A. Rip-Rap shall be placed at the locations shown and installed in accordance with the detail on the construction drawings.

3.8 CONSTRUCTION EXIT

A. Construct exit at the location shown per detail on the construction drawings. Contractor shall maintain construction exit as required by state regulations.

3.9 INLET PROTECTION

A. Install inlet protection per detail on the construction drawings. Contractor shall maintain inlet protection as required by state regulations until all disturbed surfaces are stabilized.

END OF SECTION

INDEX TO

SECTION 02231 - AGGREGATE BASE COURSE

SECTION 02231

AGGREGATE BASE COURSE

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Aggregate base course.

1.2 RELATED SECTIONS

A. Section 01025 - Measurement and Payment: Requirements applicable to unit prices for the work of this section.

B. Section 01400 - Quality Control.

C. Section 02204 - Earthwork

D. Section 02512 - Asphaltic Concrete Binder/Surface Courses

1.3 MEASUREMENT AND PAYMENT

A. Aggregate Base Course: Payment will be made at the contract unit price. Payment will include supplying all material, labor, and equipment, stockpiling, scarifying substrate surface, placing where required, and compacting.

B. Prime Coat: Bituminous prime coat will not be measured for separate payment. All costs connected with applying prime coat will be included in the unit price bid for Aggregate Base Course.

1.4 REFERENCES (LATEST REVISION)

A. ASTM C 131 – Resistance to Degradation of Small-Size Course Aggregate by Abrasion and Impact in the Lost Angeles Machine.

B. ASTM D 1557 – Laboratory Compaction Characteristics of Soil Using Modified Effort.

C. ASTM D 6938 – In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

D. ASTM D 3740 – Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock Used in Engineering Design and Construction.

E. ASTM E 329 – Agencies Engaged in Construction Inspection and/or Testing.

1.5 QUALITY ASSURANCE

A. Perform work in accordance with the South Carolina Department of Transportation 2007 Standard Specifications for Highway Construction.

1.6 TESTING

A. Laboratory tests for moisture density relationship for fill materials shall be in accordance with ASTM D 1557, (Modified Proctor).

B. In place density tests in accordance with ASTM D 6938.

C. Testing laboratory shall operate in accordance with ASTM D 3740 and E 329 and be acceptable to the Engineer.

D. Testing laboratory and Project Engineer/Project Representative shall be given a minimum of 48 hours notice prior to taking any tests.

E. Testing shall be Contractor's responsibility and performed at Contractor's expense by a commercial testing laboratory operating in accordance with subparagraph C above.

F. Test results shall be furnished to the Engineer prior to continuing with associated or subsequent work.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Aggregate shall consist of processed and blended crushed stone. Aggregates shall be free from lumps and balls of clay, organic matter, objectionable coatings, and other foreign material and shall be durable and sound. Coarse aggregate shall have a percentage of wear not to exceed 65% after 500 revolutions as determined by ASTM C 131. Aggregate shall meet applicable requirements of Section 305.2 in the South Carolina Department of Transportation Standard 2007 Specifications for Highway Construction. Material shall meet the following gradation and other requirements:

Granite Stone or Recycled Concrete	
Sieve Size	Percent by Weight Passing
2"	100
1-1/2"	95 - 100
1"	70 - 100
1/2"	48 - 75
#4	30 - 60
#30	11 - 30
#200	0 - 12
Liquid Limit	0 to 25
Plasticity Index	0 to 6

Marine Limestone	
Sieve Size	Percent by Weight Passing
2"	100
1-1/2"	95 - 100
1"	70 - 100
1/2"	50 - 85

#4	30 - 60
#30	17 - 38
#200	0 - 20
Liquid Limit	0 to 25
Plasticity Index	0 to 6

B. Prime Coat: Shall be EA-P Special, Emulsified asphalt, conforming to Section 407 of the South Carolina Department of Transportation 2007 Standard Specifications for Highway Construction.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify subbase has been tested, is dry, and slopes and elevations are correct.

B. ON SITE OBSERVATIONS OF WORK: The Owner's Representative or Engineer will have the right to require any portion of the work be completed in their presence and if the work is covered up after such instruction, it shall be exposed by the Contractor for observation at no additional cost to the Owner. However, if the Contractor notifies the Owner such work is scheduled, and the Owner fails to appear within 48 hours, the Contractor may proceed. All work completed and materials furnished shall be subject to review by the Owner, Engineer or Project Representative. Improper work shall be reconstructed, and all materials, which do not conform to the requirements of the specifications, shall be removed from the work upon notice being received from the Engineer for the rejection of such materials. Engineer shall have the right to mark rejected materials to distinguish them as such.

Contractor shall give the Owner, Project Engineer or Project Representative a minimum of 48 hours' notice for all required observations or tests.

3.2 PREPARATION

A. Subbase shall be graded and shaped conforming to the lines, grades, and cross sections required and cleaned of all foreign substances prior to constructing base course. Do not place base on soft, muddy or frozen surfaces. Correct irregularities in subbase slope and elevation by scarifying, reshaping, and recompacting.

B. At the time of base course construction, subbase shall contain no frozen material.

C. Surface of subbase shall be checked by the Engineer or Project Representative for adequate compaction and surface tolerances. Ruts or soft yielding spots appearing in areas of subbase course having inadequate compaction, and areas not smooth or which vary in elevation more than 3/8 inch above or below required grade established on the plans, shall be corrected to the satisfaction of the Engineer or Project Representative. Base material shall not be placed until subbase has been properly prepared and test results have so indicated.

3.3 AGGREGATE PLACEMENT

A. Aggregate shall be placed in accordance with South Carolina Department of 2007 Transportation Standard Specifications for Highway Construction Section 305 and in accordance with all terms included in these specifications.

B. Level and contour surfaces to elevations and slopes indicated.

C. Add small quantities of fine aggregate to coarse aggregate as appropriate to assist compaction.

D. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.

E. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

F. While at optimum moisture (± 1-1/2%), compact base course with rollers capable of obtaining required density. Vibratory, flatwheel, and other rollers accepted by the Engineer may be used to obtain required compaction. Rolling shall continue until base is compacted to 98% of the maximum laboratory dry density as determined by ASTM D 1557. In-place density of the compacted base will be determined in accordance with ASTM D 6938.

3.4 PRIME COAT

A. Bituminous material for the prime coat shall be applied uniformly and accurately in quantities of not less than 0.15 gallons per square yard nor more than 0.30 gallons per square yard of base course. All irregularities in the base course surface shall be corrected prior to application of prime coat. Clean the base course of all mud, dirt, dust, and caked and loose material

B. Do not apply prime to a wet surface nor when temperature is below 40°F in the shade. Do not apply prime when rain threatens nor when weather conditions prevent proper construction and curing of prime coat.

C. The primed base should be adequately cured before the binder or surface course is laid. In general, a minimum of 48 hours should be allowed for complete curing. Ordinarily, proper surface condition of the prime is indicated by a slight change in the shiny black appearance to a slightly brown color.

3.5 TOLERANCES

A. Flatness: Maximum variation of 1/4 inch measured with an acceptable 10-foot straight edge.

B. Scheduled Compacted Thickness: Within 3/8 inch.

C. Variation from Design Elevation: Within 3/8 inch.

D. Depth measurements for compacted thickness shall be made by test holes through the base course. Where base course is deficient, correct such areas by scarifying, adding base material and recompacting as directed by the Engineer.

3.6 FIELD QUALITY CONTROL

A. Section 01400 - Quality Assurance: Field inspection.

B. Density and moisture testing will be performed in accordance with ASTM D 1557 and ASTM D 6938.

C. If tests indicate Work does not meet specified requirements, remove Work, replace, and retest.

D. Frequency of Tests:

1. Base Density and Thickness - One test per 5,000 square feet.

END OF SECTION

INDEX TO

SECTION 02275 - RIP-RAP

SECTION 02275

RIP-RAP

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Material placed as bank protection and erosion control.

1.2 RELATED SECTIONS

A. Section 02204 – Earthwork

B. Section 02210 – Soil Erosion Control

1.3 ALLOWABLE TOLERANCES

A. Depth of rip-rap blanket as shown on the drawings and in these specifications is a minimum depth.

1.4 MEASUREMENT AND PAYMENT

A. Rip-Rap: Payment will be made at the contract unit price. Payment will include furnishing all labor, materials, and equipment and placing on a prepared surface.

1.5 REFERENCES (LATEST REVISION)

A. ASTM C 150 – Portland Cement.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Stone Rip-Rap: Shall be hard quarry or field stone of such quality the pieces will not disintegrate on exposure to water, sunlight or weather. Stone shall be solid and non-friable and range in weight from a minimum of 25 pounds to a maximum of 150 pounds. At least 50 percent of the stone pieces shall weigh more than 60 pounds. The stone pieces shall have a minimum dimension of 12 inches. Documents indicating stone analysis, source and other pertinent data (i.e. - filter fabric) shall be submitted for review by the Engineer prior to delivery.

B. Filter Fabric: Shall be a woven fabric of monofilament and multifilament yarn equivalent to Mirafi FW700. Fabric shall be finished so the filaments will retain their relative position with respect to each other. Fabric shall contain stabilizers and/or inhibitors added to make filaments resistant to deterioration due to ultraviolet and/or heat exposure. Fabric shall be free of flaws, rips, holes or defects.

2.2 PRODUCT REVIEW

A. Contractor shall provide the Engineer with a complete description of all products before ordering. Engineer will review all products before they are ordered.

PART 3 – EXECUTION

3.1 PREPARATION

A. The surface to receive rip-rap shall be prepared to a relatively smooth condition free of obstruction, depressions, debris, rises, and soft or low-density pockets of material. Contours and elevations on construction drawings are to the surface of rip-rap material.

3.2 PLACEMENT

A. Filter fabric shall be placed with the long dimension running up slope. The strips shall be placed to provide a minimum width of one foot of overlap for each joint. Fabric shall be anchored in place with securing pins of the type recommended by fabric manufacturer. Pins shall be placed on or within 3 inches of the over-lap. Place fabric so upstream strip will overlap the downstream strip. Fabric shall be placed loosely to give and avoid stretching and tearing during placement of the stones.

B. Minimum depth or thickness of stone blanket shall be 12 inches with no under tolerance. Stones shall be dropped no more than three feet during construction. Placing shall begin at bottom of slope. Provide a toe trench if required as detailed on the construction drawings. Entire mass of stone shall be placed to conform with lines, grades, and thickness shown on the plans. Rip-rap shall be placed to its full course thickness at one operation and in such a manner as to avoid displacing the underlying material. Placing of rip-rap in layers, or by dumping into chutes, or by similar methods likely to cause segregation, will not be permitted.

Larger stones shall be well distributed, and the entire mass of stone shall conform to gradation specified. All material used in rip-rap protection shall be placed and distributed so there will be no large accumulations of either the larger or smaller sizes of stone.

It is the intent of these specifications to produce a fairly compact rip-rap protection in which all sizes of material are placed in their proper proportions. Hand placing or rearranging of individual stones by mechanical equipment may be required to secure the results specified.

C. Sand-Cement Bag Rip-Rap: Bags shall be uniformly filled. Bagged rip-rap shall be placed by hand with tied ends facing the same direction, with close, broken joints. After placing, bags shall be rammed or packed against one another to produce the required thickness and form a consolidated mass. The top of each bag shall not vary more than 3 inches above or below required plane. When directed by the Engineer or required by construction drawings, header courses shall be placed.

END OF SECTION

INDEX TO

SECTION 02310 – JACK AND BORE

SECTION 02310

JACK AND BORE

PART 1 – GENERAL

1.1 SECTION DESCRIPTION

A. This section includes materials, performance and installation standards, and Contractor responsibilities associated with the furnishing of all labor, materials, equipment and incidentals required to install, complete required boring and jacking installations, or other trenchless methods for pipelines, as shown on the Drawings and as specified herein.

B. The provision of this section shall be the minimum standards for the installation of casing pipe by the boring and jacking method. Other types of trenchless methods may be acceptable and encouraged if the specific method is at least equal to the performance of typical jack and bores and is comparable in cost.

C. Payment for Jack & Bore will be made under the lump sum price for miscellaneous piping and fittings. Payment will include excavation, dewatering, backfilling, compaction, testing, and all equipment, labor and materials necessary to complete the work.

PART 2 – PRODUCTS

2.1 CASING PIPE MATERIALS AND INSTALLATION

A. Casing shall be steel pipe conforming to the requirements of ASTM Designation A–139. The minimum casing pipe size and wall thickness shall be as shown herein. For sizes not included, or for special design considerations, approval shall be obtained from the Engineer of Record. The BCWS Standards shall have precedence if there is a conflict with these specifications.

B. For crossing of state roads, casing materials and installation shall conform to GADOT or SCDOT Standards, latest edition, or as minimum shall comply with the following table:

Minimum Steel Pipe Casing Dimensions
for
D.I.P

Carrier Pipe	Steel Casing Pipe Size		Highway & DOT Bores < 200 L.F.		Highway & DOT Bores > 200 L.F.		Railroad Bores		
I.D. (Nom.)	Pressure System	Gravity System	Minimum Wall Thickness (in)	Weight Class	Minimum Wall Thickness (in)	Weight Class	Minimum Wall Thickness (in)		Weight Class
							Pressure	Gravity	
4	12	16	0.375	STD	0.500	XS	0.500	0.500	XS
6	16	20	0.375	STD	0.500	XS	0.500	0.500	XS
8	18	24	0.375	STD	0.500	XS	0.500	0.500	XS
10	20	24	0.375	STD	0.500	XS	0.500	0.500	XS
12	24	30	0.375	STD	0.500	XS	0.500	0.500	XS
16	30	36	0.375	STD	0.500	XS	0.500	0.532	XS
18	36	48	0.375	STD	0.500	XS	0.532	0.688	XS
24	38	48	0.375	STD	0.500	XS	0.532	0.688	XS
30	48	54	0.375	STD	0.500	XS	0.688	0.781	XS
36	54	60	0.375	STD	0.500	XS	0.781	0.844	XS

Minimum Steel Pipe Casing Dimensions
for
Fusible
PVC

Carrier Pipe	Steel Casing Pipe Size		Highway & DOT Bores < 200 L.F.		Highway & DOT Bores > 200 L.F.		Railroad Bores		
I.D. (Nom.)	Pressure System	Gravity System	Minimum Wall Thickness (in)	Weight Class	Minimum Wall Thickness (in)	Weight Class	Minimum Wall Thickness (in)		Weight Class
							Pressure	Gravity	
4	8	16	0.375	STD	0.500	XS	0.500	0.500	XS
6	10	20	0.375	STD	0.500	XS	0.500	0.500	XS
8	12	24	0.375	STD	0.500	XS	0.500	0.500	XS
10	16	24	0.375	STD	0.500	XS	0.500	0.500	XS
12	16	30	0.375	STD	0.500	XS	0.500	0.500	XS
16	20	36	0.375	STD	0.500	XS	0.500	0.532	XS
18	24	48	0.375	STD	0.500	XS	0.532	0.688	XS
24	30	48	0.375	STD	0.500	XS	0.532	0.688	XS
30	36	54	0.375	STD	0.500	XS	0.688	0.781	XS
36	42	60	0.375	STD	0.500	XS	0.781	0.844	XS

2.2 CARRIER PIPES

A. Wastewater and water carrier pipes to be installed within the specified casings shall be equipped with restrained joint connections. Pipe and fittings shall comply with the applicable provisions of these Standards, with minimum Ductile Iron Pipe Class 51.

2.3 CASING INSULATORS

A. Non–corrosive casing insulators shall be used. The casing runner height shall be large enough so that it does not interfere with the pipe–restrained joints. Stainless steel nuts and bolts shall be used. Installation and spacing of casing insulators shall be as required by the manufacturer.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Casing pipes crossing under roadways/railroads shall be located at suitable approved alignments in order to eliminate possible conflict with existing or future utilities and structures, with a minimum 36–inch depth of cover between the top of the casing pipe and the surface of the roadway. For casing pipe crossings under roadways/railroads, the Contractor shall comply with the regulations of said authority in regard to design, specifications, and construction. Casing installations shall be as specified in the State of Georgia or South Carolina Department of Transportation, "Utility Accommodation Guide", and for railroads the American Railway Engineering Association.

B. The boring and jacking operations shall be done simultaneously, with continuous installation, until the casing pipe is in final position. Correct line and grade shall be carefully maintained. Add–on sections of casing pipe shall be full–ring welded to the preceding length, developing watertight total pipe strength joints. The casing installation shall produce no upheaval, settlement, cracking, movement, or distortion of the existing roadbed or other facilities. Following placement of the carrier pipe within the steel casing, end link seals are to be installed at each open end. Said end link seals shall be suitable for restraining the external earth load, while allowing internal drainage.

C. Casing pipe holes shall be mechanically bored through the soil by a cutting head on a continuous auger mounted inside the pipe. The distance between the leading end of the first auger section and the leading end of the casing shall be as necessary to maintain a solid plug of spoil material inside the forward portion of the casing.

D. The casing pipe shall be adequately protected to prevent crushing or other damage under jacking pressures. Backstops shall be provided for adequately distributing the jack thrust without causing deformation of the soil or other damage. Should the casing pipe be damaged, such damaged portion not in the hole shall be replaced; however, if installed, the encasement pipe shall be abandoned in place, grouted full, and suitably plugged, and an alternate installation made. An alternate installation will also be required if the casing alignment or elevation substantially deviates from the plan locations, and results in the installation being unusable, as determined by the Project Engineer.

E. Required boring and jacking pits or shafts shall be excavated and maintained to the minimum dimensions necessary to perform the operation. Said excavations shall be adequately barricaded, sheeted, braced and dewatered as required, in accordance with the applicable portions of Section 02204, "Earthwork" and the above–stated regulations/specifications. Boring and jacking pits will normally be no closer than five (5) feet from the edge of pavement, with the permitting agency having final determination of the required setback distance.

END OF SECTION

INDEX TO

SECTION 02511 – ASPHALTIC CONCRETE BASE COURSE

SECTION 02511

ASPHALTIC CONCRETE BASE COURSE

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Asphaltic Concrete Base Course

1.2 RELATED SECTIONS

A. Section 01025 - Measurement and Payment

B. Section 01400 - Quality Control

C. Section 02204 - Earthwork

D. Section 02512 - Asphaltic Concrete Binder/Surface Courses

1.3 MEASUREMENT AND PAYMENT

A. Asphaltic Concrete Base Course: Payment will be made at the contract unit price for pavement replacement and included in the lump sum price for site paving for the Booster Pump Station. Payment will include furnishing and placing base, compaction, testing, and all equipment, labor, and materials necessary to complete the work.

1.4 REFERENCES (LATEST REVISION)

A. ASTM D 946 – Penetration-Graded Asphalt Cement for Use in Pavement Construction.

B. ASTM E 329 – Agencies Engaged in Construction Inspection and/or Testing.

C. ASTM D 2726 – Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures.

D. ASTM D 2950 – Density of Bituminous Concrete in Place by Nuclear Methods.

E. ASTM D 3740 – Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock Used in Engineering Design and Construction.

F. AASHTO T 245 – Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus.

G. AASHTO T 179 – Effect of Heat and Air on Asphalt Materials (Thin-Film Oven Test).

H. AASHTO M 226 – Viscosity Graded Asphalt Cement.

1.5 QUALITY ASSURANCE

A. Perform work in accordance with South Carolina Department of Transportation 2007 Standard Specifications for Highway Construction.

B. Mixing Plant: Conform to South Carolina Department of Transportation 2007 Standard Specifications for Highway Construction.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Do not place asphalt mixture when ambient air temperature is less than that indicated in the Table nor when the surface is wet or frozen.

Lift Thickness	Min. Air Temperature, Degrees F.
1" or Less	55
1.1" to 2"	45
2.1" to 3"	35
3.1" to 4"	30
4.1" to 8"	Contractor's Discretion

B. Place bitumen mixture when mixture temperature is not more than 15 degrees F below bitumen supplier's bill of lading and not more than the maximum specified temperature.

1.7 TESTING

A. Testing laboratory shall operate in accordance to ASTM D 3740 and E 329 and shall be acceptable to the Engineer.

B. The testing laboratory and Project Engineer/Project Representative shall be given a minimum of 48 hours notice prior to taking any tests.

C. Testing shall be the responsibility of the Contractor and shall be performed at the Contractor's expense by a commercial testing laboratory operating in accordance with subparagraph A above.

D. Test results shall be furnished to the Engineer prior to continuing with associated or subsequent work.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Asphalt Cement: PG64-22.

A. Anti-Stripping: Anti-stripping agents or other additives required shall be acceptable to the Engineer prior to their use. Additive delivery systems shall be acceptable to the Engineer.

C. Aggregate shall consist of processed and blended crushed stone and be free of lumps and balls of clay, organic matter, objectionable coatings and other foreign material, and shall be durable and sound. Material shall meet applicable

requirements of Section 310 of the South Carolina Department of Transportation Standard Specifications.

D. Base Mixture: Shall meet Section 310 of the South Carolina State Highway Department Standard Specifications.

2.2 SOURCE QUALITY CONTROL AND TESTS

A. Section 01400 - Quality Control, 01410 - Testing Laboratory Services. Provide mix design for asphalt.

B. Submit proposed mix design for review prior to beginning of work.

C. Test samples in accordance with the requirements of these specifications.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify subbase has been tested, is dry, and gradients and elevations are correct.

B. ON-SITE OBSERVATIONS OF WORK: Owner's Representative or Engineer will have the right to require any portion of work be completed in their presence. If the work is covered up after such instruction, it shall be exposed by the Contractor for observation at no additional cost to Owner. However, if Contractor notifies Owner such work is scheduled, and Owner fails to appear within 48 hours, the Contractor may proceed. All work completed and materials furnished shall be subject to review by the Owner, Engineer, or Project Representative. Improper work shall be reconstructed. All materials, which do not conform to requirements of specifications, shall be removed from the work upon notice being received from Engineer for rejection of such materials. Engineer shall have the right to mark rejected materials to distinguish them as such.

Contractor shall give the Owner, Project Engineer or Project Representative a minimum of 48 hours notice for all required observations or tests.

3.2 PREPARATION

A. Subbase shall be leveled to lines and grades of plans and cleaned of all foreign substances prior to constructing the base course.

Do not place base on soft, muddy, or frozen surfaces.

Correct irregularities in subbase gradient and elevation by scarifying, reshaping, and recompacting.

B. At the time of base course construction, the subbase shall contain no frozen material.

C. The surface of subbase shall be checked by Engineer or Project Representative for adequate compaction and surface tolerances. Ruts or soft yielding spots appearing in areas of the subbase course having inadequate compaction, and

areas not smooth or which vary in elevation more than 3/8 inch above or below required grade established on plans shall be corrected to satisfaction of Engineer or Project Representative. Base material shall not be placed until subbase has been properly prepared and test results have so indicated.

3.3 PLACEMENT

A. Construction shall be in accordance with Sections 310 and 401 of the South Carolina Department of Transportation Standard Specifications.

3.4 TOLERANCES

A. General: All paving shall be subject to visual and straightedge checking during construction operations and thereafter prior to final acceptance. A 10-foot straightedge shall be maintained in the vicinity of paving operation at all times for measuring surface irregularities on all paving courses. The straightedge and labor for its use shall be provided by Contractor. The surface of all courses shall be checked with a straightedge as necessary to detect surface irregularities. Irregularities such as ripping, tearing or pulling, which in the judgment of Engineer indicate a continuing problem in equipment, mixture or operating technique, will not be permitted to recur. The paving operation shall be stopped until appropriate steps are taken by Contractor to correct problem.

B. Flatness: Maximum variation of 1/4 inch measured with an acceptable 10-foot straight edge.

C. Scheduled Compacted Thickness: Within 3/8 inch under tolerance.

D. Variation from Design Elevation: Within 3/8 inch.

E. Base Deficient in Thickness: When measurement of any core indicates base is deficient in thickness, additional cores will be drilled 10 feet either side of the deficient core along centerline of lane until cores indicate thickness conforms to above specified requirements. A core indicating thickness deficiencies is considered a failed test. Base deficient in thickness shall be removed and replaced with the appropriate thickness of materials. If Contractor believes cores and measurements taken are not sufficient to indicate fairly the actual thickness of base, additional cores and measurements will be taken, provided Contractor will bear extra cost of drilling cores and filling holes in roadway as directed.

3.5 FIELD QUALITY CONTROL

A. Section 01400 - Quality Assurance: Field Observation.

B. Density Testing: Performed in accordance with ASTM D-2726 and ASTM D-2950. Core samples for each day's operation shall be taken, tested and results reported to Engineer the following day. The areas sampled shall be properly restored by Contractor at no additional cost to Owner. Compaction must be accomplished when the temperature of mix is above 185 degrees F and below 300 degrees F. Nuclear gauge tests shall be taken during the asphaltic concrete placement.

1. The pavement core and nuclear gauge densities shall range between 94% and 96% of the theoretical maximum density.

C. Temperature:

1. Asphaltic concrete shall not exceed 325 degrees F at any time.

2. Temperature at time of loading shall be recorded on the truck delivery ticket.

D. Frequency of Tests:

1. Asphaltic Concrete - One test for each 250 tons placed.

a. Asphalt extraction and gradation test.

b. Core Sample

2. Field determination of density by nuclear method every 5,000 square feet during construction of the base course.

END OF SECTION

INDEX TO

SECTION 02512 – ASPHALTIC CONCRETE BINDER/SURFACE COURSES

SECTION 02512

ASPHALTIC CONCRETE BINDER/SURFACE COURSES

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Surface Course

B. Binder Course

1.2 RELATED SECTIONS

A. Section 01025 – Measurement and Payment

B. Section 01400 – Quality Control

C. Section 02204 – Earthwork

D. Section 02231 – Aggregate Base Course

1.3 MEASUREMENT AND PAYMENT

A. Asphaltic Concrete Binder Course: Will be paid for at the contract unit price for pavement replacement and included in the lump sum price for site paving for the Booster Pump Station for completed and accepted binder course for the thickness specified.

B. Asphaltic Concrete Surface Course: Will be paid for at the contract unit price for pavement replacement and included in the lump sum price for site paving for the Booster Pump Station for completed and accepted surface course for the thickness specified.

C. Tack Coat: Will be paid for at the contract unit price for pavement replacement and included in the lump sum price for site paving for the Booster Pump Station for base or pavement covered.

D. Payment for pavement and tack coat will be in full for preparing and cleaning, providing all materials, labor and equipment including placing, compacting and testing.

1.4 REFERENCES (LATEST REVISION)

A. ASTM D 946 – Penetration-Graded Asphalt-Cement for Use in Pavement Construction.

B. ASTM E 329 – Agencies Engaged in Construction Inspection and/or Testing.

C. ASTM D 3740 – Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock Used in Engineering Design and Construction.

D. ASTM D 2726 – Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures.

E. ASTM D 2950 – Density of Bituminous Concrete in Place by Nuclear Methods.

F. ASTM D 1188 – Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Coated Samples.

G. ASTM D 1754 – Effect of Heat and Air on Asphaltic Materials (Thin-film Oven Test).

1.5 QUALITY ASSURANCE

A. Perform work in accordance with South Carolina Department of Transportation 2007 Standard Specifications for Highway Construction.

B. Mixing Plant: Conform to South Carolina Department of Transportation 2007 Standard Specifications for Highway Construction.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Do not place asphalt mixture when ambient air temperature is less than that indicated in the Table nor when the surface is wet or frozen.

Lift Thickness	Min. Air Temperature, Degrees F.
1" or Less	55
1.1" to 2"	45
2.1" to 3"	40
3.1" to 4.5"	35

B. Mixture shall be delivered to the spreader at a temperature between 250 degrees F and 325 degrees F.

1.7 GUARANTEE

A. Contractor shall guarantee the quality of materials, equipment, and workmanship for a period of 12 months after acceptance. Defects discovered during this period shall be repaired by the Contractor at no cost to the Owner.

1.8 TESTING

A. Testing laboratory shall operate in accordance with ASTM D 3740 and E 329 and be acceptable to the Engineer.

B. Testing laboratory and Project Engineer/Project Representative shall be given a minimum of 48 hours notice prior to taking any tests.

C. Testing shall be Contractor's responsibility and shall be performed at Contractor's expense by a commercial testing laboratory operating in accordance with subparagraph A above.

D. Test results shall be furnished to the Engineer prior to continuing with associated or subsequent work.

PART 2 – PRODUCTS

2.1 TACK COAT

A. Shall consist of asphalt binder (asphalt cement) or emulsified asphalt, conforming to Section 401 of the South Carolina Department of Transportation 2007 Standard Specifications for Highway Construction. Asphalt binder shall be PG64-22. The acceptable grades of emulsified asphalt are RS-1, MS-1, MS-2, HFMS-1, HFMS-2, SS-1, CRS-1, CRS-2, CMS-2, and CSS-1.

2.2 ASPHALT BINDER AND ADDITIVES

A. Shall be PG64-22 and conform to Section 401 of the South Carolina Department of Transportation 2007 Standard Specifications for Highway Construction.

B. Anti-Stripping: Shall conform to requirements of Section 401 of the South Carolina Department of Transportation 2007 Standard Specifications for Highway Construction.

2.3 AGGREGATES

A. General: Mineral aggregate shall be composed of fine aggregate or a combination of fine and coarse aggregate. Coarse aggregate shall be that portion of the material retained on a No. 4 sieve.

Fine aggregate shall be considered that portion passing the No. 4 sieve. Fine aggregate, coarse aggregate, and any additives in combination with the specified percentage of asphalt cement shall meet the requirements of tests specified, before acceptance may be given for their individual use. Marine (Fossiliferous) limestone shall not be used.

B. Fine Aggregate: Shall conform to the requirements of Section 401 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.

C. Coarse Aggregate: Shall be granite stone and conform to the requirements of Section 401 of the South Carolina Department of Transportation 2007 Standard Specifications for Highway Construction.

D. Surface Course: The surface course shall consist of fine and coarse aggregate and mineral filler uniformly mixed with hot asphalt binder in an acceptable mixing plant. The plant shall conform to South Carolina Department of Transportation 2007 Standard Specifications for Highway

Construction. The gradations, asphalt content and air voids shall be the following:

TYPE C	
Square Sieve	% Passing
3/4 inch	100
1/2 inch	97 – 100
3/8 inch	83 – 100
No. 4	58 – 80
No. 8	42 – 62
No. 30	20 – 40
No. 100	8 – 20
No. 200	3 – 9
% Asphalt Binder	5.0 – 6.8
Air Voids, %	3.5 – 4.5

E. Intermediate or Binder Course: The mineral aggregates and asphalt binder shall be combined in such proportions the composition by weight of the finished mixture shall be within the following range limits:

TYPE B	
Sieve Designation	Percentage by Weight Passing
1 inch	100
3/4 inch	90 – 100
1/2 inch	75 – 90
3/8 inch	64 – 80
No. 4	38 – 54
No. 8	22 – 36
No. 30	8 – 22
No. 100	3 – 10
No. 200	2 – 8
% Asphalt Binder	4 – 6
Air Voids, %	3.5 – 4.5

2.4 SOURCE QUALITY CONTROL AND TESTS

A. Section 01400 – Quality Control and Section 01410 - Testing Laboratory Services.

B. Submit proposed mix design for review prior to beginning of work.

C. Test samples in accordance with the requirements of these specifications.

PART 3 – EXECUTION

3.1 EXAMINATION

A. On-Site Observations: Owner's Representative or Engineer will have the right to require any portion of work be completed in their presence. If work is covered up after such instruction, it shall be exposed by the Contractor for observation at no additional cost to Owner. However, if Contractor notifies Engineer such work is scheduled, and Engineer fails to appear within 48 hours, the Contractor may proceed. All work completed and materials furnished shall be subject to review by the Engineer or Project Representative. Improper work shall be reconstructed. All materials, which do not conform to requirements of specifications, shall be removed from the work upon notice being received from Engineer for rejection of such materials. Engineer shall have the right to mark rejected materials to distinguish them as such.

Contractor shall give the Owner, Project Engineer or Project Representative a minimum of 48 hours notice for all required observations or tests.

B. Contractor shall verify base has been tested, is dry, and slopes and elevations are correct.

3.2 PREPARATION

A. Apply tack coat in accordance with Section 401 of the South Carolina Department of Transportation 2007 Standard Specifications for Highway Construction. Rate of application shall be 0.05 to 0.15 gallons per square yard of surface.

B. Work shall be planned so no more tack coat than is necessary for the day's operation is placed on the surface. All traffic not essential to the work should be kept off the tack coat.

C. Apply tack coat to contact surfaces of curbs and gutters. Apply in manner so exposed curb or gutter surfaces are not stained.

D. Coat surfaces of manhole frames and inlet frames with oil to prevent bond with asphalt pavement. Do <u>not</u> tack coat these surfaces.

3.3 PLACEMENT

A. Construction shall be in accordance with Sections 401, 402, and 403 of the South Carolina Department of Transportation 2007 Standard Specifications for Highway Construction.

B. Asphaltic concrete shall not be placed on a wet or frozen surface.

C. Compaction shall commence as soon as possible after the mixture has been spread to the desired thickness. Compaction shall be continuous and uniform over the entire surface. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment. Perform rolling with consecutive passes to achieve even and smooth finish without roller marks. Compaction rolling shall be complete before material temperature drops below 175° F.

D. Areas of pavement with deficient thickness or density shall be removed and replaced at no additional cost to the Owner.

3.4 TOLERANCES

A. General: All paving shall be subject to visual and straightedge evaluation during construction operations and thereafter prior to final acceptance. A 10-foot straightedge shall be maintained in the vicinity of the paving operation at all times for the purpose of measuring surface irregularities on all paving courses. The straightedge and labor for its use shall be provided by the Contractor. The surface of all courses shall be checked with the straightedge as necessary to detect surface irregularities. Irregularities such as rippling, tearing or pulling, which in the judgment of the Engineer indicate a continuing problem in equipment, mixture or operating technique, will not be permitted to recur. The paving operation shall be stopped until appropriate steps are taken by the Contractor to correct the problem.

B. Flatness: All irregularities in excess of 1/8 inch in 10 feet for surface courses and 1/4 inch in 10 feet for intermediate courses shall be corrected.

C. Variation from Design Elevation:

1. General Paving: Less than 1/4 inch.

2. Accessible Routes: Shall not exceed 1/4 inch. However, accessible routes shall not exceed maximum ADA allowable slopes. Contractor shall remove and replace any and all portions of the accessible route that exceed maximum ADA allowable slopes.

D. Scheduled Compacted Thickness: Within 1/4 inch per lift.

E. Pavement Deficient in Thickness: When measurement of any core indicates the pavement is deficient in thickness, additional cores will be drilled 10 feet either side of the deficient core along the centerline of the lane until the cores indicate the thickness conforms to the above specified requirements. A core indicating thickness deficiencies is considered a failed test. Pavement deficient in thickness shall be removed and replaced with the appropriate thickness of materials. If the Contractor believes the cores and measurements taken are not sufficient to indicate fairly the actual thickness of the pavement, additional cores and measurements will be taken, provided the Contractor will bear the extra cost of drilling the cores and filling the holes in the roadway as directed.

3.5 FIELD QUALITY CONTROL

A. Acceptance of the in-place density of the binder and surface courses shall be in accordance with the South Carolina Department of Transportation 2007 Standard Specifications for Highway Construction.

B. Density Testing: Performed in accordance with ASTM D-2726 and ASTM D-2950. Core samples for each day's operation shall be taken, tested and results reported to the Engineer the following day. The areas sampled shall be properly restored by the Contractor at no additional cost to the Owner. Nuclear gauge tests shall be taken during the asphaltic concrete placement.

1. The pavement core and nuclear gauge densities shall range between 94% and 96% of the theoretical maximum density.

C. Temperature:

1. Asphaltic concrete shall not exceed 325 degrees F at any time.

2. Asphaltic concrete shall not be placed once the temperature of the mix falls below 250 degrees F or the delivered temperature is more than 15 degrees F below the batch plant's delivery ticket.

3. Temperature at time of loading shall be recorded on the truck delivery ticket.

D. Frequency of Tests:

1. Asphaltic Concrete – One test for each 250 tons placed.

a. Asphalt extraction and gradation test.

b. Core Sample

2. Field determination of density by nuclear method every 5,000 square feet during construction of the asphaltic concrete binder/surface course.

END OF SECTION

INDEX TO

SECTION 02558 – HORIZONTAL DIRECTIONAL DRILLING (HDD)
INADVERTENT RELEASE CONTROL PLAN (IRCP)

SECTION 02558

HORIZONTAL DIRECTIONAL DRILLING (HDD)
INADVERTENT RELEASE CONTROL PLAN (IRCP)

PART 1 – GENERAL

1.1 DESCRIPTION

Installation of a pipeline using a trenchless excavation method is known as horizontal directional drilling (HDD). A primary environmental impact potentially associated with HDD is inadvertent release of drilling fluids/mud (water/bentonite mixture) to the surface during construction (sometimes referred to as "frac-out"). Objective of this section is to provide procedures which will minimize the potential for release of drilling fluids/mud into wetlands, waterbodies or onto adjacent surface soils.

1.2 SCOPE OF WORK

HDD is to be conducted in accordance with an Inadvertent Release Control Plan (IRCP). As such, HDD will be conducted in a manner to prevent inadvertent releases of drilling mud. Contractor shall have a written IRCP which shall address the "Containment, Response and Notification". This plan shall elaborate on measures to be implemented if a release occurs despite prevention efforts. The plan is to be implemented if a release occurs despite prevention efforts. The plan is to be implemented as appropriate by the Contractor under supervision of Regulatory Agencies to contain, control and clean up any release of drilling mud during HDD pipeline construction. Prior to commencement of HDD operations, Contractor shall inform construction personnel involved in HDD as to the responsible party(ies) for release containment and response. Contractor will ensure the appropriate response personnel and containment equipment are on site for each HDD. A copy of the plan shall be submitted to Owner and Engineer for review prior to any drilling taking place. A copy of the plan shall be onsite during drilling activities.

At a minimum, sediment control devices and spill control barriers (such as straw bales, silt fence or similar) shall be erected between the bore site and nearby areas such as wetlands, rivers, and critical lines to prevent material from reaching these areas. The drilling entry and exit areas will be surrounded by a barrier and/or sediment control device to control spill. These devices shall be as approved by the Regulatory Agencies. All barriers shall be installed according to the Regulatory Agency requirements.

Prior to initiating construction activities, Owner, Engineer and Contractor will review applicable permits to ensure Contractor and all personnel involved are made aware of and understands the permit and its requirements, including any special conditions of the permit, monitoring of the project required by the permit, implementation of the IRCP (frac-out) Response Plan and the implementation of Best Management Practices (BMP) during all phases of construction which are designed to prevent release of sediment or deleterious substances into adjacent wetlands or waterways. It is the responsibility of Owner to initiate this meeting. Additionally, wetland boundaries will be marked in the field and silt fencing will be established along these boundaries by Contractor prior to any other land disturbing activities on site.

1.3 MEASUREMENT AND PAYMENT

No separate payment will be made for preparation and/or implementation of the IRCP, including but not limited to plan preparation, observation, response, agency notifications, cleanup, containment, etc. Payment shall be incidental to cost of HDD work and considered a subsidiary obligation of the contract.

1.4 ON-SITE OBSERVATION DURING CONSTRUCTION

A. During construction of a directionally-drilled crossing, pipeline construction personnel will monitor pipeline route throughout the process, as follows:

1. The drill path will be continually monitored during active drilling with mud circulation;

2. Construction observers will be briefed on what to watch for and will be made aware of the importance of timely detection and response actions to any release of drilling mud;

3. Construction observers will have appropriate, operational communication equipment (e.g. radio, cell phones) available at all times during installation of the directionally drilled crossing, with ability to communicate directly with HDD operations control center;

4. If HDD operator realizes a sustained loss in fluid pressure or loss of circulation, operator will immediately notify construction observers of the assumed position of drill head and forward drilling progress will be temporarily suspended until area is reviewed;

5. Construction observers will have the authority to order installation of containment structures, if needed, and to require additional response measures if deemed appropriate;

6. Contractor shall maintain records on drilling fluid pumping rates, pressure, viscosity, density, etc. throughout the course of drilling; and

7. If drilling at night is required, appropriate lighting shall be provided.

B. Monitoring the project site during all phases of construction will be conducted by Contractor. Contractor will visually inspect the project site at least twice daily (AM and PM) for compliance with BMP's and to ensure work is proceeding as permitted and conditions are such that problems are not anticipated and an inadvertent release or frac-out has not occurred. Inspection logs will be maintained on-site and will contain the date and time of all inspections and will note any problems or potential problems or other items of interest. All actions occurring on-site causing problems with work or a temporary stop in work will be noted in the log. Daily photographs will also document progress of work, the integrity of any sediment control measures and compliance with permit conditions.

1.5 RESPONSE TO INADVERTENT RELEASES

A. If an inadvertent drilling mud release is observed during an HDD crossing, the release will be assessed to determine amount of drilling mud being released and potential for release to reach sensitive resource areas (e.g. wetlands and waterbodies). Response measure will vary based on location of inadvertent release as discussed below.

1. Upland Locations:

Response measures include:

a. Evaluate release to determine if containment structures are warranted and if they will effectively contain the release;

b. Order installation of containment measures as needed (see Section 1.6); and

c. Initiate immediate suspension of drilling operations if the mud release cannot be effectively contained.

2. Wetland Location:

This section also applies to areas immediately adjacent to wetlands and waterbodies, such as stream banks or steep slopes, where drilling mud releases could quickly reach surface water.

Response measures include:

a. Evaluate release to determine the most effective containment measures;

b. Order installation of containment measures (see Section 1.6);

c. Initiate immediate suspension of drilling operations if the mud release cannot be effectively contained;

d. Review and adjust drill pressures, pump volume rates, and drill profile to minimize extent of the release;

e. Further evaluate the current drill circumstances and site conditions to identify potential means to prevent further inadvertent release events; and

f. If necessary, suspend drilling operations in accordance with Section 1.6 and in consultation with the Owner and Engineer, and notify appropriate regulatory agencies in accordance with Section 1.7.

1.6 CONTAINMENT

A. Containment, response and clean-up equipment will be available at both sides of HDD crossing location prior to commencement of HDD to assure a timely response in the event of an inadvertent release of drilling mud (i.e. frac-out). Containment and response equipment includes but is not limited to:

1. Straw bales, sediment logs, and staking;
2. Silt fence;
3. Plastic sheeting;
4. Shovels and other appropriate hand tools;
5. Squeegees;
6. Pails;
7. Push brooms;
8. Pumps and sufficient hose;
9. Mud storage tanks;
10. Vacuum truck on 24-hour call or on site;
11. Pre-filled sandbags;
12. Geotextile fabric;
13. One small boat (for larger rivers and open water wetlands);
14. Steel box or large-diameter pipe section (or the equivalent) that, under appropriate conditions, could be used to contain a frac-out;
15. Floating containment booms;
16. Standby power; and
17. Lights for possible work at night.

B. Contractor will immediately implement measures to contain any release of sediment or other deleterious substance into adjacent wetlands or waterbodies.

Upland Locations:

1. Deploy appropriate containment measures to contain and recover drilling mud as feasible;
2. Remove excess mud at a rate sufficient to prevent an uncontrolled release;

3. If the amount of surface release is not great enough to allow practical physical collection from affected area, it shall be diluted with clean water and/or allowed to dry and dissipate naturally; and

4. If the amount of surface release exceeds that which can be completely contained with hand-placed barriers, small collection sumps (less than 5 cubic yards) may be used to remove released drilling mud by use of portable pumps and hoses.

C. Wetland and Waterbody Locations:

This section also applies to areas immediately adjacent to wetlands and waterbodies, such as pond edges, stream banks or steep slopes, where drilling mud releases could quickly reach sensitive water resource areas.

1. In the event of a drilling mud release in wetlands, waterbodies, or adjacent areas:

   a. The release will be evaluated, and appropriate containment measures will be deployed;

   b. Emergency containment measures will be deployed as feasible, based on site-specific conditions, including location of the release;

   c. Following containment, recovery measures will be evaluated to determine the most effective collection method;

   d. Drilling operations will be suspended if, as determined by Owner, containment measure do not effectively control the release; and

   e. Agency and project management personnel will be notified in accordance with Section 1.7.

2. Owner and Contractor shall immediately consult with appropriate regulatory agencies to evaluate circumstances of the release, discuss additional containment or cleanup requirements, and determine whether and under what conditions HDD may proceed (see Section 1.8);

3. If the amount of surface release is not great enough to allow practical physical collection from affected area without causing additional impacts, it shall be diluted with clean water and/or allowed to dry and dissipate naturally;

4. If the amount of surface release exceeds that which can be contained with hand-placed barriers, small collection sumps (less than 5 cubic yards) may be excavated to collect released drilling mud for removal by use of portable pumps and hoses;

5. Excess mud will be held within the containment area and removed using pumps or other appropriate measures at a rate sufficient to maintain secure containment;

6. Removed mud will be stored in a temporary holding tank or other suitable structure out of the floodplain and/or wetland for reuse or eventual disposal in an acceptable disposal facility;

7. If spill affects a vegetated area, the area shall be seeded and/or replanted similar to preconstruction conditions. Re-vegetation must be successful within the warranty period or Contractor shall replant at no additional cost to Owner.

1.7 NOTIFICATION AND RESUMPTION OF SUSPENDED HDD OPERATIONS

For all drilling mud releases during HDD crossings, Contractor will notify Engineer and Owner immediately. If Engineer determines the release affects wetland or in-stream area, he or she will immediately notify Owner and appropriate regulatory agencies.

If notifications are necessary during non-business hours they will be done according to prior arrangements made between the Owner and regulatory agencies. Follow-up notifications will be made as necessary and practicable.

The conditions under which HDD operations can resume will be discussed with appropriate regulatory agencies and/or field representatives. If containment measures are functioning, and circumstances and potential impacts of the release are understood, HDD operations may resume.

1.8 CLEAN-UP

A. Clean-up measures following mud releases in uplands, wetlands, and waterbodies will be implemented as determined by this plan and in consultation with the appropriate regulatory agencies. Contractor shall coordinate with governing regulatory agencies, Owner and Engineer to determine the appropriate method for cleaning up affected areas and appropriate methods for disposing of sediment or deleterious substances. The following measures are to be considered as appropriate:

1. Drilling mud will be cleaned up by hand shovels, buckets and soft-bristled brooms as possible without causing extensive ancillary damage to existing vegetation. Clean water washes may also be employed if deemed beneficial and feasible;

2. Containment structures will be pumped out and the ground surface scraped to bare topsoil without causing undue loss of topsoil or ancillary damage to existing and adjacent vegetation;

3. Material will be collected in containers for temporary storage prior to removal from the site; and

4. Potential for secondary impact from clean-up process is to be regularly evaluated and clean-up activities terminated if physical damage to the site is deemed to exceed benefits of removal activities in consultation with appropriate regulatory agencies and/or field representative.

5. Water containing mud, silt, bentonite or other pollutants from operations, washing or other clean-up activities, shall not be allowed to enter any waterbody, marsh or wetland area. Also, all such pollutants shall be cleaned up.

1.9 RESTORATION AND POST-CONSTRUCTION MONITORING

Following clean-up activities, restoration and re-vegetation of affected areas will be completed by Contractor to restore the site to equal or better than its original condition. All affected areas will be fully stabilized and re-vegetated as appropriate. The site will be reviewed during warranty period to assure adequate restoration. If the site does not restore to equal or better than original conditions, subsequent re-vegetation shall be made by Contractor as part of warranty work.

1.10 ABANDONMENT PLAN

If for any reason, it becomes necessary to suspend HDD operations and/or abandon partially completed drill holes, the following procedures will be implemented:

A. During Pilot Hole Drilling:

If drilling is suspended during reaming of the hole;

1. If possible, reamer will be pushed back to the exit end, then:

   a. Reamer will be replaced with a cementing head; and

   b. Drill string will be withdrawn and the hole will be pumped with cement or Engineer and industry-accepted fill material to displace drilling fluid.

2. If reamer cannot be pushed back to the exit end, then:

   a. Drill string will be withdrawn and the hole will be pumped with cement or Engineer and industry-accepted fill material to displace drilling fluid;

   b. Drilling rig will rig down at the entry end and rig up at exit end;

   c. Drilling rig will run in the pilot hole with cement head on pilot hole drill string until previously cemented reamed hole is bumped; and

   d. Drill string will be withdrawn and hole pumped with cement or Engineer and industry-accepted fill material to displace the drilling fluid.

B. HDD Realignment:

If it is found necessary to abandon original location, the proposed alignment will be modified to accommodate a new drill. The proposed new exit and entry areas will be surveyed for sensitive biological and cultural resources, and agencies with regulatory control will be contacted to amend permits as needed.

In case of abandonment, an additional attempt at completing the horizontal direction drill may be made in proximity to previous route. A new hole will be drilled in the same general area as initial drill hole. No alternative crossing method will be implemented (i.e. wet trench) without the proper agency notification and permits. All work will occur at no additional cost to the Owner.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

3.1 IRCP

Contractor shall prepare a written IRCP and submit it to Owner, Engineer and regulatory agencies for concurrence. The IRCP shall be revised to include all comments from these entities and final IRCP shall remain on site. HDD Project Superintendent shall be familiar with the IRCP and shall have authority to implement it.

END OF SECTION

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SECTION 02559 – HORIZONTAL DIRECTIONAL DRILLING (HDD)

SECTION 02559

HORIZONTAL DIRECTIONAL DRILLING (HDD)

PART 1 – GENERAL

1.1 WORK INCLUDED:

A. The work under this Section is horizontal directional drilling which shall include all work, materials, labor and related necessary for the installation of Fusible Polyvinylchloride (FPVC) pressure pipe, as shown on the Drawings and as specified herein. Services provided by the Contractor shall be performed in accordance with the current industry practice and these Specifications. The Contractor shall accomplish, but is not limited to, the following tasks:

1. Site preparation necessary for construction.
2. Transportation of all equipment, labor, and material to and from the project location.
3. Provide and assemble FPVC carrier pipe.
4. Erection and dismantling of drilling equipment at the project location.
5. Drilling of a small diameter pilot hole along the alignment.
6. Reaming the pilot hole to a diameter suitable for installation of the casing pipe.
7. Pulling the assembled casing and FPVC carrier pipe through the reamed hole along with a detector wire.
8. Hydrostatic testing of the FPVC pipe.
9. Disinfection and bacteriological testing of FPVC pipe before and after installation.
10. Removal of all equipment and materials upon completion of construction.
11. Cleanup and final restoration of all work areas.

B. Related Work:

1. Work associated with providing and installing FPVC pipe is specified in Section 02610 of these Specifications.

1.2 OBSERVATION:

The Contractor will provide and maintain instrumentation, which will accurately locate the pilot hole, measure drilling fluid flow discharge rate and pressure at all times. The Engineer will have access to these instruments and readings.

1.3 SUBMITTALS:

Shop drawings shall be submitted, as required by the contract documents, for the following:

1. Installation Plan: At least 30 days prior to mobilizing equipment, Contractor shall submit detailed installation plan to the Engineer. The plan shall include a detailed plan and profile of the proposed bores and shall be plotted at a scale no smaller than 1–inch equals 20 feet vertical and horizontal.

2. Details describing the proposed method of directional drilling. This shall include, but is not limited to, arrangement of equipment, location and size of drilling and receiving pits, methods of dewatering, method of removing spoils material, size and capacity of equipment, method of installing pipe, method of installing detection wire, pipe and seals, support segments, method of monitoring and controlling line and grade and provisions for protecting existing structures. Directional drilling work shall not proceed until shop drawings have been reviewed and accepted by the Engineer. If, in the opinion of the Engineer, modifications to the methods are necessary during construction, the Engineer may direct the Contractor to discontinue any directional drilling activities until proper drawings are submitted and accepted delineating such modifications.

3. Bentonite/drilling mud or other drilling fluid: product information, material specifications, handling procedures, pit lining material, material safety data sheet, special precautions required, and method of mixing and application.

4. Methods and material for joining ends of directionally drilled pipe segments.

5. A South Carolina Registered Professional Engineer other than Thomas & Hutton Engineering Co. shall design the final casing (if applicable) and FPVC pipe wall thickness and shall submit the stamped design calculations to the Owner (assume the area between the casing and the FPVC pipe contains water).

6. Manufacturer's certificate documenting the pipe and fittings has been tested and meet the specifications.

7. Equipment: Contractor will submit specifications on directional drilling equipment used to ensure the equipment will be adequate to complete the project. Equipment shall include, but not be limited to, drilling rig, mud system, mud motors (if applicable), down–hole tools, guidance system, and rig safety systems. Calibration records for guidance equipment shall be included. Specifications for any drilling fluid additives the Contractor intends to use or might use will be submitted.

8. Material: Specifications on materials used shall be submitted to Engineer. Material shall include the pipe, fittings, and any other item to be an installed component of the project.

1.4 QUALITY ASSURANCE:

The requirements set forth in this document specify a wide range of procedural precautions necessary to ensure the very basic, essential aspects of a proper directional bore installation are adequately controlled. Strict adherence shall be required under specifically covered conditions outlined in this specification or within any associated permit (i.e.: DHEC, DOT, etc.). Adherence to the specifications contained herein, or the Representative's acceptance on any aspect of any directional bore operation covered by this specification, shall in no way relieve the Contractor of their ultimate responsibility for the satisfactory completion of the work authorized under the Contract. The HDD contractor shall be responsible for the repair of all damage to private and/or public property (at no expense to the Owner. Repair work shall meet all local and state rules and requirements.

1.5 QUALIFICATIONS:

A. The work shall be accomplished by trained workers with a minimum of three years of directional drill experience. The Contractor's on–site superintendent shall have a minimum of five years' experience. The Contractor shall have installed directionally drilled pipe at least as large as 16 inches in diameter and have performed crossings at least 1,000 feet in length.

B. A South Carolina Professional Engineer, other than Thomas & Hutton Engineering Co., shall design the final casing size and thickness and FPVC pipe wall thickness and shall submit the stamped design calculations to the Owner (assuming the area between the casing (if applicable) and the FPVC pipe contains water).

C. Experience: Each bidder shall submit a list of experience with their bid for the directional drilling Contractor (or Subcontractor) presenting similar experience on at least five projects involving road crossings of 12 inches or greater in the Contractor's qualification form.

D. Material and equipment shall be the standard product of a manufacturer who has manufactured them for a minimum of two years and who provides published data on the quality and performance of the product.

A subcontractor for any part of the work must have experience on similar work and, if required, furnish the Engineer with a list of projects and Owners or Engineers who are familiar with its competence.

All testing of the piping shall be made by the Contractor with equipment qualified by the Owner, Engineer, or utility company and in the presence of the Engineer, Owner and utility company. The Engineer or Project Representative reserves the right to accept or reject testing equipment.

1.6 REFERENCES:

1. This section contains references to the following documents. They are a part of this section as specified and modified. Where a referenced document contains references to other standards, those other standards are included as references under this section as if referenced directly. In the event of a conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

2. Unless otherwise specified, references to documents shall mean the documents in effect at the time of design, bid, or construction, whichever is earliest. If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued.

3. Where documents dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, regardless of whether the document has been superseded by a version with a later date, discontinued, or replaced.

REFERENCE	TITLE
ANSI/ASSE A10.16	Safety Requirements for Tunnels, Shafts and Caissons
ANSI/AWWA C206	Polyethylene (PE) Pressure Pipe and Fittings, 4-inch through 63-inch, for Water Distribution American Society for Testing and Materials (ASTM) Standards.
ANSI/AWWA C651	AWWA Standard for Disinfecting Water Mains
ANSI/AWWA C906	Polyethylene (PE) Pressure Pipe and Fittings, 4-inch through 63-inch, for Water Distribution American Society for Testing and Materials (ASTM) Standards.
ASTM A53/A53M	Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A126	Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings
ASTM A530/A530M	Specification for General Requirements for Specialized Carbon and Alloy Steel Pipe
ASTM A865	Specification for Threaded Couplings, Steel, Black, or Zinc-Coated (Galvanized) Welded or Seamless, for Use in Steel Pipe Joints
ASTM D638	Standard Test Method for Tensile Properties of Plastics.
ASTM D2122	Standard Method of Determining Dimensions of Thermoplastic Pipe and Fittings.
ASTM D2321	Standard Practice for Underground Installation of Flexible Thermoplastic Pipe for Sewers and Other Gravity–Flow Applications
ASTM D2683	Standard Specification for Socket–Type Polyethylene Fittings for Outside Diameter–Controlled Polyethylene Pipe and Tubing.
ASTM D2837	Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials.
ASTM D3035	Standard Specification for Polyethylene (PE) Plastic Pipe (SDR–PR) Based on Controlled Outside Diameter.
ASTM D3261	Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing
ASTM D3350	Standard Specification for Polyethylene Plastics Pipe and Fittings Materials

REFERENCE	TITLE
ASTM E3261	Standard Specification for Butt Heat Fusion Polyethylene Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
ASTM F412	Standard Terminology Relating to Plastic Piping Systems.
ASTM F714	Standard Specification for Polyethylene (PE) Plastic Pipe (SDR–PR) Based on Outside Diameter.
ASTM F1962	Standard Guide for Use of Maxi-Horizontal Directional Drilling for Placement of Polyethylene Pipe or Conduit Under Obstacles, Including River Crossings
ASTM F2620	Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings.

1.7 PRODUCT DELIVERY, STORAGE & HANDLING:

Material shall be unloaded in a manner avoiding damage and shall be stored where it will be protected and will not be hazardous to traffic. The Contractor shall repair any damage caused by the storage. Material shall be examined before installation and neither damaged nor deteriorated material shall be used in the work. Owner and Engineer have the right to reject defective or damaged material. If stored on private property, Contractor shall obtain permission from the property owner and shall repair all damage caused by the storage.

1.8 SEQUENCING AND SCHEDULING:

The Contractor shall arrange work so sections of mains between valves are tested, sterilized, pavement replaced, and the section placed in service as soon as reasonable after it is placed. Owner reserves the right to dictate the sequence of construction.

1.9 ALTERNATIVES:

The intention of these specifications is to define the acceptable methods and materials for installing FPVC Pipe by horizontal directional drilling and to produce the best system for Owner. If Contractor suggests alternative material, equipment or procedures will improve results at no additional cost, the Engineer and Owner will examine suggestion, and if it is accepted, it may be used. The basis upon which acceptance of an alternative will be given is its value to Owner, and not for convenience of Contractor.

1.10 CALCULATIONS:

The Contractor shall submit final design calculations for Owner's and Engineer's review and acceptance within 90 days of receiving notice to proceed. Final design calculations shall support the Contractor's specific proposed means, methods, and products. The Contractor's final design calculations shall be prepared and sealed by a Licensed Professional Engineer registered to practice in the State of South Carolina and retained by the Contractor. Horizontal directional drilling shall not commence until the Contractor has

received written acceptance of all design calculation submittals from Owner's and Engineer's.

At a minimum, design calculations shall demonstrate the proposed pipe, equipment, and means and methods comply with requirements of this Section and have been designed based on the design bore path, and installation means and methods, for anticipated installation and handling, hydrostatic, earth, and live loads, installation temperature and site conditions. Design calculations shall address the considerations and guidelines presented in ASTM F1962.

The Contractor shall supply copies of all other calculations required to support the required submittals for horizontal directional drilling. At a minimum, the following calculations should be included:

A. Maximum allowable pipe loading limits

B. Pullback load calculation based upon proposed drill path plan and profile.

C. Buoyancy effect calculations.

D. Effects of ballasting plan on pipe pullback forces.

E. Hydrofracture analysis. This should include a maximum annular pressure curve and the respective formation pressure versus depth based on proposed drill plan and profile.

F. Confirmation that design parameters do not exceed predicted installation stresses including factors such as tensile load, buckling and deformation.

1.11 GUARANTEE:

Contractor shall guarantee the quality of materials, equipment, and workmanship for a period of 18 months after final project acceptance. Defects discovered during period shall be repaired by the Contractor at no cost to the Owner. Contractor shall provide an 18–month guarantee.

1.12 WARRANTY:

Contractor shall supply to Owner and a two (2) year unconditional warranty. Warranty shall include materials and installation and shall constitute complete replacement and delivery to the site of materials and installation of same to replace defective materials or defective workmanship with new materials/workmanship conforming to project specifications.

Pipe manufacturer shall provide a warranty to Contractor stating the pipe conforms to these specifications and pipe shall be free from defects in materials and workmanship for a period of two (2) years from date of substantial completion of installation. Manufacturer's warranty shall be in a form acceptable to and for the benefit of Owner and shall be submitted by Contractor as a condition of final payment. Manufacturer's warranty to Contractor shall in no way relieve Contractor from its unconditional warranty to Owner.

Contractor shall warrant to Owner the methods used in the contract, where covered by

patents or license agreements, are furnished in accordance with such agreements and prices included herein cover all applicable royalties and fees in accordance with such license agreements. Contractor shall defend, indemnify, and hold Owner and Engineer harmless from and against any and all costs, loss, damage or expense arising out of, or in any way connected with, any claim of infringement of patent, trademark, or violation of license agreement.

1.13 EXISTING UTILITIES:

All known utility facilities are shown schematically on plans, and are not necessarily accurate in location as to plan or elevation. Utilities such as service lines or unknown facilities not shown on plans will not relieve the Contractor of responsibility under this requirement. "Existing Utilities Facilities" means any utility existing on the project in its original, relocated, or newly installed position. Contractor will be held responsible for the cost of repairs to damaged underground facilities – even when such facilities are not shown on plans. Contractor shall contact all utility companies prior to beginning work and request an accurate field location of their respective utility lines. Contractor shall also be responsible for exposing ("potholing") existing utilities as required by utility owner to verify horizontal and vertical position of utility prior to start of bore operations. There will be no separate measurement or payment for any and all labor, equipment, or materials, or incidentals required to locate and expose existing utilities. These costs shall be considered a subsidiary obligation of the contract.

1.14 ENVIRONMENTAL PROTECTION:

Contractor shall place silt fence between all drilling operations and any drainage, wetland, waterway or other area designated for such protection by contract documents, state, federal and local regulations. Contractor shall place hay bales, or acceptable protection, to limit intrusion upon project area. Additional environmental protection necessary to contain any hydraulic or drilling fluid spills shall be put in place, including berms, liners, turbidity curtains and other measures. Contractor shall adhere to all applicable environmental regulations including environmental condition stated in local, state and federal permits. Fuel may not be stored in bulk containers (greater than 25 gallons) within 200' of any water–body or wetland.

1.15 CONNECT NEW MAIN TO EXISTING SYSTEM:

Contractor shall furnish necessary pipe and perform all excavation, dewatering, shoring, backfilling, etc., necessary to make the connection of a new main to existing system to be or already installed by others. Contractor shall contact the utility a minimum of 72 hours in advance of construction. Contractor shall be responsible for coordinating construction with the utility.

1.16 DAMAGE TO EXISTING SYSTEM:

Damage to any part of existing system by Contractor or Subcontractors, which is repaired by Utility Owner's forces, or an acceptable Contractor shall be charged to the Contractor on basis of time and material, plus an overhead and administration charge using Commission's multiplier, or plus 30% for overhead and administration for an acceptable Contractor.

1.17 CONSTRUCTION RECORDS:

A. Daily Reports: The Contractor shall maintain daily activity reports throughout all horizontal directional drilling operations, including pipe installation. A sample daily report shall be submitted to Engineer for acceptance prior to the commencement of drilling operations. Daily reports shall be submitted within 24 hours of completion, and shall include, for each drill rod added or withdrawn, or every 30 feet during drilling, pre–reaming, and pullback:

1. Downhole tools and equipment in use.
2. Description of ground conditions encountered.
3. Description of drilling fluid.
4. Drilling fluid pumping rate.
5. Maximum and minimum downhole fluid pressures.
6. Drilling head location – at least every 10 feet along the bore path.
7. Drill stem torque.
8. Details and perceived reasons for delays greater than one hour other than normal breaks and shift changes.
9. Details of any unusual conditions or events.

B. Production and As–built Drawings: Contractor shall maintain at the construction site a complete set of field drawings for recording as–built conditions. Contractor shall plot as–built conditions on field drawings, including location in plan and elevation of drill string, reaming head, and installed pipe, at the completion of each production shift. Contractor shall compile and submit as–built data in accordance with Engineer's standards. As–builts shall include all bores successful and failed.

C. Testing and Quality Control and Assurance Documentation: Contractor shall maintain records for all testing and quality control and assurance procedures. The following records shall be provided to Engineer on the day information is acquired by Contractor:

1. Manufacturer's field reports.
2. Test reports.
3. Fusions reports. For each weld, provide an electronic and printed report of the downloaded information.

1.18 EQUIPMENT REQUIREMENTS:

A. General: Directional drilling equipment shall consist of a directional drilling rig with sufficient capacity to perform bore and pullback of pipe, a drilling fluid mixing, delivery and recovery system of sufficient capacity to successfully complete crossing, a drilling fluid recycling system to remove solids from drilling fluid so fluid can be re–used, a magnetic guidance system to accurately guide boring operations, a vacuum truck of sufficient capacity to handle drilling fluid volume, and trained and competent personnel to operate the system. All equipment shall be in good, safe operating condition with sufficient supplies, materials, and spare parts on hand to maintain system in good working order for the duration of this project.

B. Drilling System:

1. Drilling Rig: Directional drilling machine shall consist of a hydraulically–powered system to rotate, push and pull hollow drill pipe into the ground at a variable angle while delivering a pressurized fluid mixture to a guidable drill (bore) head. Machine shall be anchored to the ground to withstand pulling, pushing and rotating pressure required to complete crossing. The hydraulically–powered system shall be self–contained with sufficient pressure and volume to power drilling operations. Hydraulic system shall be free of leaks. Rig shall have a system to monitor and record maximum pull–back pressure during pull–back operations. The rig shall be grounded during drilling and pull–back operations. There shall be a system to detect electrical current from the drill string and an audible alarm, which automatically sounds when an electrical current is detected.

2. Drill Head: The drill head shall be steerable by changing its rotation and shall provide necessary cutting surfaces and drilling fluid jets.

3. Mud Motors (if required): Mud motors shall be of adequate power to turn required drilling tools.

4. Drill Pipe: Shall be constructed of high–quality 4130 seamless tubing, Grade D or better, with threaded box and pins. Tool joints should be hardened to 32–36 RC.

C. Guidance System: A Magnetic Guidance System (MGS) probe or proven gyroscopic probe and interface shall be used to provide a continuous and accurate location of the drill head during drilling operation. The guidance shall be capable of tracking at all depths up to one hundred feet and in any soil condition, including hard rock. It shall enable driller to guide drill head by providing immediate information on the tool face, azimuth (horizontal direction), and inclination (vertical direction). Guidance system shall be accurate to approximately 2% of vertical depth of the borehole at sensing position at depths up to 100 feet and accurate within 1.5 meters horizontally.

Bore Tracking and Monitoring:

At all times during the pilot bore, Contractor shall provide and maintain a bore tracking system capable of accurately locating the position of the drill head in the x, y, and z axis. Contractor shall record this data at least once per drill pipe length or every twenty–five (25) feet, whichever is most frequent.

1. Downhole and Surface Grid Tracking System: Contractor shall monitor and record x, y, and z coordinates relative to an established surface survey bench mark. The data shall be continuously monitored and recorded at least once per drill pipe–length or at twenty–five (25) feet, whichever is more frequent.

2. Deviations between recorded and design bore path shall be calculated and reported on the daily log. If deviations exceed plus or minus 5 feet (horizontal or vertical deviation) from the design

path, such occurrences shall be reported immediately to Engineer. Contractor shall undertake all necessary measures to correct deviations and return to design line and grade.

3. Drilling Fluid Pressures and Flow Rates: Drilling fluid pressures and flow rates shall be continuously monitored and recorded by the Contractor. Pressures shall be monitored at the pump. These measurements shall be made during pilot bore drilling, reaming, and pullback operations.

Components: Contractor shall supply all components and materials to install, operate, and maintain the guidance system. This shall include, but not be limited to the following:

Probe and Interface
Computer, Printer and Software
DC Power Source, Current Control Box, and Tracking Wire

The Guidance System shall be a proven type such as Sharewell TruTracker MGS, or other proven guidance system, and shall be set up and operated by personnel trained and experienced with this system. Operator shall be aware of any geo–magnetic anomalies and shall consider such influences in the operation of guidance system.

D. Drilling Fluid (Mud) System:

1. Mixing System: A self–contained, closed, drilling fluid mixing system shall be of sufficient size to mix and deliver drilling fluid composed of bentonite clay, potable water and appropriate additives. Mixing system shall be able to "molecularly shear" individual bentonite particles from the dry powder to avoid clumping and ensure thorough mixing. The drilling fluid reservoir tank shall be a minimum of 5000* gallons. Mixing system shall continually agitate the drilling fluid during drilling operations.

2. Drilling Fluids: Drilling fluids shall be composed of clean water and bentonite clay. Water shall be from an authorized source with a pH of 8.5 – 10. Water of a lower pH or with excessive calcium shall be treated with the appropriate amount of sodium carbonate or equal. The water and bentonite clay shall be mixed thoroughly and be absent of any clumps or clods. No additional material may be used in drilling fluid without prior acceptance from Engineer.

Bentonite mixture used shall have the minimum viscosities as measured by a Marsh Funnel:

Rock, Clay	60 sec.
Hard Clay	40 sec.
Soft Clay	45 sec.
Sandy Clay	90 sec.
Stable Sand	80 sec.
Loose Sand	110 sec.
Wet Sand	110 sec.

* D*ependent upon project size.*

These viscosities may be varied to best fit soil conditions encountered, as accepted by the Engineer.

3. Delivery System: The mud pumping system shall have a minimum capacity of 500* GPM and be capable of delivering drilling fluid at a constant minimum pressure of 1,200 psi. The delivery system shall have filters in–line to prevent solids from being pumped into drill pipe. Connections between the pump and drill pipe shall be relatively leak–free. Used drilling fluid and drilling fluid spilled during drilling operations shall be contained and conveyed to the drilling fluid recycling system. A berm, minimum of 12 inches high, shall be maintained around drill rigs, drilling fluid mixing system, entry and exit pits and drilling fluid recycling system to prevent spills into the surrounding environment. Pumps and/or vacuum truck(s) of sufficient size shall be in place to convey excess drilling fluid from containment areas to storage and recycling facilities.

   * D*ependent upon project size.*

4. Drilling Fluid Viscosity:

   In the event inadvertent returns or returns loss of drilling fluid occurs during pilot hole drilling operations, Contractor shall cease drilling, wait at least 30 minutes, inject a quantity of drilling fluid with a viscosity exceeding120 seconds as measured by a Marsh funnel and then wait another 30 minutes. If mud fracture or returns loss continues, Contractor shall cease operations and notify Engineer. Engineer and Contractor shall discuss additional options and work will then proceed accordingly.

5. Drilling Fluid Recycling System: The drilling fluid recycling system shall separate sand, dirt and other solids from drilling fluid and render drilling fluid reusable. Spoils separated from the drilling fluid will be stockpiled for later use or disposal.

6. Control of Drilling Fluids:

   Contractor shall control operational pressures, drilling mud weights, drilling speeds, and any other operational factors required to avoid hydrofracture fluid losses to formations, and control drilling fluid spillage. This includes any spillages or returns at entry and exit locations or at any intermediate point. All inadvertent returns or spills shall be promptly contained and cleaned up. Contractor shall maintain on–site mobile spoil removal equipment during all drilling, pre–reaming, reaming and pullback operations and shall be capable of quickly removing spoils. Contractor shall immediately notify Engineer of any inadvertent returns or spills and immediately contain and clean up the return or spill.

E. Other Equipment:

1. Pipe Rollers: Pipe rollers shall be of sufficient size to fully support weight of the pipe while being hydro–tested and during pull–back operations. Sufficient number of rollers shall be used to prevent excess sagging of pipe.

2. Pipe Rammers: Hydraulic or pneumatic pipe rammers may only be used if necessary and with the authorization of Engineer.

3. Restrictions: Other devices or utility placement systems for providing horizontal thrust other than those previously defined in preceding sections shall not be used unless accepted by Engineer prior to commencement of the work. Consideration for acceptance will be made on an individual basis for each specified location. Proposed device or system will be evaluated prior to acceptance or rejection on its potential ability to complete utility placement satisfactorily without undue stoppage and to maintain line and grade within tolerances prescribed by particular conditions of the project.

PART 2 – PRODUCTS

2.1 STEEL CASING:

A. The steel casing shall be new and unused pipe. The casing pipe shall be welded steel pipe, Schedule 30 or thicker and shall conform to ASTM A–139 and AWWA C200.

B. Pipe shall meet size and thickness required to complete the joint pull with an FPVC carrier pipe.

Minimum Steel Pipe Casing Dimensions for HDPE Pipe

Carrier Pipe	Steel Casing Pipe Size	
I.D. (Nom.)	Pressure System	Gravity System
4	12	16
6	14	20
8	16	24
10	18	24
12	20	30
16	26	36
18	30	48
24	36	48
30	42	54
36	48	60

Minimum Steel Pipe Casing Dimensions for Fusible PVC Pipe

Carrier Pipe	Steel Casing Pipe Size	
I.D. (Nom.)	Pressure System	Gravity System
4	8	16
6	10	20
8	12	24
10	16	24
12	16	30
16	20	36
18	24	48
24	30	48
30	36	54
36	42	60

C. The pipe and fitting manufacturer shall have an established quality control program responsible for checking incoming and outgoing materials. Incoming polyethylene materials shall be checked for density, melt flow rated, and contamination. Cell classification properties of material shall be certified by the supplier, and verified by Manufacturer's Quality Control.

D. Delivery, Storage and Handling of Products:

1. Contractor shall check materials delivered to the site for damage. All materials found during observation or progress of work to have cracks, flaws, cracked linings, or other defects shall be rejected and removed from the job site without delay.

2. Unload and store opposite or near the place where work will proceed with minimum handling. Store material under cover out of direct sun light. Do not store directly on the ground. Keep all materials free of dirt and debris.

3. Contractor is responsible for obtaining, transporting and sorting any fluids, including water, to the work site.

4. Disposal of fluids is the responsibility of Contractor. Disposal of fluids shall be done in a manner in compliance with all permits and applicable federal, state, or local environmental regulations. Contractor shall thoroughly clean entire area of any fluid residue upon completion of installation, and replace any and all plants and sod damaged, discolored, or stained by drilling fluids.

2.2 FPVC CARRIER PIPE

Fusible Polyvinylchloride (FPVC) Pipe – FPVC as specified in Section 02610 shall be used for this project.

2.3 HDPE CARRIER PIPE

High Density Polyethylene (HDPE) Plastic Pipe – HDPE as specified in Section 02561 shall be used for this project.

PART 3 – EXECUTION

3.1 GENERAL:

A. Contractor shall take precautions to protect the pipe during handling and assembly. Chains, hooks, or cable slings shall not be used to handle the pipe.

B. Care shall be used to protect the pipe from scarring, gouging, or excessive abrasion.

C. If pipe is stacked, stacking height shall not exceed the manufacturer's recommendations. Manufacturer's recommendation shall be followed in unloading, storing and protecting pipe.

D. The directional drilling procedure shall include provisions to guard against electrical shock such as ground mats, ground cables, hot boots and gloves. In addition, the drilling equipment shall include an alarm system capable of detecting electrical current as it nears electrical lines.

E. Contractor shall confirm all necessary permits, easements, and/or rights–of–way have been secured before beginning work.

F. The directional drilling method shall have mechanical fluid assistance. Pneumatic, water jetting, or mechanical jack and bore methods are not acceptable.

G. Contractor may make changes to proposed vertical and horizontal alignment of the installation and location of entry and exit points, provided these changes are submitted in writing to Engineer, and received acceptance of Engineer prior to construction.

H. Horizontal Directional Drilling is to be operated in a manner to eliminate the discharge of water, drilling mud and cuttings to adjacent creek or land areas involved during construction process. Contractor shall provide equipment and procedures to maximize the recirculation or reuse of drilling mud to minimize waste. All excavated pits used in the drilling operation shall be lined by Contractor with heavy–duty plastic sheeting with sealed joints to prevent migration of drilling fluids and/or ground water.

Contractor shall visit site, and must be aware of the close proximity of structures on either side of crossing, and provide Engineer with a drilling plan outlining procedures to prevent drilling fluid from adversely affecting these structures.

The general work areas on entry and exit sides of crossing shall be enclosed by a berm to contain unplanned spills or discharge.

Waste cuttings and drilling mud shall be processed through a solids control plant comprised as a minimum of sumps, pumps, tanks, desilter/desander, centrifuges,

material handlers, and haulers all in a quantity sufficient to perform the cleaning/separating operation without interference with drilling program. The cuttings and excess drilling fluids shall be dewatered and dried by Contractor to extent necessary for disposal in off–site landfills. Water from dewatering process shall be treated by the Contractor to meet permit requirements and disposed of locally. The cuttings and water for disposal is subject to being sampled and tested. The construction site and adjacent areas will be checked frequently for signs of unplanned leaks or seeps.

Equipment (graders, shovels, etc.) and materials (such as groundsheets, haybales, booms, and absorbent pads) for cleanup and contingencies shall be provided in sufficient quantities by Contractor and maintained at all sites for use in the event of inadvertent leaks, seeps, or spills.

Waste drilling mud and cuttings shall be dewatered, dried, and stockpiled so it can be loaded by a front–end loader, transferred to a truck, and hauled off–site to a suitable legal disposal site. The maximum allowed water content of these solids is 50% of weight.

Due to a limited storage space and environmental sensitivity at the worksites, dewatering and disposal work shall be concurrent with drilling operations. Treatment of water shall satisfy regulatory agencies before it is discharged.

I. Drill Path Survey: Entire drill path shall be accurately surveyed with entry and exit stakes placed in appropriate locations within the areas indicated on drawings. If Contractor is using a magnetic guidance system, drill path will be surveyed for any surface geo–magnetic variations or anomalies.

J. Environmental Protection: Contractor shall place silt fence between all drilling operations and any drainage, wetland, waterway or other area designated for such protection by contract documents, state, federal and local regulations. Additional environmental protection necessary to contain any hydraulic or drilling fluid spills shall be put in place, including berms, liners, turbidity curtains and other measures. Contractor shall adhere to all applicable environmental regulations. Fuel may not be stored in bulk containers within 200 feet of any water–body or wetland.

General work areas on entry and exit sides of the crossing shall be enclosed by a berm to contain unplanned spills or discharge.

K. Safety: Contractor shall adhere to all applicable state; federal and local safety regulations and all operations shall be conducted in a safe manner. Safety meetings shall be conducted at least weekly with a written record of attendance and topic submitted to Engineer.

L. Pipe: Pipe shall be welded/fused together in one length, if space permits, with welds X–rayed prior to being placed in bore hole. Pipe will be placed on pipe rollers before pulling into bore hole with rollers spaced close enough to prevent excessive sagging of pipe.

3.2 JOINING FPVC PIPE AT ENDS OF DIRECTIONAL DRILLED SEGMENTS:

A. All joints at ends of directionally drilled line shall be fusion bonded to the proposed pipe section. Mechanical couplings are not permitted. Fusion bonded joints shall provide leak free service at the specified test pressure. See details.

B. Fusion bonding shall be accomplished as specified in Section 02610 – Fusible Polyvinylchloride (FPVC) Pipe.

3.3 DRILLING FLUID:

A. During the drilling, reaming, or pullback operations, Contractor shall make adequate provisions for handling drilling fluids for cutting entry and exit pits. To the greatest extent practical, these fluids must not be discharged into any waterway. When the Contractor's provisions for storage of fluids or cuttings on site are exceeded, these materials shall be hauled away to a suitable legal disposal site. Contractor shall conduct directional drilling operation in such a manner so drilling fluids are not forced though the sub–bottom into any waterway. After completion of the directional drilling work, entry and exit pit locations shall be restored to original conditions. The Contractor shall comply with all permit provisions.

B. Pits at entry or exit point areas shall be constructed to completely contain the drill fluid and prevent its escape to any waterway or surrounding drainage system.

C. To the extent practical, Contractor shall maintain a closed loop drilling fluid system.

D. The Contractor shall minimize drilling fluid disposal quantities by utilizing a drilling fluid cleaning system, which allows returned fluids to be reused.

E. As part of the installation plan specified herein before, Contractor shall submit a drilling fluid plan which details types of drilling fluids, cleaning and recycling equipment, estimated flow rates, and procedures for minimizing drilling fluid escapes.

F. The composition of drilling fluid used shall be submitted to Engineer for acceptance prior to starting work. Fluids shall be inert and of no risk to the environment. No fluid will be accepted or utilized which does not comply with permit requirements and environmental regulations.

G. Drilling fluid shall remain in bore hole to increase stability of surrounding soil and to reduce drag on the pulled pipe.

H. Disposal of drilling fluid and all other spoils shall be the responsibility of Contractor at no additional cost to Owner and shall be conducted in compliance with all relative environmental regulations, right–of–way and work space agreements and permit requirements.

I. Drilling fluid returns at locations other than the entry and exit points shall be minimized. The Contractor shall immediately clean up any drilling fluid which inadvertently surfaces.

J. Excess drilling fluid shall be disposed of at a pre–permitted location found by Contractor. Contractor is responsible for transporting all excess fluids and other spoils to the disposal site and paying any disposal costs.

K. Drilling fluid shall not be discharged into sanitary or storm drain systems, ditches or waterways, nor allowed to enter any wetland area or creek.

3.4 SUBSURFACE CONDITIONS:

A. Anticipated subsurface conditions at the crossing are described in soil borings attached. Borings are being provided for information only and the Owner and Engineer assume no liability for them or their interpretation.

B. Contractor must use its own experience and judgment in interpreting this data to prepare a proposal and/or perform the work. Contractor is solely responsible for performing any additional geotechnical test/study needed to verify subsurface conditions at the Contractor's sole expense.

3.5 EXISTING UTILITIES:

A. The Contractor must exercise caution in regard to existing utilities, including:

1. Verify location of all underground utilities.

2. Exposing any utilities which are to be crossed.

3. Modify drilling practices or down hole assemblies to prevent damage to adjacent underground and above ground utilities and structures.

B. The Contractor shall provide sheeting as necessary to protect adjacent structures.

3.6 DRILLING WATER AND RESTORATION:

A. Potable water is available at a cost to the Contractor in accordance with current utility company rate structure. Cost of transporting water to construction site is an expense of the Contractor.

B. Upon completion of pipe installation, the drilling pit and receiving pit shall be backfilled to original grade.

C. Restoration of any disturbed area shall be completed in accordance with these specifications.

3.7 SUB–AQUEOUS DIRECTIONAL DRILLING:

A. The pipe shall be directionally drilled, as shown on plans. Equipment used to pull the pipe shall be of sufficient size for this project.

Pilot hole shall be drilled along path shown on Plan and Profile drawings to the following tolerances:

1. Vertical Location – Plus or minus 1 foot

2. Horizontal Location – Plus or minus 3 feet.

B. At the completion of pilot hole drilling, Contractor shall provide a tabulation of coordinates referenced to drilled entry point, which accurately describes location of pilot hole. This information shall be plotted on a 1" = 50' scale plan with a 1" = 50' horizontal and 1" = 2' vertical profile scales, compatible to the Drawings. This "as–built" plan and profile shall be updated as the pilot bore is advanced. Contractor shall at all times provide and maintain instrumentation that will accurately locate the pilot hole and measure drilling fluid flow and pressure. Contractor shall grant Engineer access to all data and readout pertaining to position of the bore head and fluid pressures and flows. When requested, Contractor shall provide explanations of the position monitoring and steering equipment. Contractor shall employ experienced personnel to operate directional drilling equipment and, in particular, the position monitoring and steering equipment. No information pertaining to position or inclination of pilot bores shall be withheld from the Engineer.

Each exit point shall be located as shown with an over–length tolerance of 5 feet and an alignment tolerance of 3 feet left/right with due consideration of the position of other exit points. Alignment of each pilot bore must be acceptable to the Engineer before pipe can be pulled. If pilot bore fails to conform to above tolerances, Engineer has the option to require a new pilot boring be made.

C. A suitable cutting head shall be used to bore the face of excavation. Overcut of the excavation shall be minimized.

D. Reaming operations shall be conducted to enlarge pilot hole after acceptance of the pilot bore. Number and size of such reaming operations shall be conducted at discretion of the Contractor.

E. Joining Pipe:

1. FPVC carrier or casing pipe shall be joined by thermal butt fusion as specified in Section 02610.

2. Steel casing pipe shall be welded (air tight) with a full penetration weld around the entire circumference. The weld shall not increase outside diameter by more than 3/4-inch. Joints shall be welded in accordance with AWWA C206 and applicable American Welding Society Standards.

F. Pipe Layout and Pullback:

1. Entire pipe length shall be laid out, welded and tested in one complete unit before being pulled back through the drill hole. Line pullback shall be continuous. Pipe shall be continuously lubricated during pullback and shall be laid on rollers or other suitable apparatus to facilitate pulling the pipe.

2. If pipe or its protective coating is damaged, it shall be replaced at no cost to the Owner.

3. **If pipe is placed at an incorrect location or cannot be advanced due to an unknown obstruction, the pipe shall be abandoned in place by filling with**

flowable fill. The cost of abandoning pipe, replacing pipe materials, and redrilling new pipe in new location shall be at Contractor's expense, including pipe which must be abandoned due to an unknown obstruction.

4. Pulling Loads: The maximum allowable pull exerted on FPVC pipelines shall be measured continuously and limited to maximum allowed by pipe manufacturer so pipe or joints are not overstressed.

5. Torsion and Stresses: A swivel shall be used to connect pipeline to drill pipe to prevent torsional stresses from occurring in the pipe.

6. Pipeline Support: The pipelines shall be adequately supported during installation to prevent overstressing or buckling.

7. Contractor shall at all times handle FPVC pipe in a manner which does not overstress the pipe. Vertical and horizontal curves shall be limited so stresses do not exceed 50% of yield stress for flexural bending of the FPVC pipe. If pipe is buckled or otherwise damaged, the damaged section shall be removed and replaced at Contractor's expense. Contractor shall take appropriate steps during pullback to ensure the FPVC pipe will be installed without damage.

F. Contractor shall bleed all air out of the line.

3.8 SPECIAL CONSTRUCTION REQUIREMENTS FOR 24–INCH AND LARGER PIPE:

For FPVC pipe 24 inch and larger, unless accepted otherwise by Engineer, a foundation bed of granular material (No. 57 stone) shall be placed under and around all ductile iron fittings and valves for additional support of heavy system components. A foundation bed of granular material shall be provided for all valves 20 size and larger. For granular materials, minimum vertical limit is 12 inches under fitting or valve, up to 1/3 the overall height of fitting or valve. Minimum horizontal limits of granular material shall be 12 inches in all directions beyond outer edges of the fitting or valve. Compaction of soils below granular material shall be at 98% of the maximum density. Payment for this work shall be included in the associated fitting or valve unit cost. All spool pieces between 24 inch and larger ductile fittings and valves shall be at least 5 feet long. No joint deflection shall be allowed at the fittings or valves.

3.9 SWABBING:

The purpose of swabbing a new pipeline is to conserve water while thoroughly cleaning pipeline of all foreign material, sand, gravel, construction debris and other items not found in a properly cleaned system. Prior to pressure testing of a new pipeline, swabbing shall be utilized as specified on the construction plans for each project.

All new water, wastewater, force, and reclaim mains greater than 12-inch I.D. (with exceptions to smaller pipe lines as deemed necessary by Engineer) shall be hydraulically cleaned with a polypropylene swabbing device to remove dirt, sand and debris from main.

If swabbing access and egress points are not provided in design drawings, it will be Contractor's responsibility to provide temporary access and egress points for the cleaning,

as required.

Passage of cleaning poly swabs through system shall be constantly monitored, controlled and all poly swabs entered into system shall be individually marked and identified so the exiting of poly swabs from the system can be confirmed.

Cleaning of the system shall be done in conjunction with, and prior to, initial filling of system for its hydrostatic test.

CONTRACTOR shall insert flexible polyurethane foam swabs (two pounds per cubic foot density) complete with rear polyurethane drive seal, into the first section of pipe. Swabs shall remain there until the pipeline construction is completed. Engineer shall be present for the swabbing process including swab insertion and retrieval.

The line to be cleaned shall only be connected to existing distribution system at a single connection point.

Locate and open all new in–line valves beyond point of connection on pipeline to be cleaned during the swabbing operation.

At receiver or exit point for the poly swab, CONTRACTOR is responsible for creating a safe environment for collection of debris, water and swab. Considerations shall be made for protecting surrounding personnel and property and safe retrieval of the swab.

Cleaning and flushing shall be accomplished by propelling the swab down pipeline to exit point with potable water. Flushing shall continue until the water is completely clear and swab(s) is/are retrieved.

After the swabbing process, pressure testing and disinfection of the pipe shall be completed in accordance with Section 3.12.

3.10 ON–SITE OBSERVATIONS OF WORK:

A. Engineer or Project Representative shall have the right to require any portion of work be completed in their presence. Any work covered up after such instruction shall be exposed by the Contractor for observation. However, if Contractor notifies Engineer or Project Representative such work is scheduled and they fail to appear within 72 hours, Contractor may proceed. All work completed and materials furnished shall be subject to review by the Engineer or Project Representative. All improper work shall be reconstructed, and all materials which do not conform to requirements of specifications, shall be removed from the work upon notice being received from Engineer for rejection of such materials. Engineer shall have the right to mark rejected materials to distinguish them as such.

B. Contractor shall give Engineer or Project Representative a minimum of 72 hours' notice for all required observations or tests.

C. It will also be required of Contractor to keep accurate, legible records of the location of all lines, valves, fittings, and appurtenances. These records shall be prepared in accordance with record drawing requirements of these Specifications. Final payment to the Contractor will be withheld until all such information is received and accepted. A disclaimer by the surveyor preparing As–

Built drawings concerning location of underground lines will not be acceptable.

3.11 SAFETY:

A. Provide all necessary bracing, sheeting, bulkheads and shields to ensure complete safety to all traffic, persons, and property at all times during the work. Perform the work in such a manner as to not permanently damage existing structures or roadbeds.

B. Observe all applicable regulations of the authorities having jurisdiction over this site.

C. Perform all activities in accordance with Occupational Safety and Health Act of 1970 (PL–596), as amended through January 1, 2004, applicable regulations of Federal Government, OSHA 29 CFR 1926 and applicable criteria of ANSI A10 16, "Safety Requirements for the Construction of Tunnel Shafts and Caissons."

3.12 TESTING:

A. Disinfection tests:

1. All water pipe and fittings shall be thoroughly disinfected prior to being placed in service. Disinfection shall follow applicable provisions of the procedure established for disinfection of water mains as set forth in AWWA – Standard C651 entitled "AWWA Standard for Disinfecting Water Mains" and shall be in accordance with these specifications. Bacteriological testing on the water main shall be scheduled and completed by Contractor. Contractor will collect water samples and be responsible for completing the water analysis (lab testing).

2. Temporary blow–offs shall be installed for the purpose of cleaning water main. Blow–offs installed on water mains up to and including 12–inches shall be the same diameter as the water main. Blow–offs installed on 16–inch water mains and larger shall be the next smaller size, in diameter, than water main being tested. Temporary blow–offs shall be removed and plugged after the main is cleared. The Engineer shall be present prior to and during operation of blow–offs. The main shall be flushed prior to disinfection.

3. The new water main shall be connected to existing water main at one point only for flushing purposes (no looping). new main MUST have a blow off on the end. After new main is thoroughly flushed, the open end shall be sealed and restrained and main shall be thoroughly disinfected. Anytime new line is reopened, (to repair defective joints or pipe, defective fitting or valve) the complete disinfection process shall be repeated. Once bacteriological clearance has been received from regulatory authority, the new main may be pressure tested.

B. Pressure and Leakage Tests:

4. Contractor shall test pipelines installed under this Contract in accordance with these specifications prior to acceptance of pipeline by Owner. All field tests shall be made in the presence of Engineer. Except as otherwise

directed, all pipelines shall be tested. Unless accepted otherwise by Engineer, all fusible or butt weld joints shall be tested, including MJ adapter fittings associated with the new construction. All piping to operate under liquid pressure shall be tested in sections of appropriate length. The pressure testing of an HDPE line section shall be tested separately from PVC and DIP line sections. Where impractical, HDPE test section shall include only a minimum amount of PVC and ductile iron pipe within the test section. If possible, PVC and D.I.P. test sections shall be left exposed during the pressure test for visual leakage observation. For these tests, Contractor shall furnish clean water, suitable temporary testing plugs or caps, and other necessary equipment, and all labor required. If Contractor chooses to pressure test against an existing water main/valve, the new water main must be disinfected prior to connection to existing line. Engineer will not be responsible for failure of the pressure test due to existing valve leaking. Engineer may elect to specify suitable pressure gauges for these tests. If not, Contractor will furnish suitable pressure gauges, calibrated by an accepted testing laboratory, which increments no greater than 2 psi. Gauges used shall be of such size so pressures tested will not register less than 10% or more than 90% of the gauge capacity. All valved sections shall be hydrostatic tested to insure sealing (leak allowance) of all line valves. All HDD over 100 LF shall be air pressure tested (above ground) at 5 PSI for a period of 15 minutes, prior to insertion. There shall be no pressure loss allowed.

5. Unless it has already been done, section of pipe to be tested shall be filled with potable water and air shall be expelled from the pipe. Reclaimed water may be utilized for filling new reclaimed water or wastewater force main installations. If blow offs or other outlets are not available at high points for releasing air, the Contractor shall provide 1 inch (minimum taps and blow–off valves at the 12:00 position), as necessary. The cost of constructing blow–off valves and plugging them, after a successful pressure test, shall be included in unit price bid amount for pipe.

6. For mains larger than 20–inch size, Contractor shall profile (line and grade) the main after installation and prior to pressure and leakage test to accurately locate all high points. Field survey instrument (Level equipment) shall be utilized for this task. Blow off valves shall be installed (at a minimum) at all high points which offset vertically more than two pipe diameters. Contractor shall consult the design Engineer on any technical questions or concerns.

7. Hydrostatic testing shall consist of a 150 psig test pressures, based on elevation of the highest point of line or section under tests. Pressure shall be applied by means of a pump connected to the pipe in a manner satisfactory to Engineer. The pump, pipe connection and all necessary apparatus shall be furnished by Contractor and shall be subject to acceptance by Engineer.

8. Maximum duration for pressure test, including initial and final phase of the test, shall not exceed eight (8) hours. If test is not completed due to leakage, equipment failure, etc., depressurize the test section, and then allow it to "relax" for at least eight (8) hours before bringing test section up to test pressure again.

9. *Initial Phase of Pressure Testing*: First, all air must be removed from the test section. The pressure test shall be completed after line is backfilled. If possible, all flanged or mechanical joint valves and fittings shall be left exposed to check for visible leaks. If possible all PVC and D.I.P. test sections shall be left exposed to check for visible leaks. Initially, the pressure within test section should be raised to approximately 160 psi and then allowed to be idle (no additional make–up water/pressure to be injected), for approximately 3 hours. During this 3–hour period, the test section shall be allowed to stabilize and come to an equilibrium stage. No additional make–up water/pressure shall be applied to test section during this 3–hour stabilization period unless the line pressure drops below 140 psi. In this case, make–up water/pressure shall only be applied to the test section to maintain a minimum of 140 psi (during the 3–hour stabilization period).

10. *Final Phase of Pressure Testing*: Final phase of the pressure test shall involve applying make–up water/pressure to achieve an "initial test pressure" of 150 psi (minimum)/155 psi (maximum). The test section is then allowed to be idle (no make–up water/pressure is added) for a period of 2 hours. After this 2–hour period, make–up water/pressure is applied and measured to re–establish the "initial test pressure." Quantity of water utilized to re–pump the line shall be measured and compared to allowable quantities as determined by table below. If actual make–up water quantity is equal or less than allowable amount, the pressure test passes. If actual make–up water quantities are greater than allowable amount, the pressure test fails (see table below).

ALLOWABLE MAKE UP AMOUNT

Nominal Pipe Size (in)	Make–up Water Allowance (GAL/LF of pipe), 2–hour test
6	0.003
8	0.005
10	0.0065
12	0.0115
14	0.014
16	0.0165
18	0.0215
20	0.0275
22	0.035
24	0.044
26	0.05
28	0.0555
30	0.0635
32	0.0715
34	0.081
36	0.09

42	0.115
48	0.135
54	0.157

11. In the event a section fails to pass tests, Contractor shall do everything necessary to locate, uncover (even to the extent of uncovering the entire section), and replace defective pipe, valve, fitting or joint. Visible leaks shall be corrected regardless of total leakage. Lines which fail to meet these tests shall be retested as necessary until test requirements are complied with. All testing shall be performed at the Contractor's expense.

12. If, in the judgment of Engineer, it is impracticable to follow foregoing procedures exactly for any reason, modifications in procedure shall be made with acceptance by Engineer; but, in any event, Contractor shall be responsible for ultimate tightness of piping within above requirement. Re–disinfection shall be required if the line is de–pressurized for repairs prior to tying in.

C. Locate Wire:

Two locate wires shall be provided on all installations. For HDD projects, locate wire shall be 12 AWG high strength copper–clad carbon steel with 45 mils (min) insulation. The external color shall be either blue for water, green for wastewater, purple for reuse, or black for raw water. Locate wire shall be brought to grade within a valve box or locate station box at all "entry point locations" and all "exit point locations." For HDD projects, there is no maximum length or interval between locate wire stations. The testing and report requirements within these specifications shall be required except as modified herein. If both locate wires break or are not continuous (from end to end), Contractor shall, at Contractor's expense, provide soft–digs for portions of the main with 12–feet or less cover (every 25 LF along main) to confirm as–built data. This soft–dig data shall be recorded on the as–built record drawings as specified here–in.

3.13 SITE RESTORATION:

Following drilling operations, Contractor will demobilize equipment and restore the worksite to its original condition. All excavations will be backfilled and compacted to 95 percent of original density. Landscaping will be the responsibility of Contractor.

3.14 RECORDKEEPING AND AS–BUILTS:

Contractor shall maintain a daily project log of drilling operations and a guidance system log with a copy given to Engineer at completion of project. As–built drawings shall be completed by a professional surveyor and certified as to accuracy by Contractor.

END OF SECTION

INDEX TO

SECTION 02561 – HIGH DENSITY POLYETHYENE (HDPE) PLASTIC PIPE

SECTION 02561

HIGH DENSITY POLYETHYLENE (HDPE) PLASTIC PIPE

PART 1 – GENERAL

1.1 WORK INCLUDED

The work under this section covers high–density polyethylene (HDPE) pipe for sanitary sewer force mains and water mains installed as a part of the horizontal directional drill process. The work includes the installation and testing of all polyethylene pipe and fittings for the main as shown on the Drawings. Provide all labor, materials, equipment and services indicated on the Drawings, as specified herein and as reasonably necessary or incidental to complete the job.

1.2 QUALITY ASSURANCE

A South Carolina Registered Professional Engineer, other than Thomas & Hutton Engineering Co., shall design the final steel casing size (if applicable) and thickness and HDPE pipe wall thickness and shall submit the stamped design calculations to the Owner (assuming the area between the steel casing and the HDPE pipe contains water).

1.3 REFERENCED STANDARDS

Unless otherwise indicated, all referenced standards shall be the latest edition available at the time of bidding. Any requirements of these Specifications shall in no way invalidate the minimum requirements of the referenced standards.

ASTM D2321	Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity–Flow Applications
ASTM D3261	Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing
ASTM D3350	Standard Specification for Polyethylene Plastics Pipe and Fittings Materials
ASTM F714	Standard Specification for Polyethylene (PE) Plastic Pipe (DR–PR) Based on Outside Diameter.
AWWA C906	Standard for Polyethylene (PE) Pressure Pipe and Fittings 4" through 63" for Water Distribution and Transmission

1.4 ACCEPTANCE OF PIPE

Acceptance of pipe will be based on design, material tests, and examination of the complete product. Quality of all materials used in the pipe, process of manufacture, and finished pipe shall be subject to examination by Engineer. Examination may be made at place of manufacture, or on job site after delivery, or at both places and pipe shall be subject to rejection at any time on account of failure to meet any of the specification

requirements, even though sample pipe units may have been accepted as satisfactory at place of manufacture. All pipe which is rejected must be immediately removed from project site by the Contractor.

1.5 SUBMITTALS

A. Manufacturer's Certificate Pipe and Fittings: For information only, submit two copies of manufacturer's certificate indicating pipe and fittings have been examined and tested at the place of manufacture and meet requirements of referenced Standards and these Specifications.

B. Submit two copies of the Registered Professional Engineer's Design Calculations required by Paragraph 1.2 of this Section.

1.6 REQUIREMENTS OF REGULATORY AGENCIES

The HDPE pipe shall meet requirements and specifications of South Carolina DHEC including testing and disinfection as applicable.

1.7 PRODUCT DELIVERY, STORAGE, AND HANDLING

Material shall be unloaded in a manner avoiding damage and shall be stored where it will be protected and will not be hazardous to traffic. Contractor shall repair any damage caused by the storage. Material shall be examined before installation and neither damaged nor deteriorated material shall be used in the work. Owner and Engineer have the right to reject defective or damaged material.

1.8 SEQUENCING AND SCHEDULING

Contractor shall arrange work so sections of mains between valves are tested, sterilized, pavement replaced, and the section placed in service as soon as reasonable after it is placed. Owner reserves the right to dictate sequence of construction.

1.9 ALTERNATIVES

The intention of these specifications is to produce best system for Owner. If Contractor suggests alternative material, equipment or procedures will improve results at no additional cost, the Engineer and Owner will examine suggestion, and if it is accepted, it may be used. The basis upon which acceptance of an alternative will be given is its value to Owner, and not for convenience of Contractor.

1.10 GUARANTEE

Contractor shall guarantee the quality of materials, equipment, and workmanship for a period of 18 months after final project acceptance. Defects discovered during this period shall be repaired by Contractor at no cost to the Owner. The Contractor shall provide an 18–month guarantee.

1.11 EXISTING UTILITIES

All known utility facilities are shown schematically on plans, and are not necessarily accurate in location as to plan or elevation. Utilities such as service lines or unknown

facilities not shown on plans will not relieve the Contractor of responsibility under this requirement. "Existing Utilities Facilities" means any utility existing on the project in its original, relocated, or newly installed position. Contractor will be held responsible for cost of repairs to damaged underground facilities – even when such facilities are not shown on the plans. Contractor shall contact all utility companies prior to beginning work and request an accurate field location of their respective utility lines.

1.12 CONNECT NEW MAIN TO EXISTING SYSTEM

Contractor shall furnish necessary pipe and perform all excavation, dewatering, shoring, backfilling, etc., necessary to make the connection of a new main to existing system to be or already installed by others. Contractor shall contact the utility a minimum of 72 hours in advance of construction. Contractor shall be responsible for coordinating construction with the utility.

1.13 DAMAGE TO EXISTING SYSTEM

Damage to any part of existing system by Contractor or Subcontractors, which is repaired by Utility Owner's forces, or an acceptable contractor shall be charged to the Contractor on basis of time and material, plus an overhead and administration charge using Commission's multiplier, or plus 30% for overhead and administration for an acceptable contractor.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Polyethylene Pipe:

1. Provide high–density polyethylene pipe and fittings to comply with ASTM D3350. Pipe shall also meet the dimensions and tolerances as specified in ASTM F–714. Pipe shall be equivalent to Driscopipe 1000 as manufactured by Phillips Driscopipe Co., Inc., Plexco PE 3408 by Chevron Plexco, Inc. or by CSR Polypipe.

2. The required pipe SDR shall be determined by a South Carolina Registered Professional Engineer to meet operational and load conditions encountered after and during construction. Pipe diameter shall be as specified on the Drawings. The minimum SDR shall be 9 for all sizes (ASTM F–714).

B. Pipe Joints: Pipe sections shall be permanently connected by thermal butt fusion in accordance with manufacturer's procedures using equipment specified by the pipe manufacturer. Mechanical jointing shall be accomplished with the use of flange adapters and stub ends complying with ASTM D3261 and in accordance with manufacturer's instructions for mechanical joining.

C. Fittings: Unless otherwise specified or indicated on the Drawings, all polyethylene fittings shall conform to ASTM D3261.

PART 3 – EXECUTION

3.1 GENERAL

Examine areas and conditions under which pipe is to be installed and notify Engineer in writing of conditions detrimental to proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in an acceptable manner.

3.2 PIPE PACKAGING, HANDLING, STORAGE

A. The manufacturer shall package pipe in a manner designed to deliver it to the project neatly, intact, and without physical damage. The transportation carrier shall use appropriate method and intermittent checks to insure pipe is properly supported, stacked, restrained, and pipe interior protected from airborne contamination during transport so pipe is not nicked, gouged, or physically damaged.

B. Pipe shall be stored on clean, level ground to prevent undue scratching or gouging of the pipe. If pipe must be stacked for storage, such stacking shall be done in accordance with the manufacturer's recommendations. Handling of pipe shall take place in such a manner it is not damaged by dragging over sharp objects or cut by chokers of lifting equipment.

C. Sections of pressure pipe having been discovered with cuts or gouges in excess of 10% of the pipe wall thickness shall be cut out and removed. The undamaged portions of pipe shall be rejoined using a heat fusion joining method.

D. Fused segments of pipe shall be handled to avoid damage to the pipe. When lifting fused sections of pipe, chains or cable type chokers must be avoided. Nylon slings are preferred. Spreader bars are recommended when lifting long fused sections. Care must be exercised to avoid cutting or gouging the pipe.

3.3 PIPE INSTALLATION

Install pipe in accordance with the manufacturer's recommendations. Adhere to Rules, Regulations, and Requirements of OSHA, Occupational Safety, and Health Act.

A. Trench Construction: The trench and trench bottom shall be constructed in accordance with ASTM D2321.

B. Embedment Material: Shall be Class I, Class II, or Class III materials as defined by ASTM D2321. The use of Class IV and Class V materials for embedment is not allowed. Class I crushed stone and Class II well–graded dense aggregates are preferred and shall have an installed density of at least 85% Standard Proctor Density through compaction or consolidation.

C. Bedding: Pipe bedding shall be performed in accordance with ASTM D2321. Compaction rates shall be as specified in ASTM D2321. Deviation from specified compaction rates shall only be allowed when accepted by the Engineer.

D. Haunching and Initial Backfill: Shall be as specified in ASTM D2321 using Class I, Class II, or Class III materials. In cases where a compaction rate of 95% Standard Proctor Density is not attainable, Engineer may increase the SDR of pipe to provide adequate stiffness.

E. Joint Fusion:

1. Joining sections of pipe and fittings shall be in continuous lengths by the heat fusion method and shall be performed in strict accordance with manufacturer's recommendations. The heat fusion equipment used in joining procedures should be capable of meeting all conditions recommended by pipe manufacturer, including, but not limited to, temperature requirements of 400°F, alignment, and 75 psi interfacial fusion pressure.

2. Heat fusion joining shall be 100% efficient offering a joint weld strength equal to or greater than the tensile strength of pipe. Socket fusion shall not be used. Flanges, unions, grooved–couplers, transition fittings and some mechanical couplers may be used to mechanically connect HDPE pipe without butt fusion. Refer to the manufacturer's recommendations. Both installers and joint examiners shall be trained by the manufacturer or its authorized representative. Fusion of unlike SDRs is not permitted. Transition from different SDRs using mechanical couplings or a transition nipple Polyethylene pipe shall be connected to systems or other material fittings using flanged connections or mechanical compression coupling for use with polyethylene pipe. Mechanical couplings shall be installed according to manufacturer's recommendations.

F. Special Conditions: ASTM–D2321–Section 11.2, Minimum Cover for Load Application, Section 11.3, Use of Compaction Equipment, and Section 11.4, Removal of Trench Protection shall apply unless directed otherwise by the Engineer.

3.4 HYDROSTATIC AND LEAKAGE TESTS

A. Hydrostatic and leakage tests of pressure lines shall be made by Contractor under the direction of Engineer.

B. High density polyethylene pipe shall be tested using hydrostatic procedures. The preferred testing medium is clean water, but other liquids may be used. The test section should be completely filled with liquid, taking care to bleed off any trapped air. While the test section is filling, venting at high points may be necessary to purge air pockets. The test pressure shall be 1–1/2 times the system design operating pressure.

C. The test procedure consists of initial expansion and test phases. For the initial expansion phase, makeup water is added as required to maintain the test pressure for three hours. For the test phase, the test pressure is reduced by 10 psi. If the pressure remains steady (within 5% of the target value) for an hour, no leakage is indicated. The total test time including initial pressurization, initial expansion, and time at test pressure, must not exceed eight hours. **If the test is not completed due to leakage, equipment failure, etc., depressurize the test section, and then allow it**

to "relax" for at least eight hours before bringing the test section up to test pressure again.

D. Should any test of the pipe laid disclose leakage, Contractor shall, at its own expense, locate and repair defective joints.

E. Contractor is responsible for notifying the Engineer 48 hours (minimum) prior to applying pressure for testing. Pressure test will be witnessed by the Engineer, Project Representative, and utility owner.

F. Potable water is available at a cost to the Contractor in accordance with current utility company rate structure. The cost of transporting water to construction site is an expense of Contractor.

3.5 DISINFECTION

A. After hydrostatic and leakage tests are satisfactorily completed, the HDPE carrier pipe shall be disinfected in accordance with AWWA C 651 and Regulations of South Carolina DHEC.

All new mains and repaired portions of, or existing mains shall be thoroughly flushed at a flow velocity greater than 2.5 feet per second then chlorinated with not less than fifty parts per million (50 ppm) of available chlorine. Chlorine gas or seventy percent high–test calcium hypochlorite can be used. Water from the existing distribution system or other source of supply should be controlled to flow slowly into newly laid pipeline during application of chlorine. The solution shall be retained in pipeline for not less than 24 hours and a chlorine residual of 25 ppm shall be available at this time. Then system shall be flushed with potable water and the sampling program started.

B. A minimum of two bacteriological samples shall be taken at least 24 hours apart after disinfection and tested by a State accepted lab and shall indicate the water line to be absent of total coliform bacteria. The number of sampling sites depends on the amount of new lines; however, all dead lines must be sampled. Results shall be submitted to Engineer by the Contractor. Results shall indicate coliform growth, non–coliform growth (NCG) and chlorine residual at the time of sampling. Results shall indicate sample date, location, and time, and shall be performed less than 30 days prior to the Engineer submitting for final permit to operate. All samples must be analyzed by a state certified laboratory.

END OF SECTION

INDEX TO

SECTION 02570 – TRAFFIC CONTROL

SECTION 02570

TRAFFIC CONTROL

PART 1 – GENERAL

1.1 DESCRIPTION

A. This section covers furnishing, installation, and maintenance of all traffic control devices, portable signal equipment, warning signs, and temporary traffic lanes used during construction of the project.

1.2 RELATED WORK

A. Section 02667 – Water Distribution System

1.3 RESPONSIBILITY

A. The Contractor shall furnish, install, and maintain all necessary automated signals, barricades, concrete traffic barriers, warning signs, traffic barriers, traffic lanes, and other protective devices. Ownership of these temporary warning devices shall remain with the Contractor provided devices are removed promptly after completion and acceptance of work to which devices pertain. If such warning devices are left in place for more than 30 days after specified time for removal, Owner shall have the right to remove such devices and to claim possession thereof.

1.4 MEASUREMENT AND PAYMENT

A. There will be no measurement for this item. Payment shall be included in the lump sum price for "Traffic Control".

PART 2 – PRODUCTS

2.1 MATERIALS

A. All barricades signs, and traffic control signal devices shall conform to requirements of the current South Carolina Manual on Uniform Traffic Control Devices except as may be modified in these project specifications.

B. Portable traffic control signal devices, barricades, signs and other Control Devices shall be either new or in acceptable condition when first erected on Project and shall remain in acceptable condition throughout the construction period.

C. All signs shall have a black legend and border on an orange reflectorized background and will be a minimum of engineering grade reflective.

PART 3 – EXECUTION

3.1 ERECTION

A. Prior to commencement of any actual construction on the project, Contractor shall erect appropriate advance warning signs and place concrete traffic barriers where necessary. Subsequently, as construction progresses and shifts from one side of road to the other, temporary lanes must be installed to provide continuous two-way traffic and bike thoroughfare. All appropriate signs and traffic control devices pertinent to the work shall be erected ahead of construction site to advise and warn travelling public of activity and any necessary detours.

3.2 DELAYS TO TRAFFIC

A. Except in rare and unusual circumstances, two-way traffic shall be maintained at all times by temporary and/or permanent roads. There are to be no traffic delays during the hours between 7 AM – 10 AM and 4 PM – 10 PM. Between the hours of 10 AM and 4 PM the maximum delay is to be 15-minutes.

B. When traffic is halted temporarily due to transition procedures including the ingress and egress of construction vehicles, Contractor shall provide necessary flagging personnel with proper equipment and clothing to hold such traffic.

C. If Contractor's proposed traffic control plan involves more than occasional disruption to alternating one-way traffic through the work, then temporary, signalized control equipment will be required.

3.3 TEMPORARY TRAFFIC LANES

A. Two-lane traffic shall be maintained at all times unless prior written permission has been given and all necessary flagging personnel and/or signage has been installed. Temporary lane line stripes shall be applied to the detour paving, as agreed to by Engineer and Owner's representative. The no-passing double center-line stripes shall be yellow. Such stripes shall be a temporary, degradable, reflectorized tape strip. All temporary striping shall be maintained throughout the period traffic control is needed.

B. Contractor is responsible for installation and removal of all temporary roads and trails throughout the construction process. These detour roads are to be in accordance with the Pavement Specifications herein.

3.4 SIGNS AND BARRICADES

A. Contractor shall provide a detailed map showing location and verbage of all traffic control signs and methods for the project. All critical warning signs for the project will be a minimum of engineering grade reflective material and include appropriate flashing lights.

B. Appropriate Safety Barricades shall be installed between bicycle trails, sidewalks, and the temporary traffic lanes. These barricades shall be impact resistant for passenger vehicles with a travelling speed of 40 mph.

1. Advance warning signs: These signs shall be placed approximately 500 feet in advance of the construction site and detour on each approach to the construction area with subsequent warning signs every 250 feet, until construction site is met.

2. Road Construction Signs: Before and during construction of the detour, advance road construction signs shall be located as already stated above. The construction site detour lanes will have reflective trestle type barricade with flashing lights spaced a maximum of 25 feet apart to delineate each side of any temporary roadway. Additional signage shall be placed to indicate a reduced speed limit of 10 mph for the entire construction area. Other signs as appropriate to a particular activity in the work area shall be erected in advance of that activity.

3. Barricades: While detour is open to traffic, a line of concrete traffic barricades shall be placed across the closed roadway to channelize traffic onto detour. They shall be spaced across the blocked roadway end to end so no vehicle will be able to pass between any two adjacent barricades.

4. Barriers: Shall be wooden having a minimum of 3 horizontal 6-inch rails spaced 20 inches on center. Markings for barrier rails shall be 6 inches wide alternate orange and white reflectorized stripes sloping downward at 45 degrees in the direction traffic is to pass.

   During hours of darkness, the Contractor shall place and maintain flashing warning lights on tops of all barriers.

5. Direction Arrow Signs: At each change in traffic direction along the detour, Contractor shall install a sign with an arrow indicating change in traffic direction. This sign is to be located across the pavement from and facing on-coming traffic.

6. End Construction Sign: This sign shall be 60 inches x 24 inches and erected approximately 200 feet beyond end of construction area on the right-hand side.

END OF SECTION

INDEX TO

SECTION 02575 – SURFACE RESTORATION

SECTION 02575

SURFACE RESTORATION

PART 1 – GENERAL

1.1 WORK INCLUDED

A. This section covers the work necessary to replace all pavements, sidewalks, driveways, rock surfacing, drainage facilities, and other features damaged either directly or indirectly by operations incidental to new construction. The work consists of restoring existing surface areas due to planned improvements.

B. Standard specifications noted in this section are the 2007 edition of South Carolina Department of Transportation (SCDOT) Standard Specifications for Highway Construction.

C. All disturbed areas shall be left equal to or better than preconstruction conditions.

1.2 MEASUREMENT AND PAYMENT

A. No separate measurement or payment shall be made. Applicable costs shall be included elsewhere.

1.3 GENERAL PROVISIONS

A. Maintenance of Traffic

Whenever work interferes with flow of traffic along a roadway, Contractor shall provide for traffic control, signing, and public safety in accordance with provisions of the State Department of Transportation and Manual on Uniform Traffic Control Devices. Neither road closures nor detours shall be permitted unless specified in the Special Provisions and applicable permits/approvals are authorized by Engineer and DOT. Where road closures or detours are permitted by Engineer and DOT, Contractor must notify the appropriate agencies or departments prior to taking action. Proper advance notice shall be provided to the Owner, Engineer, and DOT.

Compliance with this requirement shall not be construed to relieve Contractor from the responsibility of notifying agencies or institutions whose services may be predicated upon a roadway being opened to traffic or whose services would be hindered if a roadway is closed to traffic or delays traffic. Such agencies or institutions shall include, but not be limited to, police department, fire department, municipal bus service, school bus service, and ambulance service. Contractor shall keep the required agencies informed of changing traffic patterns and detour situations.

B. Surface Restoration

Contractor shall perform all work and furnish all materials to restore the work area. This includes any gravel, asphalt, concrete, lawn, fences, mailboxes, signs or any other surfaces or related objects damaged or disturbed by the construction

operation. Surface restoration shall follow as closely as possible the backfill and compaction of excavations.

Cleanup shall be a continuing process from the start of work to final acceptance of project. Contractor shall, at all times, keep the area on which work is in progress free from accumulations of waste material or rubbish.

Spillage from the Contractor's hauling vehicles on public and private roads shall be promptly cleaned up. Upon completion of work, Contractor shall remove all temporary structures, rubbish, waste material, equipment, and supplies, resulting from the Contractor's operations. Contractor shall leave such lands in a neat and orderly condition, which is at least as good as found, prior to the new work. Contractor shall submit photos and similar records of preconstruction conditions to the Engineer prior to commencing work.

In roadways and traffic areas, Contractor shall be responsible for maintaining a road surface suitable for travel by the public and emergency vehicles from time of excavation until road surface has been restored. Such work includes dust control, temporary patching, signing, grading, temporary surfaces, and filling of potholes on temporary street surfaces, etc. Contractor shall be responsible for all claims and damages resulting from failure to maintain a suitable surface.

PART 2 – PRODUCTS

2.1 BASE COURSE

A. Aggregate shall consist of processed and blended crushed stone. Aggregates shall be free from lumps and balls of clay, organic matter, objectionable coatings, and other foreign material and shall be durable and sound. Coarse aggregate shall have a percentage of wear not to exceed 65% after 500 revolutions as determined by ASTM C 131. Aggregate shall meet applicable requirements of Section 305.2 in the South Carolina Department of Transportation Standard 2007 Specifications for Highway Construction. Material shall meet the following gradation and other requirements:

Granite Stone or Recycled Concrete	
Sieve Size	Percent by Weight Passing
2"	100
1-1/2"	95 - 100
1"	70 - 100
1/2"	48 - 75
# 4	30 - 60
# 30	11 - 30
#200	0 - 12
Liquid Limit	0 to 25
Plasticity Index	0 to 6

Marine Limestone	
Sieve Size	Percent by Weight Passing
2"	100
1-1/2"	95 - 100

1"	70 - 100
1/2"	50 - 85
# 4	30 - 60
# 30	17 - 38
#200	0 - 20
Liquid Limit	0 to 25
Plasticity Index	0 to 6

B. Prime Coat: Shall be EA-P Special, Emulsified asphalt, conforming to Section 407 of the South Carolina Department of Transportation 2007 Standard Specifications for Highway Construction.

2.2 ASPHALT CONCRETE

A. Surface Course: The surface course shall consist of fine and coarse aggregate and mineral filler uniformly mixed with hot asphalt binder in an acceptable mixing plant. The plant shall conform to South Carolina Department of Transportation 2007 Standard Specifications for Highway Construction. The gradations, asphalt content and air voids shall be the following:

TYPE C	
Square Sieve	% Passing
3/4 inch	100
1/2 inch	97 – 100
3/8 inch	83 – 100
No. 4	58 – 80
No. 8	42 – 62
No. 30	20 – 40
No. 100	8 – 20
No. 200	3 – 9
% Asphalt Binder	5.0 – 6.8
Air Voids, %	3.5 – 4.5

2.3 CONCRETE

Concrete for curbs, sidewalks, pavement, and miscellaneous construction shall conform to ASTM C 94, Alternate 3; and shall have a design mix proportioned for 3,000 pounds per square inch compressive strength at 28 days. Concrete mix shall contain no less than 5-l/2 sacks of cement per cubic yard.

1. Concrete Forms: All forms shall be either two-inch (2") dimension lumber, plywood, or metal forms.

2. Curing Compound: Commercial grade conforming to ASTM C 309, Type I.

3. Reinforcing Steel: Conform to ASTM A 615, Grade 60.

2.4 CONCRETE PIPE FOR CULVERT REPLACEMENT

Concrete Pipe shall conform to ASTM C 76, Class III O-ring unless there is less than 1.5 feet of cover over the pipe, then Class IV O-ring will be required.

PART 3 – EXECUTION

3.1 CONSTRUCTION PROCEDURE

A. Engineer reserves the right to vary classes of backfill and type of resurfacing as best serves the interest of Owner. Trench backfill shall be as specified in the details and related specifications.

B. Replace all pavement damaged under this contract with similar materials and design. Bomanite shall be replaced to match existing conditions.

3.2 REMOVAL OF PAVEMENT, SIDEWALK, CURBS AND GUTTERS

Removal and disposal of all pavement, sidewalks, curbs, and gutters shall conform to the standard specifications. Saw cut sections to be removed to create a neat edge.

3.3 STREET MAINTENANCE

Maintain all streets as specified in the applicable Encroachment Permit(s) and allow traffic to follow normal or rerouted traffic patterns.

3.4 ASPHALT CONCRETE PAVEMENT REPLACEMENT

Procedures shall be followed as specified below and as detailed on the plans.

A. Subgrade:

1. Bring trench to a smooth, even grade at correct distance below top of existing pavement surface, providing adequate space for the base course and pavement. Trim existing pavement to a straight line. Remove any pavement which has been damaged, broken, or is unsound. Provide a smooth, sound edge for joining the new pavement.

2. Compact the subgrade to ninety-seven percent (97%) of its modified proctor. (ASTM D-1557)

B. Base Course:

1. Place sufficient base course on the subgrade to obtain a minimum thickness of twelve inches (12") after compaction. Place for full width of the trench and compact as required to provide a smooth surface without segregation.

2. Compact the base course with mechanical vibratory or impact tampers. Determine the amount and method of compaction necessary to prevent subsequent settlement. Any subsequent settlement of finished surfacing

during the warranty period shall be promptly repaired at Contractor's expense.

C. Prime Coat: After base course has been compacted, apply an asphalt prime coat, specified above, at 0.15- to 0.30- gallon per square yard to the surface of base course and edges of existing pavement as required.

D. Asphalt Concrete:

1. Place asphalt concrete on prepared subgrade over the trench to a depth of not less than two and one-half inches (2-1/2") or depth of adjacent pavement, whichever is greater, but not for more than 6 inches. Place asphalt concrete after the prime coat has set. Spread and level asphalt concrete with hand tools or by use of a mechanical spreader, depending upon the area to be paved. Bring asphalt concrete to the proper grade and compact by rolling or use hand tampers where rolling is impossible or impractical.

2. Roll with power rollers capable of providing compression of 200 to 300 pounds per linear inch. Begin rolling from outside edge of the replacement progressing toward existing surfacing, lapping existing surface at least one-half the width of the roller. If existing surfacing bounds both edges of the replacement, begin rolling at edges of the replacement, lapping existing surface at least one-half the width of the roller, and progress toward center of the replacement area. Overlap each preceding track by at least one-half the width of the roller and make sufficient passes over entire area to remove all roller marks and to produce desired result, as determined by Engineer.

3. Finished surface of new compacted paving shall be flush with existing surface and shall conform to the grade and crown of adjacent pavement.

4. Immediately after new paving is compacted, all joints between new and original asphalt pavement shall be painted with hot asphalt or asphalt emulsion and be covered with dry paving sand before the asphalt solidifies.

E. Surface Smoothness: When a straightedge is laid across patched area between edges of old surfacing and surface of new pavement, new pavement shall not deviate from the straightedge more than one-quarter inch.

3.5 WEATHER CONDITIONS

Asphalt shall not be applied to wet material. Asphalt shall not be applied during rainfall, sand or dust storms, or any imminent storms. The Engineer will determine when surfaces and material are dry enough to proceed with construction. Asphalt concrete shall not be placed (1) when atmospheric temperature is lower than 45 degrees F (unless asphalt thickness is 1 inch, then temperature shall be above 55 degrees F), (2) during heavy rainfall, or (3) when the surface upon which it is to be placed is frozen or wet. Asphalt mixture shall be delivered to spreader at a temperature between 275 degrees F and 325 degrees F and shall not have dropped more than 50 degrees F from temperature the mix left asphalt

plant. Asphalt for prime coat shall not be applied when the surface temperature is less than 50 degrees F. Exceptions will be permitted only in special cases and only with prior written acceptance of the Engineer.

3.6 PROTECTION OF STRUCTURES

A. Provide whatever protective coverings may be necessary to protect the exposed portions of bridges, culverts, curbs, gutters, posts, guard fences, road signs, and any other structures from splashing oil and asphalt from paving operations. Remove any oil, asphalt, dirt, or other undesirable matter from structures caused by the paving operations.

B. Where water valve boxes, manholes, catch basins, or other underground utility appurtenances are within area to be surfaced, resurfacing shall be level with the top of existing finished elevation of these facilities. If it is evident these facilities are not in accordance with the proposed finished surface, notify Engineer to have proper authority contacted. Have the facility altered before proceeding with resurfacing around the obstruction. Consider any delays experienced from such obstructions as incidental to the paving operation. Protect all covers during asphalt paving.

C. All surface structures and features located outside permissible excavation limits for underground installations, together with those within the construction areas which are indicated in the Plans as being saved, shall be properly protected against damage and shall not be disturbed or removed without direction from the Engineer. Within construction limits, as required, the removal of improvements such as paving, curbing, walks, turf, etc., shall be subject to acceptable replacement after completion of underground work. All expense of removal and replacement shall be borne by the Contractor to the extent that separate compensation is not specifically provided for in the Contract.

Obstructions such as street signs, guard posts, small culverts, mailboxes, and other items of prefabricated construction may be temporarily removed during construction provided that essential service is maintained in a relocated setting as accepted by the Engineer. Nonessential items shall be properly stored for the duration of construction. Upon completion of the underground work, all such items shall be replaced in their proper setting at the sole expense of Contractor.

Contractor shall be responsible for protection of existing overhead utilities and poles. This shall include arranging with and paying the utility for holding poles close to the edge of any trench. Holding of poles and repair of any damage to these facilities shall be considered incidental to the project with no additional compensation allowed. If relocation or removal of these facilities is required, Contractor will contact the concerned utility and pay for relocation or removal at no additional expense to Owner.

3.7 EXCESS MATERIALS

Dispose of all excess materials at the Contractor's expense. Make arrangements for the disposal and bear all costs or retain any profit incidental to such disposal.

3.8 CONTRACTOR'S RESPONSIBILITY

Settlement of replaced pavement over trenches within the warranty period shall be considered result of improper or inadequate compaction of sub-base or base materials. Contractor shall promptly repair all pavement deficiencies during the warranty period at Contractor's sole expense.

3.9 ROCK SURFACING

Where existing, place crushed rock surfacing material, as specified herein, for the full width of all streets, driveways, parking areas, street shoulders, and other areas disturbed by hand labor where necessary. Level and grade the rock to conform to existing grades and surfaces.

3.10 SIDEWALKS

A. Replace concrete sidewalks to the same section width, depth, line, and grade as removed or damaged.

B. Replace concrete sidewalks between scored joints and make replacement in a manner that will avoid a patched appearance. Provide a minimum two-inch (2") thick compacted leveling course of clean 3/4-inch minimum crushed rock or gravel of quality hereinbefore specified. Finish concrete surface similar to the adjacent sidewalks. Score joints and finish edges with a steel edging tool.

C. Saw cut edges neatly.

D. Tunneling under curbs and sidewalks is optional. However, should any subsequent cracking, subsidence, or any other indication of failure occur within the warranty period, damaged section shall promptly be replaced at Contractor's sole expense.

3.11 DIRECTIONAL BORING

Horizontal directional boring/drilling (HDD or Horizontal Directional Drilling) installation shall be accomplished where shown on Plans or in the Special Provisions to minimize disturbance of existing surface improvements. Contractor may elect to complete work using HDD methods if acceptable to the Engineer. The installer shall have a minimum of three years of experience in this method of construction and have installed at least 20,000 feet of 8-inch or larger diameter pipe to specified grades. Field supervisor employed by Contractor shall have at least three years of experience and shall be on site at all times during boring/drilling installation, and be responsible for all of the work.

Contractor shall submit boring/drilling pit locations to the Engineer before beginning construction.

Drilling equipment shall be capable of placing the pipe as shown on plans. The installation shall be by a steerable drilling tool capable of installing continuous runs of pipe, without intermediate pits, a minimum distance of 200 feet. The guidance system shall be capable of installing pipe within 1-1/2 inch of planned vertical dimensions and 2 inches of horizontal dimensions. Contractor shall be required to abandon pipes which

vary in depth and alignment from these tolerances. Contractor shall reinstall pipes to proper depth and alignment at no additional cost to Owner.

Pull back forces shall not exceed allowable pulling forces for the pipe being installed. Drilling fluid shall be a mixture of water and bentonite clay. Disposal of excess fluid and spoils shall be the responsibility of Contractor.

3.12 CULVERTS

A. All culverts removed because of interference with new construction shall be removed with the least possible damage to pipe or basin. Dispose of culvert pipe in too poor condition for replacement because of age, physical condition, or other reasons.

B. Culverts anticipated to be removed must have elevations taken to ensure proper replacement. Replace all pipes to preexisting lines and grades. Pipe fifteen inches (15") and smaller shall be laid on a minimum four-inch (4") thick crushed stone aggregate. Use a minimum six-inch (6") thick stone aggregate base under pipe eighteen inches (18") and larger.

C. Replace culvert headwalls of all types to a condition at least equivalent to their original shape or form.

3.13 RESTORATION OF SURFACE IMPROVEMENTS

Wherever any surface improvements such as pavement, curbing, pedestrian walks, fencing, or turf have been removed, damaged or otherwise disturbed by Contractor's operations, they shall be repaired or replaced to the Engineer's satisfaction. Each item of restoration work shall be completed as soon as practicable after installation and backfilling operations on each section of pipeline.

The in-place pavement structure (including base aggregates) shall be restored in kind and depth as previously existed or to the detail shown on drawings, whichever is more stringent.

Existing concrete and bituminous surfaces at the trench wall shall be sawed or cut with a cutting wheel to form a neat edge in a straight line before surfaces are to be restored. Sawing or cutting may be accomplished as a part of removal or prior to restoration at the option of Contractor. However, all surface edges will be checked prior to restoration.

3.14 TURF RESTORATION

Turf restoration shall be accomplished by sod placement except where seeding is specifically allowed or required.

Topsoil shall be placed to a minimum depth of four inches under all sod and in all areas seeded. The topsoil material used shall be light friable loam containing a liberal amount of humus and shall be free of heavy clay, coarse sand, stones, plants, roots, sticks and other foreign matter. Topsoil meeting these requirements shall be selected from excavated materials to the extent available and needed. If additional topsoil is required, Contractor shall provide it at no additional cost to the Owner.

3.15 RESTORATION OF MISCELLANEOUS ITEMS

Wherever any curbing, curb and gutter sections, pedestrian walks, fencing, driveway surfacing, or other improvements are removed or in any way damaged or undermined, they shall be restored to original condition by repair or replacement as the Engineer considers necessary. Replacement of old materials will be acceptable only to the extent existing quality can be fully achieved, such as in the case of fencing. Otherwise, new materials shall be provided and placed as the Engineer directs. Workmanship and finished quality shall be equal to new construction.

A proper foundation shall be prepared before reconstructing concrete or bituminous improvements. Unless otherwise directed, granular material shall be placed to a depth of at least four inches under all concrete and bituminous items. No direct compensation will be made for furnishing and placing this material even though such course was not part of the original construction.

3.16 MAINTENANCE AND FINAL CLEANUP

All subgrade surfaces shall be maintained acceptably until the start of surfacing construction or restoration work, and until work has been finally accepted. Additional materials shall be provided and placed as needed to compensate for trench settlement and to serve as temporary construction pending completion of the final surface improvements.

Final disposal of debris, waste materials, and other remains or consequences of construction, shall be accomplished intermittently as new construction items are completed and shall not be left to await final completion of all work. Cleanup operations shall be considered as being a part of the work covered under Contract Items involved and only work which cannot be accomplished at any early time shall be considered as final cleanup work not attributable to a specific Contract Item.

If disposal operations and other cleanup work are not conducted properly as construction progresses, Engineer may withhold partial payments until such work is satisfactorily pursued or deduct the estimated cost of its performance from partial estimate value.

Maintenance of sodded and seeded areas shall include adequate watering for plant growth and replacement of any dead or damaged sod as may be required for acceptance of the work.

END OF SECTION

SECTION 02610

FUSIBLE POLYVINYLCHLORIDE PIPE FOR INSTALLATION BY HORIZONTAL DIRECTIONAL DRILL (HDD)

PART 1 – GENERAL

1.1 DESCRIPTION

A. SCOPE

1. This section specifies fusible polyvinylchloride pipe, including standards for dimensionality, testing, quality, acceptable fusion practice, safe handling, storage, and installation of the pipe by horizontal directional drilling, directional boring, or guided boring.

B. REQUIREMENTS:

1. Contractor shall install Owner-furnished fusible polyvinylchloride pipe conforming to all standards and procedures and meeting all testing and material properties as described in this specification for installation by horizontal directional drilling.

2. Contractor shall be responsible for all installation processes and procedures associated with the installation by horizontal directional drilling in accordance with this specification.

C. PIPE DESCRIPTION

1. Pipe Supplier shall furnish fusible polyvinylchloride pipe conforming to all standards and procedures and meeting all testing and material properties as described in this specification.

2. Pipe shall conform to the following dimensionality and general characteristics table:

Pipe Description	Nominal Diameter (inches)	DR	Color	Pressure Class (psi)	Required Inner Diameter (inches)
Water Main	16"	18	Blue	235	15.35

1.2 QUALITY ASSURANCE

D. REFERENCES:

1. This section contains references to the following documents. They are a part of this section as specified and modified. Where a referenced document contains references to other standards, those other standards are included as references under this section as if referenced directly. In the event of a conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

2. Unless otherwise specified, references to documents shall mean the documents in effect at the time of design, bid, or construction, whichever is earliest. If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued.

3. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, regardless of whether the document has been superseded by a version with a later date, discontinued, or replaced.

Reference	Title
ANSI/AWWA C110/A21.10	American National Standard for Ductile–Iron and Gray–Iron Fittings, 3–inch through 48–inch, for Water and Other Liquids
ANSI/AWWA C111/A21.11	American National Standard for Rubber–Gasket Joints for Ductile–Iron Pressure Pipe and Fittings
AWWA C605	Standard for Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water
AWWA C651	Standard for Disinfecting Water Mains
AWWA C900	Standard for Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 in. through 12 in. (100mm Through 300mm), for Water Distribution
AWWA C905	Standard for Polyvinyl Chloride (PVC Pressure Pipe and Fabricated Fittings, 14 in. through 48 in. (350mm Through 1200mm), for Water Distribution and Transmission
AWWA M23	AWWA Manual of Supply Practices PVC Pipe—Design and Installation, Second Edition
ASTM C923	Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals
ASTM D1784	Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
ASTM D1785	Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
ASTM D2152	Test Method for Degree of Fusion of Extruded Poly(Vinyl Chloride) (PVC) Pipe and Molded Fittings by Acetone Immersion
ASTM D2241	Poly (Vinyl Chloride) (PVC) Plastic Pipe (SDR–PR)
ASTM D2665	Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings
ASTM D3034	Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
ASTM F477	Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM F679	Standard Specification for Poly(Vinyl Chloride) (PVC) Large Diameter Plastic Gravity Sewer Pipe and Fittings

Reference	Title
ASTM F1057	Standard Practice for Estimating the Quality of Extruded Poly (Vinyl Chloride) (PVC) Pipe by the Heat Reversion Technique
ASTM F1417	Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using Low–Pressure Air
UNI–B–6	Recommended Practice for Low–Pressure Air Testing of Installed Sewer Pipe
UNI–PUB–08	Tapping Guide for PVC Pressure Pipe
NSF–14	Plastics Piping System Components and Related Materials
NSF–61	Drinking Water System Components—Health Effects
PPI TR–2	PVC Range Composition Listing of Qualified Ingredients

E. MANUFACTURER REQUIREMENTS

1. All piping shall be made from PVC compound conforming to cell classification 12454 per ASTM D1784.

F. FUSION TECHNICIAN REQUIREMENTS

1. Fusion Technician shall be fully qualified by the pipe supplier to install fusible polyvinylchloride pipe of the type(s) and size(s) being used. Qualification shall be current as of the actual date of fusion performance on the project.

G. SPECIFIED PIPE SUPPLIERS

1. Fusible polyvinylchloride pipe shall be equivalent to those manufactured under the trade names Fusible C–900®, Fusible C–905®, and FPVC®, for Underground Solutions, Inc., Poway, CA, (858) 679–9551. Fusion process shall be as patented by Underground Solutions, Inc., Poway, CA, Patent No. 6,982,051. No other supplier of fusible polyvinylchloride pipe shall be used unless approved in writing.

H. WARRANTY

1. The pipe shall be warranted for one year per the pipe supplier's standard terms.

2. In addition to the standard pipe warranty, the fusion services shall be warranted for one year per the fusion service provider's standard terms.

I. PRE–CONSTRUCTION SUBMITTALS

1. The following PRODUCT DATA is required from the pipe supplier and/or fusion provider:

a. Pipe Size

b. Dimensionality

c. Pressure Class per applicable standard

d. Color

e. Recommended Minimum Bending Radius

f. Recommended Maximum Safe Pull Force

g. Fusion technician qualification indicating conformance with this specification

2. The following WORK PLAN AND INFORMATION is required from the contractor and/or horizontal directional drilling Contractor. This WORK PLAN AND INFORMATION shall also be supplied to the pipe supplier, should it be requested:

a. Work plan shall include for each HDD installation any excavation locations and dimensions, interfering utilities, bore dimensions and locations including bend radii used, and traffic control schematics.

b. A project safety and contingency plan which shall include but shall not be limited to drilling fluid containment and cleanup procedures, equipment and plan for compromised utility installations including electrical and power lines, water, wastewater and any other subsurface utility in the area.

c. An HDD schedule identifying daily work hours and working dates for each installation.

J. POST–CONSTRUCTION SUBMITTALS

1. The following AS–RECORDED DATA is required from the contractor and/or fusion provider to the owner or pipe supplier upon request:

a. Approved datalogger device reports

b. Fusion joint documentation containing the following information:

i. Pipe Size and Thickness

ii. Machine Size

iii. Fusion Technician Identification

iv. Job Identification

v. Fusion Joint Number

vi. Fusion, Heating, and Drag Pressure Settings

vii. Heat Plate Temperature

viii. Time Stamp

ix. Heating and Cool Down Time of Fusion

x. Ambient Temperature

c. As–recorded Information

i. The as–recorded plan and profile will reflect the actual installed alignment, and reflect the horizontal offset from the baseline and depth of cover.

ii. All fittings, valves, or other appurtenances will also be referenced and shown.

iii. A daily project log, along with tracking log sheets, should they be used, shall be provided. Tracking log sheet data, should it be employed, shall include any and all that apply, including inclination, depth, azimuth, and hydraulic pull–back and rotational force measured.

PART 2 – PRODUCTS

2.1 FUSIBLE POLYVINYLCHLORIDE PRESSURE PIPE FOR POTABLE WATER

A. Fusible polyvinylchloride pipe shall conform to AWWA C900, AWWA C905, ASTM D2241 or ASTM D1785 for standard dimensions, as applicable. Testing shall be in accordance with the referenced AWWA standards for all pipe types.

B. 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.

C. Fusible polyvinylchloride pipe shall be manufactured in a standard 40' nominal length, or custom lengths as specified.

D. Fusible polyvinylchloride pipe shall be blue in color for potable water use.

E. Pipe generally shall be marked per AWWA C900, AWWA C905, ASTM D2241, or ASTM D1785, as applicable, and shall include as a minimum:

1. Nominal pipe size

2. PVC

3. Dimension Ratio, Standard Dimension Ratio, or Schedule

4. AWWA pressure class or standard pressure rating for non–AWWA pipe

5. AWWA standard designation number or pipe type for non–AWWA pipe

6. NSF–61 mark verifying suitability for potable water service

7. Extrusion production–record code

8. Trademark or trade name

9. Cell Classification 12454 and/or PVC material code 1120 may also be included

F. Pipe shall be homogeneous throughout and be free of visible cracks, holes, foreign material, blisters, or other visible deleterious faults.

2.2 FUSION JOINTS

A. 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 as described in this specification.

2.3 CONNECTIONS AND FITTINGS FOR PRESSURE APPLICATIONS

A. Connections shall be defined in conjunction with the coupling of project piping, as well as the tie–ins to other piping systems.

B. DUCTILE IRON MECHANICAL AND FLANGED FITTINGS
Acceptable fittings for use with fusible polyvinylchloride pipe shall include standard ductile iron fittings conforming to AWWA/ANSI C110/A21.10 and AWWA/ANSI C111/A21.11.

1. Connections to fusible polyvinylchloride pipe may be made using a restrained or non–restrained retainer gland product for PVC pipe, as well as for MJ or flanged fittings.

2. Bends, tees, and other ductile iron fittings shall be restrained with the use of thrust blocking or other means as indicated in the construction documents.

3. Ductile iron fittings and glands must be installed per the manufacturer's guidelines.

C. PVC GASKETED, PUSH–ON FITTINGS

Acceptable fittings for use with fusible polyvinylchloride pipe shall include standard PVC pressure fittings conforming to AWWA C900 or AWWA C905.

1. Acceptable fittings for use joining fusible polyvinylchloride pipe other sections of fusible polyvinylchloride pipe or other sections of PVC pipe shall include gasketed PVC, push–on type couplings and fittings, including bends, tees, and couplings as shown in the drawings.

2. Bends, tees, and other PVC fittings shall be restrained with the use of thrust blocking or other restraint products as indicated in the construction documents.

3. PVC gasketed, push–on fittings, and mechanical restraints, if used, must be installed per the manufacturer's guidelines.

D. FUSIBLE POLYVINYL CHLORIDE SWEEPS OR BENDS

1. Fusible polyvinyl chloride sweeps or bends shall conform to the same sizing convention, diameter, dimensional tolerances and pressure class of the pipe being joined using the sweep or bend.

2. 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. There shall be no gasketed connections utilized with a fusible polyvinyl chloride sweep.

3. 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.

E. SLEEVE–TYPE COUPLINGS

1. Sleeve–type mechanical couplings shall be manufactured for use with PVC pressure pipe, and may be restrained or unrestrained as indicated in the construction documents.

2. Sleeve–type couplings shall be rated at the same or greater pressure carrying capacity as the pipe itself.

F. EXPANSION AND FLEXIBLE COUPLINGS

1. Expansion–type mechanical couplings shall be manufactured for use with PVC pipe, and may be restrained or unrestrained as indicated in the construction documents.

2. Expansion–type mechanical couplings shall be rated at the same or greater pressure carrying capacity as the pipe itself.

G. CONNECTION HARDWARE

Bolts and nuts for buried service shall be made of non–corrosive, high–strength, low–alloy steel having the characteristics specified in ANSI/AWWA C111/A21.11, regardless of any other protective coating.

2.4 DRILLING SYSTEM EQUIPMENT

A. GENERAL

1. The directional drilling equipment, as a minimum, shall consist of a directional drilling rig of sufficient capacity to perform the bore(s) and pull–back of the pipe(s), a drilling fluid mixing & delivery system of sufficient capacity to successfully complete the crossing, a guidance system to accurately guide boring operations, and trained and competent personnel to operate the system. All equipment shall be in good, safe operating condition with sufficient supplies, materials and spare parts on hand to maintain the system in good working order for the duration of this project. All required equipment shall be included in the emergency and contingency plan as submitted per these specifications.

B. DRILLING RIG

1. The directional drilling machine shall consist of a hydraulically powered

system to rotate, push and pull drill pipe while delivering a pressurized fluid mixture to a drill head. The machine shall be anchored to withstand the pulling, pushing and rotating forces required to complete the project.

2. The drilling rig hydraulic system shall be of sufficient pressure and volume to power drilling operations. The hydraulic system shall be free from leaks.

3. The drilling rig shall have a system to monitor pull–back hydraulic pressure during pull–back operations.

C. DRILL HEAD

1. The horizontal directional drilling equipment shall produce a stable fluid lined tunnel with the use of a steer–able drill head and any subsequent pre–reaming heads.

2. The system must be able to control the depth and direction of the drilling operation.

3. Drill head shall contain all necessary cutters and fluid jets for the operation, and shall be of the appropriate design for the ground medium being drilled.

D. DRILLING FLUID SYSTEM

1. DRILLING FLUID (DRILLING MUD)

a. Drilling fluid shall be composed of clean water and the appropriate additive(s) for the fluid to be used. Water shall be from a clean source and shall meet the mixing requirements of the mixture manufacturer(s).

b. The water and additives shall be mixed thoroughly to assure the absence of any clumps or clods. No hazardous additives may be used.

c. Drilling fluid shall be maintained at a viscosity sufficient to suspend cuttings and maintain the integrity of bore wall(s).

d. Drilling fluid shall be disposed of off–site in accordance with local, state and federal requirements and/or permit conditions.

e. No additional chemicals or polymer surfactants shall be allowed to be added to the drilling fluid unless they have been submitted per this specification.

2. MIXING SYSTEM

a. A drilling fluid mixing system shall be of sufficient size to mix and deliver drilling fluid for the project.

b. The mixing system shall be able to ensure thorough mixing of the drilling fluid. The drilling fluid reservoir tank shall be sized for adequate storage of the fluid.

c. The mixing system shall continually agitate the drilling fluid during drilling operations.

3. DRILLING FLUID DELIVERY AND RECOVERY SYSTEM

a. The drilling fluid pumping system shall have a minimum capacity to supply drilling fluid in accordance with the drilling equipment pull–back rating at a constant required pressure.

b. The delivery system shall have filters or other appropriate in–line equipment to prevent solids from being pumped into the drill pipe.

c. Used drilling fluid and drilling fluid spilled during drilling operations shall be contained and properly disposed of. The use of spill containment measures shall be maintained around drill rigs, drilling fluid mixing system, entry and exit pits and drilling fluid recycling system (if used) to prevent spills into the surrounding environment. Pumps, vacuum truck(s), and/or storage of sufficient size shall be in place to contain excess drilling fluid.

d. A closed–loop drilling fluid system and a drilling fluid cleaning system should be used to whatever extent practical, depending upon project size and conditions. Under no circumstances shall drilling fluid that has escaped containment be reused in the drilling system.

E. DRILLING CONTROL SYSTEM

1. Calibration of the electronic detection and control system shall be verified prior to the start of the bore.

2. The drilling head shall be remotely steer–able by means of an electronic or magnetic detection system. The drilling head location shall be monitored in three dimensions:

a. Offset from the baseline,

b. Distance along the baseline, and

c. Depth of cover.

3. Point of rotation of the head shall also be monitored.

4. For gravity application and on–grade drilling, sonde/beacon or approved equipment applicable for grade increments of 1/10th of one percent shall be used.

2.5 PIPE PULL HEADS

A. Pipe pull heads shall be utilized that employ a positive through–bolt design assuring a smooth wall against the pipe cross–section at all times.

B. Pipe pull heads shall be specifically designed for use with fusible polyvinylchloride pipe, and shall be as recommended by the pipe supplier.

2.6 PIPE ROLLERS

C. Pipe rollers, if required, shall be of sufficient size to fully support the weight of the pipe during handling and pullback operations.

D. A sufficient quantity of rollers and spacing, per the pipe supplier's guidelines shall be used to assure adequate support and excessive sagging of the product pipe.

PART 3 – EXECUTION

3.1 DELIVERY AND OFF–LOADING

A. All pipe shall be bundled or packaged in such a manner as to provide adequate protection of the ends during transportation to the site. Any pipe damaged in shipment shall be replaced as directed by the owner or engineer.

B. Each pipe shipment should be inspected prior to unloading to see if the load has shifted or otherwise been damaged. Notify owner or engineer immediately if more than immaterial damage is found. Each pipe shipment should be checked for quantity and proper pipe size, color, and type.

C. Pipe should be loaded, off–loaded, and otherwise handled in accordance with AWWA M23, and all of the pipe supplier's guidelines shall be followed.

D. Off–loading devices such as chains, wire rope, chokers, or other pipe handling implements that may scratch, nick, cut, or gouge the pipe are strictly prohibited.

E. During removal and handling, be sure that the pipe does not strike anything. Significant impact could cause damage, particularly during cold weather.

F. If appropriate unloading equipment is not available, pipe may be unloaded by removing individual pieces. Care should be taken to insure that pipe is not dropped or damaged. Pipe should be carefully lowered, not dropped, from trucks.

3.2 HANDLING AND STORAGE

A. Any length of pipe showing a crack or which has received a blow that may have caused an incident fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the work. Damaged areas, or possible areas of damage may be removed by cutting out and removing the suspected incident fracture area. Limits of the acceptable length of pipe shall be determined by the owner or engineer.

B. Any scratch or gouge greater than 10% of the wall thickness will be considered significant and can be rejected unless determined acceptable by the owner or engineer.

C. Pipe lengths should be stored and placed on level ground. Pipe should be stored at the job site in the unit packaging provided by the manufacturer. Caution should be exercised to avoid compression, damage, or deformation to the ends of the pipe. The interior of the pipe, as well as all end surfaces, should be kept free from dirt and foreign matter.

D. Pipe shall be handled and supported with the use of woven fiber pipe slings or

approved equal. Care shall be exercised when handling the pipe to not cut, gouge, scratch or otherwise abrade the piping in any way.

E. If pipe is to be stored for periods of 1 year or longer, the pipe should be shaded or otherwise shielded from direct sunlight. Covering of the pipe which allows for temperature build–up is strictly prohibited. Pipe should be covered with an opaque material while permitting adequate air circulation above and around the pipe as required to prevent excess heat accumulation.

F. Pipe shall be stored and stacked per the pipe supplier's guidelines.

3.3 FUSION PROCESS

A. GENERAL

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) connected 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. Fusion machines must incorporate the following elements:

a. HEAT PLATE – Heat plates shall be in good condition with no deep gouges or scratches. Plates shall be clean and free of any debris or contamination. Heater controls shall function properly; cord and plug shall be in good condition. The appropriately sized heat plate shall be capable of maintaining a uniform and consistent heat profile and temperature for the size of pipe being fused, per the pipe supplier's guidelines.

b. CARRIAGE – Carriage shall travel smoothly with no binding at less than 50 psi. Jaws shall be in good condition with proper inserts for the pipe size being fused. Insert pins shall be installed with no interference to carriage travel.

c. GENERAL MACHINE – Overview of machine body shall yield no obvious defects, missing parts, or potential safety issues during fusion.

d. DATA LOGGING DEVICE – An approved datalogging device with the current version of the pipe supplier's recommended and compatible software shall be used. Datalogging device operations and maintenance manual shall be with the unit at all times. If fusing for extended periods of time, an independent 110V power source shall be available to extend battery life.

5. Other equipment specifically required for the fusion process shall include the following:

a. Pipe rollers shall be used for support of pipe to either side of the machine

b. A weather protection canopy that allows full machine motion of the heat plate, fusion assembly and carriage shall be provided for fusion in inclement, extreme temperatures, and /or windy weather, per the pipe supplier's recommendations.

c. An infrared (IR) pyrometer for checking pipe and heat plate temperatures.

d. Fusion machine operations and maintenance manual shall be kept with the fusion machine at all times.

e. Facing blades specifically designed for cutting fusible polyvinylchloride pipe shall be used.

B. JOINT RECORDING

Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) connected to the fusion machine. The fusion data logging and joint report shall be generated by software developed specifically for the butt–fusion of fusible polyvinyl chloride pipe. The software shall register and/or record the parameters required by the pipe supplier and these specifications. Data not logged by the data logger shall be logged manually and be included in the Fusion Technician's joint report.

3.4 DRILLING OPERATIONS

A. GENERAL

1. Bore path and alignment are as indicated in the contract documents. The path of the bore may be modified based on field and equipment conditions. Entry and exit locations and control–point elevations shall be maintained as indicated in the contract documents.

2. Bend radii shown in the contract documents are minimum allowable radii and shall not be reduced.

B. LOCATION AND PROTECTION OF UNDERGROUND UTILITIES

1. Correct location of all underground utilities that may impact the HDD installation is the responsibility of the Contractor, regardless of any locations shown on the drawings or previous surveys completed.

2. Utility location and notification services shall be contacted by the Contractor prior to the start of construction.

3. All existing lines and underground utilities shall be positively identified, including exposing those facilities that are located within an envelope of possible impact of HDD installation as determined for the project specific site conditions. It is the Contractor and HDD system operator's responsibility to determine this envelope of safe offset from existing utilities. This will include, but is not limited to, soil conditions and layering, utility proximity and

material, HDD system and equipment, and foreign subsurface material.

C. SITE LOCATION PREPARATION

1. Work site as indicated on drawings shall be graded or filled to provide a level working area. No alterations beyond what is required for operations are to be made

2. Contractor shall confine all activities to designated work areas.

D. DRILLING LAYOUT AND TOLERANCES

1. The drill path shall be accurately surveyed with entry and exit areas placed in the appropriate locations within the areas indicated on drawings. If using a magnetic guidance system, drill path will be surveyed for any surface geomagnetic variations or anomalies.

2. Instrumentation shall be provided and maintained at all times that accurately locates the pilot hole, measures drill–string axial and torsional loads and measures drilling fluid discharge rate and pressure.

3. Entry and exit areas shall be drilled so as not to exceed the bending limitations of the pipe as recommended by the pipe supplier.

E. PILOT HOLE BORE

1. Pilot hole shall be drilled along bore path. In the event that the pilot bore does deviate from the bore path, it may require contractor to pull–back and re–drill from the location along bore path before the deviation.

2. The Contractor shall limit curvature in any direction to reduce force on the pipe during pull–back. The minimum radius of curvature shall be no less than that specified by the pipe supplier and as indicated on the drawings.

F. REAMING

1. After successfully completing the pilot hole, the bore hole shall be reamed to a diameter which meets the requirements of the pipe being installed. The following table is offered as an estimated guide:

Nominal Pipe Diameter	**Bore Hole Diameter**
< 8 inches	Pipe Dia. + 4 inches
8 inches to 24 inches	Pipe Dia. X 1.5
> 24 inches	Pipe Dia. + 12 inches

2. Multiple reaming passes shall be used at the discretion of the Contractor and shall conform to this specification.

3. In the event of a drilling fluid fracture, returns loss or other loss of drilling fluid, the Contractor shall be responsible for restoring any damaged property to original condition and cleaning up the area in the vicinity of the damage or loss.

3.5 PIPE PULL–BACK AND INSERTION

A. Pipe shall be fused prior to insertion, if the site and conditions allow, into one continuous length.

B. Contractor shall handle the pipe in a manner that will not over–stress the pipe prior to insertion. Vertical and horizontal curves shall be limited so that the pipe does not bend past the pipe supplier's minimum allowable bend radius, buckle, or otherwise become damaged. Damaged portions of the pipe shall be removed and replaced.

C. The pipe entry area shall be graded as needed to provide support for the pipe and to allow free movement into the bore hole.

1. The pipe shall be guided into the bore hole to avoid deformation of, or damage to, the pipe.

2. The fusible polyvinylchloride pipe may be continuously or partially supported on rollers or other Owner and Engineer approved friction decreasing implement during joining and insertion, as long as the pipe is not over–stressed or critically abraded prior to, or during installation.

3. A swivel shall be used between the reaming head and the fusible polyvinylchloride pipe to minimize torsion stress on the pipe assembly.

D. Buoyancy modification shall be at the sole discretion of the Contractor, and shall not exceed the pipe supplier's guidelines in regards to maximum pull force or minimum bend radius of the pipe. Damage caused by buoyancy modifications shall be the responsibility of the Contractor.

E. Once pull–back operations have commenced, the operation shall continue without interruption until the pipe is completely pulled through the bore hole.

F. The pipe shall be installed in a manner that does not cause upheaval, settlement, cracking, or movement and distortion of surface features. Any damages caused by the Contractor's operations shall be corrected by the Contractor.

3.6 INSTALLATION CLEANUP

A. Following the installation, the project site shall be returned to a condition equal to or better than the pre–construction condition of the site. All excavations will be backfilled and compacted per the construction documents and jurisdictional standards. All pavement and hardscape shall be repaired per applicable jurisdictional standards, excess materials shall be removed from the site, and disturbed areas shall be re–landscaped. All drilling fluid shall be properly disposed of per these specifications and all applicable jurisdictional laws.

B. Contractor shall verify that all utilities, structures, and surface features in the project area are sound.

3.7 PREPARATION PRIOR TO MAKING CONNECTIONS INTO EXISTING PIPING SYSTEMS

A. Approximate locations for existing piping systems are shown in the construction

documents. Prior to making connections into existing piping systems, the contractor shall:

1. Field verify location, size, piping material, and piping system of the existing pipe.

2. Obtain all required fittings, which may include saddles, sleeve type couplings, flanges, tees, or others as shown in the construction documents.

3. Have installed all temporary pumps and/or pipes in accordance with established connection plans.

B. Unless otherwise approved, new piping systems shall be completely assembled and successfully tested prior to making connections into existing pipe systems.

3.8 PIPE SYSTEM CONNECTIONS

A. Pipe connections shall be installed per applicable standards and regulations, as well as per the connection manufacturer's guidelines and as indicated in the construction documents. Pipe connections to structures shall be installed per applicable standards and regulations, as well as per the connection manufacturer's guidelines.

B. If possible, pipe installed via HDD shall be filled with water prior to making any connections to the existing system or other portions of the project.

3.9 TAPPING FOR POTABLE WATER APPLICATIONS

A. Tapping shall be performed using standard tapping saddles designed for use on PVC piping in accordance with AWWA C605. Tapping shall be performed only with use of tap saddles or sleeves. NO DIRECT TAPPING WILL BE PERMITTED. Tapping shall be performed in accordance with the applicable sections for Saddle Tapping per Uni–Pub–8.

B. All connections requiring a larger diameter than that recommended by the pipe supplier, shall be made with a pipe connection as specified and indicated on the drawings.

C. Equipment used for tapping shall be made specifically for tapping PVC pipe:

1. Tapping bits shall be slotted "shell" style cutters, specifically made for PVC pipe. 'Hole saws' made for cutting wood, steel, ductile iron, or other materials are strictly prohibited.

2. Manually operated or power operated drilling machines may be used.

D. Taps may be performed while the pipeline is filled with water and under pressure ('wet' tap,) or when the pipeline is not filled with water and not under pressure ('dry' tap).

3.10 TESTING

A. Testing shall comply with all applicable jurisdictional building codes, statutes, standards, regulations, and laws.

B. HYDROSTATIC TESTING AND LEAKAGE TESTING FOR PRESSURE PIPING

1. Hydrostatic and leakage testing for piping systems that contain mechanical jointing as well as fused PVC jointing shall comply with AWWA C605.

2. Unless agreed to or otherwise designated by the owner or engineer, for a simultaneous hydrostatic and leakage test following installation, a pressure equal to 150% of working pressure at point of test, but not less than 125% of normal working pressure at highest elevation shall be applied. The duration of the pressure test shall be for two (2) hours.

3. If hydrostatic testing and leakage testing are performed at separate times, follow procedures as outlined in AWWA C605.

4. In preparation for pressure testing the following parameters must be followed:

   a. All air must be vented from the pipeline prior to pressurization. This may be accomplished with the use of the air relief valves or corporation stop valves, vent piping in the testing hardware or end caps, or any other method which adequately allows air to escape the pipeline at all high points. Venting may also be accomplished by 'flushing' the pipeline in accordance with the parameters and procedures as described in AWWA C605.

   b. The pipeline must be fully restrained prior to pressurization. This includes complete installation of all mechanical restraints per the restraint manufacturer's guidelines, whether permanent or temporary to the final installation. This also includes the installation and curing of any and all required thrust blocking. All appurtenances included in the pressure test, including valves, blow–offs, and air–relief valves shall be checked for proper installation and restraint prior to beginning the test.

   c. Temporary pipeline alignments that are being tested, such as those that are partially installed in their permanent location shall be configured to minimize the amount of potentially trapped air in the pipeline.

C. DISINFECTION OF THE PIPELINE FOR POTABLE WATER PIPING

1. After installation, the pipeline, having passed all required testing, shall be disinfected prior to being put into service. Unless otherwise directed by the owner or engineer, the pipeline will be disinfected per AWWA C651.

D. PARTIAL TESTING

1. Segments of the pipe may be tested separately in accordance with standard testing procedure, as approved by the owner and engineer. Testing of each HDD installation prior to connection to the system or other piping is preferred.

END OF SECTION

INDEX TO

SECTION 02667 – WATER DISTRIBUTION SYSTEM

SECTION 02667SC

WATER DISTRIBUTION SYSTEM

PART 1 – GENERAL

1.1 BERKELEY COUNTY WATER & SANITATION AUTHORITY SPECIFICAITONS

A. The current edition of Berkeley County Water & Sanitation Authority (BCWS) Standards seen in Appendices A – E are hereby incorporated into these project specifications. The BCWS Standards shall have precedence if there is a conflict with these specifications. The contractor shall have a current copy of BCSW Standards present at the job site at all times.

1.2 SECTION INCLUDES

A. Piping

B. Valves

C. Fittings

D. Connect to Existing System

E. All necessary appurtenances to convey potable water from the existing system to the location shown on the plans.

1.2 RELATED SECTIONS

A. Section 02110 – Site Clearing

B. Section 02204 – Earthwork

C. Section 02902 – Grassing

1.3 OPTIONS

OMITTED

1.4 REFERENCES (Latest Revision)

A. ASTM D 3740 – Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.

B. ASTM E 329 – Agencies Engaged in Construction Inspection and/or Testing.

C. ANSI/AWWA C 153/A-21.53 – Ductile Iron Compact Fittings for Water Service.

D. ANSI/AWWA C 110/A21.10 – Ductile Iron and Gray Iron Fittings,

E. ANSI/AWWA C 150/A-21.50 – Thickness Design of Ductile Iron Pipe.

F. ANSI/AWWA C 151/A-21.51 – Ductile Iron Pipe, Centrifugally Cast, for Water, or other liquids.

G. ANSI/AWWA C 104/A-21.4 – Cement-Mortar Lining for Ductile Iron Pipe and Fittings for Water.

H. ASTM D 1784 – Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.

I. ASTM D 2241 – Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR - Series).

J. ANSI/AWWA C 901 – Polyethylene (PE) Pressure Pipe and Tubing, 1/2 inch through 3-inches for Water Service.

K. ASTM D 2737 – Polyethylene (PE) Plastic Tubing.

L. ANSI/AWWA C 115/A21.15 – Flanged Ductile Iron Pipe with Ductile Iron or Gray Iron Threaded Flanges.

M. ANSI/AWWA C 111/A21.11 – Rubber Gasket Joints for Ductile Iron Pressure Pipe and Fittings.

N. ASTM D 3139 – Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.

O. ANSI/AWWA C 900 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 inches through 12 inches, for Water Transmission and Distribution.

P. ANSI/AWWA C 500 – Metal-Seated Gate Valves for Water Supply Service.

Q. ANSI/AWWA C 509 – Resilient-Seated Gate Valves for Water Supply Service.

R. ANSI/AWWA C 502 – Dry-Barrel Fire Hydrants.

S. ANSI/AWWA C 800 – Underground Service Line Valves and Fittings.

T. ANSI/AWWA C 600 – Installation of Ductile Iron Water Mains and Their Appurtenances.

U. ANSI/AWWA C 605 – Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water.

V. ASTM D 2774 – Underground Installation of Thermoplastic Pressure Piping.

W. ASTM D 6938 – In-Place Density and Water Content of Soil and Soil-Aggregate By Nuclear Methods (Shallow Depth).

X. ANSI/AWWA C 651 – Disinfecting Water Mains.

Y. ASTM D 1557 – Laboratory Compaction Characteristics of Soil Using Modified Effort.

Z. ANSI/AWWA C 504 – Rubber-Seated Butterfly Valves.

AA. ANSI B-18.2.2 – Square and Hex Bolts and Screws.

BB. ANSI B-18.2.2 – Square and Hex Nuts.

CC. ANSI/NSF Standard 61.

DD. ANSI/AWWA C200 – Steel Water Pipe – 6 inch (150 mm) and Larger.

EE. ASTM A 53 – Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

FF. ANSI/AWWA C905 – Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14-inch through 48-inch (350 mm through 1,200 mm), for Water Transmission and Distribution.

GG. ANSI/AWWA C 512 – Air Release, Air/Vacuum, and Combination Valves for Waterworks Service.

HH. ANSI/AWWA C 515 – Reduced-Wall, Resilient-Seated Gate Valves for Water Supply Service.

II. ASTM A 139 – Electric-Fusion (Arc) – Welded Steel Pipe (NPS4 and Over).

1.5 QUALITY ASSURANCE

A. Materials –Contractor will furnish the Engineer and Owner a description of all material before ordering. Engineer will review the Contractor's submittals and provide in writing an acceptance or rejection of material.

B. Manufacturer – Material and equipment shall be standard products of a manufacturer who has manufactured them for a minimum of 2 years and who provides published data on quality and performance of the products.

C. Subcontractor – A subcontractor for any part of the work must have experience on similar work, and if required, furnish Engineer with a list of projects and Owners or Engineers who are familiar with its competence.

D. Design – If Contractor wishes to furnish devices, equipment, structures, and systems not designed by Engineer, these items shall be designed by either a Professional Engineer registered in the state of this project, or by someone Engineer accepts as qualified. If required, complete design calculations and assumptions shall be furnished to the Engineer or Owner before acceptance.

E. Testing Agencies – Soil testing shall be conducted by a testing laboratory which operates in accordance with ASTM D 3740 and E 329 latest revision and be acceptable to the Engineer prior to engagement. Mill certificates of tests on materials made by manufacturers will be accepted provided manufacturer

maintains an adequate testing laboratory, makes regularly scheduled tests that are spot checked by an outside laboratory, and furnishes satisfactory certificates with name of entity making the test.

F. Hydrostatic tests on pipe shall be made by Contractor with equipment qualified by the Engineer. The Engineer or Project Representative reserves the right to accept or reject testing equipment. Hydrostatic testing shall be conducted in the presence of Engineer or Project Representative and a representative of Water Supplier.

G. All pipe, fittings, packing, jointing materials, valves, and fire hydrants shall conform to Section C of the American Water Works Association (AWWA) Standards.

H. All materials and products which contact potable water must be third party certified as meeting the specifications of ANSI/NSF Standard 61.

1.6 REQUIREMENTS OF REGULATORY AGENCIES

A. Water mains shall be sterilized to meet requirements of the appropriate Health Department. Sterilization shall be in accordance with AWWA Standards C-651, latest revision.

B. Fire line sprinkler systems and dedicated fire lines shall be protected by an acceptable double check valve assembly. Water lines in high hazard categories shall be protected by an acceptable Reduced Pressure Zone (RPZ) Backflow Preventer.

C. Any pipe, solder, or flux which is used in the installation or repair of any public water system or in any plumbing in a residential or nonresidential facility which provides water, through connection to a public water system, for human consumption shall be lead free. Lead free is defined as not more than 0.2% lead with respect to solder and flux and not more than 8.0% lead with respect to pipes and pipe fittings. Leaded joints necessary for repair of cast iron pipes shall be exempt from the lead-free requirement.

D. No water pipe shall pass through or come in contact with any part of a sewer manhole. Water lines may come in contact with storm sewers or catch basins if there is no practical alternative, provided ductile iron is used, no joints of water line are within the storm sewer or catch basin, and joints are located as far as possible from storm sewer or catch basin.

E. Potable water lines shall not be laid less than 25 feet horizontally from any portion of a wastewater tile field or spray field, or shall be otherwise protected by a method acceptable to DHEC.

F. Where the minimum cover of 30 inches cannot be provided, pipe shall be steel, concrete, ductile iron, or other material and method acceptable to DHEC, and, when necessary, insulated to prevent freezing.

G. Air relief valves shall be provided in accordance with sound engineering practices at high points in water mains as required. Automatic air relief valves shall not be used in situations where flooding of the manhole or chamber may occur.

H. The open end of an air relief pipe from automatic valves or from a manually operated valve shall be extended to the top of pit and provided with a screened downward facing elbow.

I. Chambers, pits, or manholes containing valves, blow-off, meters, air release valves, or other such appurtenances to a distribution system, shall not be connected directly to any storm drain or sanitary sewer.

J. There shall be no connection between distribution system and any pipes, pumps, hydrants, or tanks whereby unsafe water or other contaminated materials may be discharged or drawn into the system.

K. Asbestos cement pipe shall not be used in potable water system except in the repair of existing asbestos cement lines.

L. Thermoplastic pipe shall not be used above grade.

M. Steel pipe shall not be allowed in water systems unless specified as in AWWA C200 or ASTM A53.

N. Water mains shall be installed out of contaminated areas, unless using piping materials protecting the system (i.e., Ductile Iron Pipe with chemical resistant gaskets). Route lines out of contaminated areas if possible.

O. Cross Connection Control (Backflow Prevention Devices):

1. There shall be no connection between the distribution system and any pipes, pumps, hydrants, or tanks whereby unsafe water or other contaminated materials may be discharged or drawn into the system.

2. No-by-passes shall be allowed, unless the bypass is also equipped with an acceptable backflow prevention device.

3. Reduced pressure principal backflow prevention assemblies shall not be installed in any area location subject to possible flooding. This includes pits or vaults not provided with a gravity drain to the ground's surface capable of exceeding discharge rate of relief valve. Generally, if installed in a pit, drain line shall be 2 times the size of line entering backflow prevention device. The drain cannot empty into any type of ditch, storm drain, or sewer, which could flood water back into pit.

4. All piping up to inlet of the backflow prevention device must be suitable for potable water. The pipe must be AWWA or NSF approved. Black steel pipe cannot be used on inlet side of the device.

1.7 PRODUCT DELIVERY, STORAGE & HANDLING

A. Material shall be unloaded in a manner avoiding damage and shall be stored where it will be protected and will not be hazardous to traffic. The Contractor shall repair any damage caused by the storage. Material shall be examined before installation and neither damaged nor deteriorated material shall be used in the work.

1.8 SEQUENCING AND SCHEDULING

A. Contractor shall arrange work so sections of mains between valves are tested, sterilized, pavement replaced, and the section placed in service as soon as reasonable after installation.

1.9 ALTERNATIVES

A. The intention of these specifications is to produce the best system for the Owner. If Contractor suggests alternative material, equipment or procedures will improve the results at no additional cost, Engineer and Owner will examine suggestion, and if it is accepted, it may be used. The basis upon which acceptance of an alternative will be given is its value to the Owner, and not for Contractor's convenience.

1.10 GUARANTEE

A. Contractor shall guarantee the quality of materials, equipment, and workmanship for a period of 12 months after acceptance. Defects discovered during this period shall be repaired by Contractor at no cost to the Owner.

1.11 EXISTING UTILITIES

A. All known utility facilities are shown schematically on plans, and are not necessarily accurate in location as to plan or elevation. Utilities such as service lines or unknown facilities not shown on plans will not relieve the Contractor of responsibility under this requirement. "Existing Utilities Facilities" means any utility existing on the project in its original, relocated, or newly installed position. Contractor will be held responsible for the cost of repairs to damaged underground facilities; even when such facilities are not shown on plans

B. The Contractor shall call for underground utility locations before starting work. Underground utilities location service can be contacted at 811 or 1-888-721-7877.

1.12 CONNECT NEW MAIN TO EXISTING SYSTEM

A. Contractor shall furnish necessary pipe and perform all excavation, dewatering, shoring, backfilling, etc., necessary to make the connection of a new main to existing water system. Contractor shall contact the Superintendent of Water Utility a minimum of 72 hours in advance of construction. Contractor shall be responsible for coordinating construction with the utility operator.

1.13 DAMAGE TO EXISTING WATER SYSTEM

A. Damage to any part of the existing water system by Contractor or Subcontractors, repaired by Utility Owner's forces, shall be charged to Contractor on basis of time and material, plus 30% for overhead and administration.

1.14 MEASUREMENT AND PAYMENT

A. Measurement – The length of mains, and branch lines to be paid for will be determined by measurement along the centerline of the various sizes and types of pipe actually and installed, from the center of fitting, and from the center of the main to the end of the branch connection. No deduction will be made for the space occupied by valves and fittings.

B. Payment -

1. Pipe – Payment will be made at the contract unit price per linear foot for the various types and sizes of pipe that are actually placed, as shown on the plans, or as directed by the Engineer. Excavation, installation, backfill, compaction, testing, metal detector tape, tracing wire, and all other incidentals to installation of the mains shall be considered as subsidiary obligations of the Contractor for the completion of the line in place.

2. Fittings – Considered incidental to the cost of pipe.

3. Valves – Payment will be made at the contract unit price for each size. Payment will include furnishing and installing the valve, valve boxes, extensions, or manholes.

4. Fire Hydrants – Payment will be made at the contract unit price. Payment will include the cost of furnishing, installing, and connecting the hydrant, gravel sump, restrained joints, and backfilling. The 6-inch pipe from the main line to the hydrant will be paid for as 6-inch pipe. Gate valve and valve box will be paid for separately.

5. Cleaning and Disinfecting – No separate payment will be made for cleaning and disinfecting. Cleaning and disinfecting piping in the distribution system will be included in the lump sum and unit prices for the appropriate items.

6. Grassing – See Section 02902 – Grassing for measurement and payment.

7. Metal Detector Tape – No separate payment will be made for tape. The cost of furnishing and placing metal detector tape shall be included in the contract unit price for installing pipe.

8. Connections to Existing Mains – Payment will be made at the contract unit price for each type connection and will include all equipment, labor, and materials required to locate, excavate, cut, connect, backfill, and compact.

9. Tapping Sleeves and Crosses – No separate payment will be made for tapping sleeves and crosses. Payment will be made at the contract unit price for installing pipe and will include all labor, materials, and equipment necessary to locate, excavate, furnish, and install the sleeve or cross, valve, valve boxes or manholes, tap the existing main, backfilling and compaction.

10. Remove and Replace Existing Pavement – Payment will be made on a square foot basis, and constructed in accordance with the detail shown.

11. Flush Valves – Payment will be made at the contract unit price. Payment will include furnishing and installing the ball valve, riser pipe and cap, valve or meter box, and the concrete collar.

12. Tracing Wire – No separate payment will be made for wire. The cost of furnishing and placing location wire shall be included in the contract unit price for installing pipe.

13. Restrained Joints – Considered incidental to the cost of pipe. Installation will be shown as on plans. No payment will be made for installation.

14. Air Release Valve in Manhole – Payment will be made at the contract unit price for each size. Payment will include furnishing and installing the air release valve, saddle, ball valve, manhole, frame, and cover.

15. Backflow Preventer Assembly – Payment will be made at the contract unit price for each size. Payment will include furnishing and installing the backflow preventer assembly, vault, cover, testing, and certification.

16. Casing – Payment will be made at the contract unit price per linear foot. Payment will include dewatering, excavation, providing steel pipe, installation, casing spacers, enclosure method, backfilling, compaction, testing, and all equipment, labor, and materials necessary to complete the work.

17. Directional Drill – Payment will be made at the contract unit price per linear foot.

18. Booster Pump Station – Payment will be made as applicable under the line items under the Booster Pump Station section.

1.15 TESTING

A. Laboratory tests for moisture density relationship for fill materials shall be in accordance with ASTM D 1557, (Modified Proctor).

B. In place density tests in accordance with ASTM D 6938.

C. Testing laboratory shall operate in accordance with ASTM D 3740 and E 329 and be acceptable to the Engineer.

D. The testing laboratory and Project Engineer/Project Representative shall be given a minimum of 48 hours notice prior to taking any of the tests.

E. Testing shall be the responsibility of the Contractor and shall be performed at the Contractor's expense by a commercial testing laboratory that operates in accordance with subparagraph C above.

F. Test results shall be furnished to the Engineer prior to continuing with associated or subsequent work.

PART 2 – PRODUCTS

Products and materials used in the work shall conform to the following:

2.1 GENERAL REQUIREMENTS

A. All material or products that come into contact with drinking water shall be third party certified as meeting the specifications of the American National Institute/National Sanitation Foundation Standard 61, Drinking Water System Components – Health Effects. The American National Standards Institute shall accredit the certifying party.

B. All pipe, fittings, packing, jointing materials, valves, and fire hydrants shall conform to Section C of the AWWA Standards, and Appendix F29 BCWS Approved Parts for Water Systems.

2.2 PIPE

A. Ductile Iron Pipe - Shall conform to ANSI A-21.50 (AWWA C-150) and ANSI A-21.51 (AWWA C-151). All pipe shall be Pressure Class 250 unless otherwise noted. It shall be cement lined in accordance with ANSI A-21.4 (AWWA C-104). Ductile Iron Pipe shall be as manufactured by:

- American DIP
- McWane DIP
- U.S. Pipe
- Griffin Pipe Products

B. P.V.C. – All pipe shall be blue in color with factory marked homing lines. Pipe 4 inches through 12 inches shall conform to all requirements of AWWA C-900, DR 18, pressure class of 235 p.s.i. and shall have the following minimum wall thickness:

4 inches	0.267 inches
6 inches	0.383 inches
8 inches	0.503 inches
10 inches	0.617 inches
12 inches	0.733 inches

Pipe 14 inches through 18 inches in diameter shall conform to all the requirements of AWWA C 905, DR 18, pressure rating of 235 p.s.i.

Pipe with diameter less than 4 inches shall conform to all requirements of ASTM D-1784 and D-2241 (SDR 21). The pipe shall have a minimum pressure rating of 200 p.s.i. Certificates of conformance with the foregoing specifications shall be furnished with each lot of pipe supplied. All P.V.C. pipe shall bear the National Sanitation Foundation Seal of Approval. PVC pipe shall be as manufactured by:

- North American
- Diamond
- National
- JM Eagle, Eagle Loc 900, Internal Joint Restraint System

C. Plastic Tubing - Tubing for service lines shall be:

Polyethylene Tubing: CTS PE 3408 conforming to all requirements of AWWA C-901 and ASTM D-2737 (SDR9). The tubing shall be copper tubing size and rated for a minimum working pressure of 200 p.s.i. Marking on the tubing shall include: nominal tubing pipe size; type of tubing material - PE 3408; SDR 9; pressure rating - 200 p.s.i.; ASTM D-2737; manufacturer's name and seal of the National Sanitation Foundation. Polyethylene tubing shall be as manufactured by:

- Infinity Plastics, LLC
- Trumbull Industries, Inc.

2.3 JOINTS

A. Flanged Joints – Shall conform to ANSI A-21.15 (AWWA C-115). Bolts shall conform to ANSI B-18.2.1 and nuts shall conform to ANSI B-18.2.2. Gaskets shall be rubber, either ring or full face, and shall be 1/8 inch thick. Gaskets shall conform to the dimensions recommended by AWWA C-115 latest revision.

B. Mechanical Joints – In ductile iron pipe shall conform to ANSI A-21.11 (AWWA C-111).

C. Push-On-Joints – In ductile iron pipes shall conform to ANSI A-21.11 (AWWA C-111).

D. Plastic Pipe – Joints in plastic pipe 4 inches and larger shall meet all requirements of AWWA C-900. Joints in plastic pipe 14 inches through 18 inches shall meet all requirements of AWWA C905. Joints in plastic pipe with a diameter less than 4 inches shall conform to ASTM D-3139.

E. Restrained Joints – Restrained joints for pipe, valves and fittings shall be mechanical joints with ductile iron retainer glands equivalent to "Megalug" or push-on type joints equivalent to "Lok-Ring," "TR Flex," or "Super Lock" and shall have a minimum rated working pressure of 250 p.s.i. for ductile iron pipe and 100 p.s.i. with a minimum safety factor of 2:1 for PVC pipe. The joints shall be in accordance with the applicable portions of AWWA C-111. The manufacturer of the joints shall furnish certification, witnessed by an independent laboratory, that the joints furnished have been tested without signs of leakage or failure. Restrained joints shall be capable of being deflected after assembly. Restrained Joints, PVC, shall be manufactured by:

- EBAA Iron, Inc., Series 2000 PV, Mechanical Joint
- EBAA Iron, Inc., Series 2800, Bell Restraint Harness for C905
- EBAA Iron, Inc., Series 2500, Restraint for C900 and C905
- EBAA Iron, Inc., Series 1600, Bell Restraint Harness for C900
- EBAA Iron, Inc., Series 15PF00, PVC to DIP Fitting
- Star Pipe Products, Stargrip 4000, MJ for C900 and C905
- Star Pipe Products, 1100C, Restraint for C900 and C905
- Ford Meter Box, Inc., UFR1390-C-x, Uni-Flange Series
- Ford Meter Box, Inc., UFR1500-C-x, Uni-Flange Series
- Tyler Union, TUF Grip, Mechanical Joint; up to 12"
- Tyler Union, Series 3000, Bell Joint Restraint
- Sigma, PV-LOK Series PWP, Bell Joint Restraint
- Sigma, ONE-LOK SLCE & D-SLCE, Mechanical Joint

Restrained Joints, DIP, shall be manufactured by:

- EBAA Iron MEGLUG, Series 1100, Mechanical Joint
- U.S. Pipe, FIELD LOK Gasket
- American Ductile Iron Pipe Company, Fast-Grip Gasket
- McWane DIP, Sure Stop 350 and TR Flex
- STAR Pipe Products, Stargrip 3000, Mechanical Joint
- Sigma, PV-LOK Series PWP, Bell Joint Restraint
- Sigma ONE-LOK SLDE & D-SLDE Mechanical Joint
- Tyler Union TUF Grip Up to 24"; Up to 12" on FM
- Ford Meter Box, Inc. UFR1400-D-x Uni-Flange Series

F. Natural rubber or other material which will support microbiological growth may not be used for any gaskets, o-rings, and other products used for jointing pipes, setting meters and valves or other appurtenances which will expose such material to water.

2.4 FITTINGS

A. Fittings for Ductile Iron or Plastic Pipe – Shall be ductile iron, manufactured in accordance with ANSI A-21.53 (AWWA C-153). They shall be cement lined in accordance with ANSI A-21.4 (AWWA C-104). Fittings shall be designed to accommodate the type of pipe used. Fittings for Ductile Iron Pipe shall be manufactured by:

- Sigma, MJ fittings
- STAR Pipe Products, MJ fittings
- Tyler/Union
- Custom Fab

B. Fittings for Flanged Pipe – Shall be manufactured in accordance with ANSI A-21.10 (AWWA C-110), Class 125 flanges.

C. Fittings for Plastic Pipe – Less than 4 inches shall be PVC with ring tite rubber joints conforming to ASTM D-3139. Fittings for Plastic Pipe shall be manufactured by:

1. Transition Gaskets:

    - HARCO, DI Transition Adapters PF149-121609, Where transitioning from DIOD to SDR 35/26

2. Coupling/Sleeve:
    - Varies, Line Coupling w/ stop (SDR 26), Molded Fittings Only
    - Multi Fittings, C-900 Repair coupling (SDR 18), Molded Fittings Only
    - Multi Fittings, C-900-line coupling (SDR 18), Molded Fittings Only
    - Varies, DI MJ solid sleeve, to be used with appropriate transition gaskets
    - Harrington Corp, (C-900 x Sewer OD) BXB Adapter. (PVC)-SDR 18, Molded Fittings Only
    - Harrington Corp, DI Transition Adapters (DI or C900 x SDR35/26), P-401 lined
    - MULTI FITTINGS, CIOD-Sewer Adapter, Molded fittings for use on PVC pipes only
    - Harrington Corp, (DIOD x Sewer OD) GxG Adapter. (DI), 6" - 12" pipe sizes (DI)
    - Harrington Corp, C-900 Repair coupling (SDR 18), Molded Fittings Only
    - Harrington Corp, C-900-line coupling (SDR 18), Molded Fittings Only
    - Varies, DI MJ bends, To be used with appropriate transition gaskets. Depths Greater than 15 feet
    - Varies, SDR - 26 Gasketed Bends, 3' - 15' Depth Range. Molded Fittings Only
    - Harrington Corp, DI Gasketed Bends, Depths Greater than 15 feet

3. Service Connections at Main:

    - Varies, DI MJ Tee, DI MJ Wye, Where Required by Depth
    - Harrington Corp, DI Sewer Wye, DI Sewer Tee Wye, DI Sewer Tee, Where Required by Depth
    - Varies, SDR - 26 Tee Wye, 3' - 15' Depth Range. Molded Fittings Only

4. Wye Connections at Property Line:

    - Varies, SDR - 26: Gasketed 6X6 double and single wyes. SDR - 26: Gasketed 6x4 double and single wyes, Molded Fittings Only
    - Varies, DI MJ: Gasketed 6X6 double and single wyes. DI MJ: Gasketed 6x4 double and single wyes, Where Required by Depth

2.5 GATE VALVES

A. Two Inches and Larger – Shall be cast iron or ductile iron body, bronze mounted, double disc or resilient wedge design, with non-rising stems, conforming to AWWA C-500, C-509, or C-515. Valves shall have a working pressure of 200 p.s.i. and be tested at 400 p.s.i.

Valves shall be furnished with "O" ring packing. Two "O" rings shall be located above the thrust collar and one "O" ring below. The thrust collar shall be permanently lubricated and have an anti-friction washer on top of the thrust collar.

Valves installed in pits or above ground shall be furnished with hand wheels. Buried valves shall be furnished with square operating nuts.

Gate valves shall be manufactured by:

1. Gate Valve - up to 14" - MJ x MJ - AWWA C509:

    - Mueller, A-2360, 2"-12"
    - Mueller, A-2361, 14"
    - US Pipe, A-USPO-23, 2"-12"
    - American Flow Control, 2500 series, 2"-12"

B. Smaller than 2 Inches – Shall be all brass, ball valve type. The pressure rating shall be 175 p.s.i. Gate Valves smaller than 2" shall be manufactured by:

- Mueller, A-2360, 2"-12"
- Mueller, A-2361, 14"
- US Pipe, A-USPO-23, 2"-12"
- American Flow Control, 2500 series, 2"-12"

C. Valve Boxes – Underground valves shall be installed in acceptable valve boxes. The valve boxes shall have a suitable base which does not damage the pipe, and shaft extension sections to cover and protect the valve and permit easy access and operation. The box, cover, and any extensions needed shall be cast or ductile iron having a crushing strength of 1,500 pounds per linear foot. Valve boxes shall conform to the detail shown. Valve Boxes shall be manufactured by:

1. Adjustable Valve Box (Domestic Products Only):

    - Tyler/Union, 6850 series
    - Tyler/Union, 7000 series
    - Tyler/Union, 7100 series
    - EJIW USA, 8550 1922, Metal top & bottom sections to be used with cap to go in valve boxes

2. Valve Box Cover:

    - EJIW USA, 6800, Non-locking Lid

D. Flush valves – Shall conform to the details shown.

2.6 BUTTERFLY VALVES

A. All butterfly valves shall be of the tight-closing, rubber seated type, with rubber seat positively locking in place sealing against flow from either direction. No metal-to-metal seating surfaces will be permitted. Valves shall be bubble-tight at rated

pressures with flow in either direction. Butterfly valves shall conform to ANSI/AWWA C504, Class 150B. Butterfly valves shall not be used on pipe smaller than 14-inches unless otherwise specified.

1. Valve body end connections for buried valves shall be installed using restrained joints equivalent to those manufactured by EBAA Iron, Inc.

2. Valve shafts shall be stainless steel and may consist of a one-piece unit or may be the "Stub Shaft" type. A stub shaft comprises two separate shafts inserted into the valve disc hubs. Each stub shaft shall be inserted into the valve disc hubs for a distance of at least 1-1/2 shaft diameters.

3. Valve discs shall be solid ductile iron with an epoxy coating making it corrosion resistant. The thickness of the discs shall not exceed 2-1/4 times the shaft diameter.

4. Valve seats shall be natural or synthetic rubber providing 360 degrees uninterrupted seating. The resilient seat shall be adjustable or replaceable in the field without burning or grinding. The seat shall be molded over a stainless-steel ring for support and secured to the disc by corrosion resistant, self-locking stainless-steel screws.

5. All internal ferrous metal surfaces in the waterway shall be factory coated with a non-toxic, to-component, holiday-free, thermosetting epoxy to a nominal thickness of 4 mils.

6. All butterfly valves shall be manually operated. Operators shall be of the traveling nut, self-locking type and shall be designed to hold the valve in any intermediate position without creeping or fluttering. Operators shall be furnished with externally adjustable mechanical stop limiting devices. Valves shall have a 2-inch square operating nut and shall be installed with extension stem to extend the operating nut in accordance with the project details. The operator shall be integrally mounted on the valve mounting flange and shall have a gearing totally enclosed for buried service. Maximum force for operating nut shall be 40 pounds.

7. Butterfly valves (Butterfly Valve - over 14" - MJ x MJ) shall be manufactured by:

    - Crispin, K-FLO 500 Series, 16" - 20"MJ
    - DeZURIK, 16" or larger
    - Mueller Lineseal XP, Class 250, 16" - 48", MJ

E. Valve Boxes – Underground valves shall be installed in approved valve boxes. The valve boxes shall have a suitable base that does not damage the pipe, and shaft extension sections to cover and protect the valve and permit easy access and operation. The cover, box, and any extensions needed shall be cast or ductile iron having a crushing strength of 1,500 pounds per linear foot. Valve boxes shall conform to the detail shown. Valve Boxes shall be manufactured by:

1. Adjustable Valve Box (Domestic Products Only):

- Tyler/Union, 6850 series
- Tyler/Union, 7000 series
- Tyler/Union, 7100 series
- EJIW USA, 8550 1922, Metal top & bottom sections to be used with cap to go in valve boxes

2. Valve Box Cover:

   - EJIW USA, 6800, Non-locking Lid

2.7 AIR RELEASE, AIR/VACUUM AND COMBINATION AIR VALVES

A. Shall be designed for water service with a minimum working pressure of 100 p.s.i. The valve shall be constructed of a cast iron body, stainless steel or bronze trim, and stainless-steel float. The inlet shall be 2 inches, 5/16-inch orifice, and a minimum venting capacity of 35 c.f.f.a.m. It shall conform to the detail shown on the drawings. Valves shall conform to AWWA C 512 and equivalent to Crispin or Valmatic. Air Release Valves and Pedestal shall be manufactured by:

- GA Industries INC., Small Orifice
- ARI
- Water Plus Corp.
- Channell, SPH1420, Gray with anti-insect vents

2.8 FIRE HYDRANTS

A. General – Hydrants shall be manufacturer's current model design and construction. All units to be complete including joint assemblies. Physical characteristics and compositions of various metal used in the hydrant components shall meet the requirements as specified in AWWA C-502 latest revision. Hydrants shall be suitable for working pressure of 150 p.s.i.

B. Bonnet – Bonnet may have oil filled or dry reservoir. If oil filled, bonnet must have "O" ring packing so all operating parts are enclosed in a sealed oil bath. Oil filler plug shall be provided in bonnet to permit checking of oil level and adding oil when required. If dry type, hydrant top must have lubricating hole or nut for ease of lubrication. All parts must be removed through top of hydrant without moving entire barrel section from safety flange.

C. Nozzles and Caps – The hydrant shall have 2-1/2-inch connections and 4-1/2-inch steamer connection, National standard threads. Nozzles shall be bronze and have interlocking lugs to prevent blowout. Nozzle caps shall be secured to fire hydrant with non-kinking type chain with chain loop on cap ends to permit free turning of caps.

D. Seat Ring – Seat ring shall be bronze.

E. Drain Valves and Openings – Positive operating drain valves shall be provided to assure drainage of fire hydrant when the main valve is closed. Drain openings shall have bronze bushings.

F. Main Valve – Valve shall be designed to close with the pressure and remain closed. Valve shall be made from material resisting damage from rocks or other foreign matter. Valve shall have a full 4-1/2-inch opening.

G. Barrel and Safety Flanges – Hydrants shall have a safety-type vertical barrel with 3 1/2 foot bury and be designed with safety flanges and/or bolts to protect the barrel and stem from damage and to eliminate flooding when hydrant is struck. Bury depth shall be cast on barrel of hydrant.

H. Operating Stop and Nut – Hydrant shall have a positive stop feature to permit opening of hydrant without over travel of stem. Operating nut shall be bronze, 1-1/2-inch, point to flat, pentagon.

I. Bolts and Nuts – Bolts, washers and nuts shall be corrosion resistant.

J. Inlet – Bottom inlet of hydrant shall be provided with mechanical joint connection as specified and shall be 6-inch nominal diameter.

K. Direction of Opening – Hydrant shall be designed to close "right" or clockwise and open "left" or counter-clockwise.

L. Coatings – All inside and outside portions of hydrant shall be coated in accordance with AWWA C-502. The exterior portion of hydrant above ground level shall be painted with two coats of best grade zinc chromate primer paint and with two coats of approved hydrant enamel. Color shall be Factory Safety Yellow unless otherwise designated by Owner.

M. Joint Assemblies – Complete joint assemblies consisting of gland, gasket, bolts, and nut shall be furnished for mechanical joint inlets.

N. Fire Hydrants shall be manufactured by:

1. Fire Hydrant – 3 Way

    - Mueller Centurion, A-421
    - US Pipe, Sentinel 250
    - American-Darling, Mark 73-5

2. Post Hydrant

    - Merrill, C7502, Freeze proof
    - Kupferle Foundry Co., Eclipse No. 2, Freeze proof
    - Woodford, IOWA Y34 & Y1, Freeze proof
    - Mueller Post Hydrant, A-411, 2-1/8" main valve opens one way

2.9 SERVICE CONNECTIONS

A. Taps in pipe larger than 3 inches shall be made with a tapping machine. A corporation stop shall be installed at the connection to the main. The corporation

stop shall be brass manufactured in conformance with AWWA C-800. Inlet and outlet threads shall conform to AWWA C-800.

Corporation stops shall be 1-inch equivalent to Mueller H-15008 or B-25008 with a stainless-steel stiffener. Service saddles shall have 1-inch AWWA taps, equal to Ford Styles 202B or S70. Contractor shall adhere to pipe manufacturer's recommendations on maximum tap sizes for each main size.

B. Taps for services in PVC pipe 3-inches and smaller shall be equivalent to Romac Industries Style 306 Saddle or a PVC Tee. The connection shall be capable of withstanding internal water pressure continuously at 150 p.s.i. House service lines will be 1-inch polyethylene tubing with a curb stop at the property line. The end of the service lateral at the property line shall be marked with a 2 x 4 stake, 36 inches long with the top 6 inches above the ground and painted blue. The depth of the pipe shall be marked on the back of the stake. Location of service line must appear on the "as-built" information and record drawings.

C. Water Service parts/materials shall be manufactured by:

1. Saddle - C900 PVC - 2" Diameter

    - Ford Meter Box, Inc., S90-203

2. Saddle - Standard PVC - 2" Diameter

    - Ford Meter Box, Inc., S90-204

3. Saddle - all pipe - 4" to 12" Diameter

    - Cascade, CS22, Stainless Steel
    - PowerSeal, 3414AS
    - Ford Meter Box, Inc., FS323, S.S. Two-Section
    - Romac Industries, 305

4. Corporation Stop - 1"

    - Ford Meter Box, Inc., FB1000-4-G, Grip Joint
    - Mueller, P-25008, Pack Joint
    - Mueller, B-25008, Compresson Connection
    - A.Y. McDonald, 74701BG, Grip Joint

5. Corporation Stop - 2"

    - Ford Meter Box, Inc., FB1000-7-G, Grip Joint
    - A.Y. McDonald, 74704BG, Grip Joint

6. Tee/Wye

    - Ford Meter Box, Inc., T444-444-G, Grip Joints
    - Ford Meter Box, Inc., Y44-243, Pack Joint Y
    - A.Y. McDonald, 74760G, Grip Joints

7. Stiffeners – 1"

    - Mueller, 110
    - Ford Meter Box, Inc., INSERT-52
    - A.Y. McDonald, 6133T

8. Stiffeners – 2"

    - Ford Meter Box, Inc., INSERT-55
    - A.Y. McDonald, 6133T

9. 1" Service Meter Box

    - Ford Meter Box, Inc., LYLVP 141-243-T-G, Lockable

10. > 2" Service Meter Box

    - Sigma Corp., MBX 5A
    - Sigma Corp., MBX-1
    - Carson Industries, Inc., 1220-12

2.10 TAPPING SLEEVES

A. Shall be mechanical joint type sized to fit the intercepted pipe. They shall have duck-tipped end gaskets and shall be equal to Mueller H-615/715 with a tapping valve attached. The outlet end of the valve shall have a joint suitable for the type of pipe to be used in the new branch. Sleeve shall be sized to fit the intercepted pipe without leaking.

B. Tapping Sleeves and Tapping Valves shall be manufactured by:

1. Tapping Sleeve - MJ

    - JCM, 432 All Stainless Steel, use only when branch is smaller than pipe
    - Ford Meter Box, Inc., FTSS Tapping Sleeve with Removable Bolts, use only when branch is smaller than pipe
    - Romac Industries, SST-H, For use on HDPE only

2.11 CURB STOPS

A. At the end of the service line, where the meter is to be installed, a 1-inch brass ball valve shall be installed. The unconnected end shall be closed inside I.P. thread. All ball valves shall be 1/4-turn valves and the fully open and closed position shall be controlled by check lugs. The pressure rating shall be 175 p.s.i. The ball valves shall be equivalent to Ford Ball Valve No. B41-444W. Curb Stops shall be manufactured by:

1. Curb Stop - 1"

- Ford Meter Box, Inc., B44-444-G, Grip Joint x Grip Joint
- Mueller, B-25209, Compression Connection
- A.Y. McDonald, 76100WG, Grip Joint x Grip Joint

2.12 BACKFLOW PREVENTER ASSEMBLY

A. Reduced Pressure – Shall consist of two independently operating check valves, one differential relief valve located between the two check valves, two resilient seat gate valves, and four properly placed resilient seated test cocks. Backflow preventer 2 inches and smaller shall have a bronze valve body. Backflow preventer greater than 2 inches shall be ductile iron or stainless steel. All internal parts in the check and relief valves shall be made of series 300 stainless steel or polymer materials suitable for potable water and rated for 175 p.s.i. working pressure. The assembly shall be constructed so all internal parts can be serviced or removed while in line. Assembly must be factory assembled and tested. Backflow preventer shall be equivalent to Febco Model 860 or Ames Model 4000 SS.

B. Double Check – Shall consist of two independently operating check valves, two resilient seat gate valves, and four properly placed resilient seated test cocks. Backflow preventer 2 inches and smaller shall have a bronze valve body. Backflow preventer greater than 2 inches shall be ductile iron or stainless steel. All internal parts in the check valves shall be made of Series 300 stainless steel or polymer materials suitable for potable water and rated for 175 p.s.i. working pressure. The assembly shall be constructed so all internal parts can be serviced or removed while in line. Assembly must be factory assembled and tested. Backflow preventer shall be equivalent to Febco Model 805 YD or Ames Model 2000 SS.

2.13 CASING

A. Casing pipe shall be steel conforming to ASTM A 139, yield point of 35,000 p.s.i., of the diameter shown on the contract drawings for each crossing. The minimum wall thickness shall be 0.25 inches.

2.14 CASING SPACERS

A. Casing spacers shall be bolt on style with a shell made in two sections of a minimum 14-gauge T-304 Stainless Steel. Connecting flanges shall be ribbed for extra strength. The shell shall be lined with a PVC liner. All nuts and bolts shall be T-304 Stainless Steel. Runners shall be made of Ultra High Molecular Weight Polymer with inherently high abrasion resistance and a low coefficient of friction. The combined height of supports and runners shall keep carrier pipe a minimum of 0.75 inches from casing pipe at all times. Casing Spacers shall be as manufactured by Cascade Waterworks Manufacturing Company, or accepted equivalent.

2.15 METAL DETECTOR TAPE

A. The tape shall consist of 0.35 mils thick solid foil core encased in a protective plastic jacket resistant to alkalis, acids, and other destructive elements found in the soil. The lamination bond shall be strong enough the layers cannot be separated by hand. Total composite thickness to be 5.0 mils. Foil core to be visible from unprinted

side to ensure continuity. The tape shall have a minimum 3-inch width and a tensile strength of 35 lbs. per inch.

A continuous warning message indicating "potable water" repeated every 16 inches to 36 inches shall be imprinted on the tape surface. The tape shall contain an opaque color concentrate designating the color code appropriate to the line being buried (Water Systems - Safety Precaution Blue).

2.16 TRACING WIRE

A. Tracing wire shall be #12 gauge insulated single strand copper wire. Tracing wire shall be manufactured by:
   - Kris-Tech Wire Co, Inc., Must be blue in color; must be solid and for direct burial
   - Paige spec

2.17 PRODUCT REVIEW

A. Contractor shall provide the Engineer with a complete description of all products before ordering. The Engineer will review all products before they are ordered.

PART 3 – EXECUTION

3.1 ON-SITE OBSERVATION

A. Owner's Representative or Engineer shall have the right to require any portion of work be completed in their presence. If any work is covered up after such instruction, it shall be exposed by the Contractor for observation. However, if Contractor notifies Engineer such work is scheduled, and Engineer fails to appear within 48 hours, the Contractor may proceed. All work completed and materials furnished shall be subject to review by the Engineer or Project Representative. Improper work shall be reconstructed. All materials which do not conform to requirements of specifications shall be removed from the work upon notice being received from Engineer for rejection of such materials. Engineer shall have the right to mark rejected materials to distinguish them as such.

Contractor shall give the Project Engineer or Project Representative a minimum of 48-hours notice for all required observations or tests.

It will also be required of Contractor to keep accurate, legible records of the location of all water lines, service laterals, valves, fittings, and appurtenances. These records will be prepared in accordance with the paragraph on "Record Data" in Special Conditions. Final payment to the Contractor will be withheld until all such information is received and accepted.

3.2 INSTALLATION

A. Ductile iron pipe shall be laid in accordance with AWWA C-600; Plastic pipe shall be laid in accordance with AWWA C 605, ASTM D 2774, UNI-Bell UNI-B 3 and the pipe manufacturer's recommendations. The standards are supplemented as follows:

1. Depth of Pipe – Contractor shall perform excavation of whatever substances are encountered to a depth providing a minimum cover over top of pipe of 36 inches from the existing or proposed finished grade, unless pipe material is steel, concrete, ductile iron, or other accepted material, and if exposed, should be insulated to prevent freezing.

2. Alignment and Grade – Water mains shall be laid and maintained to lines and grades established by the plans and specifications, with fittings, valves, and hydrants at required locations unless otherwise accepted by Owner. Valve-operating stems shall be oriented in a manner to allow proper operation. Hydrants shall be installed plumb.

    a. Prior Investigation – Prior to excavation, investigation shall be made to the extent necessary to determine location of existing underground structures, utilities, and conflicts. Care shall be exercised by the Contractor during excavation to avoid damage to existing structures and utilities. Pipe manufacturer's recommendations shall be used when the watermain being installed is adjacent to a facility cathodically protected.

    b. Unforeseen Obstructions – When obstructions not shown on plans are encountered during progress of work, and interfere so an alteration of the plans is required, Owner will alter plans, or order a deviation in line and grade, or arrange for removal, relocation, or reconstruction of obstructions.

    c. Clearance – When crossing existing pipelines or other structures, alignment and grade shall be adjusted as necessary, with the acceptance of Engineer, to provide clearance as required by federal, state, and local regulations or as deemed necessary by Engineer to prevent future damage or contamination.

3. Trench Construction – The trench shall be excavated to alignment, depth, and width specified or shown on plans and shall be in conformance with all federal, state, and local regulations for protection of workers.

4. Joint Restraint – All hydrants, bends, plugs, valves, caps and tees on 2-inch pipe and larger, shall be provided with stainless steel tie rods or joint restraints equivalent to Megalugs. Additional restraint shall be as indicated on the drawings.

5. Anchorage for Hydrants - A concrete block 1-foot x 1-foot x 2-feet shall be poured between back of hydrant and undisturbed earth of the trench side without covering weep holes and bolts. Joint restraints equivalent to Megalugs manufactured by EBAA Iron may be used in lieu of concrete blocking.

6. Hydrostatic and Leakage Tests – Ductile iron pipe shall be tested in accordance with AWWA Standard C 600, Section 5.2 – Hydrostatic Testing. Allowable leakage shall not exceed the formula $L = SDP^{1/2}/148,000$, in which

L is allowable leakage in gallons per hour; S is length of pipe in feet tested; D is nominal diameter of pipe in inches; and P is average test pressure during leakage test in pounds per square inch gauge. Test shall be conducted for at least 2 hours and a pressure of 150 p.s.i. shall be maintained during the test. Fire lines shall be tested at 225 p.s.i. for the same duration.

P.V.C. pipe shall be tested in accordance with AWWA Standard C 605, Section 7.3 – Hydrostatic Testing. Allowable leakage shall not exceed formula $Q = LDP^{1/2}/148{,}000$, in which Q is allowable leakage in gallons per hour; L is length of pipe in feet tested; D is nominal diameter of the pipe in inches; and P is average test pressure during leakage test in pounds per square inch gauge. Test shall be conducted for at least 2 hours and a pressure of 150 p.s.i. shall be maintained during the test. Fire lines shall be tested at 225 p.s.i. for the same duration.

Should any test of pipe laid disclose leakage greater than the above specified, Contractor shall, at its own expense, locate and repair defective joints until leakage is within specified allowance. Contractor is responsible for notifying the Engineer 48 hours (minimum) prior to applying pressure for testing. Pressure test will be witnessed by Engineer or Project Representative. All visible leaks shall be repaired regardless of the leakage amount.

7. Bedding, Backfilling, and Compaction – Continuous and uniform bedding shall be provided for all buried pipe. All trenches and excavation shall be backfilled immediately after pipes are laid therein, unless other protection of the pipeline is directed. The backfilling material shall be selected and deposited with special reference to future safety of the pipes. The material shall be completely void of rocks, stones, bricks, roots, sticks, or any other debris causing damage to pipe and tubing or preventing proper compaction of backfill. Except where special methods of bedding and tamping are provided for, clean earth or sand shall be solidly tamped about pipe up to a level at least 2 feet above top of pipes, and shall be carefully deposited to uniform layers, each layer solidly tamped or rammed with proper tools to not injure or disturb the pipeline. The remainder of trench backfilling shall be carried on simultaneously on both sides of pipe in such manner preventing injurious side pressure. Material used shall be selected from excavations anywhere on site if any of the soil is suitable. Stones, other than crushed bedding, shall not come in contact with the pipe and shall not be within 6 inches of any pipe.

   Under traffic areas, the top 24 inches of backfill material shall be compacted to a density of not less than 98% of maximum laboratory density at optimum moisture as determined by ASTM D 6938. Below the 24-inch line, and including area around pipe, density shall not be less than 95% of maximum laboratory density, at optimum moisture. In areas other than traffic areas, the backfill shall be compacted to 90% of maximum laboratory density at optimum moisture.

Whenever trenches have not been properly filled, or if settlement occurs, they shall be refilled, smoothed off, and finally made to conform to the ground surface. Backfilling shall be carefully performed, and the original surface restored to full satisfaction of Engineer immediately after installation.

Where thermoplastic (PVC) pipe is installed, Contractor shall take precautions, in accordance with ASTM D-2774, during backfilling operations, not to create excessive side pressures, or horizontal or vertical deflection of the pipe, nor impair flow capacity.

8. New Service Connections – Contractor shall tap the main and install a service connection to each vacant lot or as directed by Engineer in accordance with detail shown on plans for Water Service Connections. Plastic tubing for service lines shall be installed in a manner preventing abrupt changes or bends in any direction. Contractor shall exercise extreme caution to prevent crimping of the tubing during handling, storage, and installation. Tubing shall have an absolute positive connection to the water main to prevent leakage. Taps shall be made perpendicular to the main. A water service connection shall be marked on the curb with a "W." The mark shall be made with a branding iron on vertical face of curb and shall be a minimum of 1/4-inch in depth.

9. Detection Tape – Detection tape will be used over all pipe and tubing. The tape shall be laid 18 inches below finished grade.

10. Tracing Wire – Tracing wire will be installed on all water mains and water service laterals directly on top of the water line. The wire shall be secured to the pipe with tape or other acceptable methods at spacings of no more than 36 inches apart. Where water service laterals connect to water mains, the wire insulation shall be stripped so bare wires can and shall be jointed securely together and wrapped with a rubberized insulation tape. The insulated wire must maintain electrical continuity. The tracing wire shall also be stubbed up into each valve box and at each fire hydrant. Stub up connections shall be stripped, joined and wrapped as previously described for water service laterals. This tracing wire system shall be checked and tested by Contractor, in the presence of Engineer or water department, prior to acceptance of water main installation. All equipment, meters, detectors, etc., needed for testing shall be furnished by the Contractor.

11. Jacking and Boring – Steel casing of diameter shown on the plans shall be jacked and bored in location indicated. Joints between sections of the steel casing shall be of a continuous weld made by a certified welder. Jacking and boring shall be in accordance with the State Department of Transportation Standard Specifications. Carrier pipe shall be installed as shown on the detail. After carrier pipe has been installed, ends of the casing shall be sealed using a rubber enclosure and stainless-steel straps or brick and mortar.

Where work involves a highway, Resident Engineer of the State Department of Transportation shall be notified 3 days before crossing is started. Where

the work involves a railroad, installation shall conform to requirements of AREA specifications. Division Superintendent of the Railroad shall be notified three days prior to beginning work. Before commencing work within right-of-way of railroads or highways, Contractor shall verify the Owner has obtained required permits.

12. Lubricants – Lubricate pipe before jointing per manufacturer's recommendations using acceptable lubricants. Lubricants that will support microbiological growth shall not be used. Vegetable shortening shall not be used to lubricate joints.

13. Hydrant drains shall not be connected to or located within 10-feet of sanitary sewers. No flushing device shall be directly connected to any sewer.

14. Pipe for above water crossings shall be adequately supported and anchored, protected from damage and freezing, and accessible for repair or replacement.

15. Underwater line crossings shall have a minimum 2-feet of cover over the pipe. When crossing water courses greater than fifteen 15-feet in width, the following shall be provided:

    a. The pipe material and joints shall be designed appropriately.

    b. Valves shall be located on both sides of crossing so the section can be isolated for testing or repair. Valves shall be easily accessible and not subject to flooding.

    c. A blow-off shall be provided on the side opposite the supply, sized in accordance with State Drinking Regulation Section R.61-58.4(D)(7). Direct blow-off away from streams, over ground.

    d. Provide ductile iron pipe with mechanical joints for any lines installed in rock.

3.3 AIR RELEASE, AIR/VACUUM AND COMBINATION AIR VALVES

A. Valves shall be installed in locations as shown on the contract drawings. The Contractor shall verify high points in the water line and notify Engineer of differing conditions from the drawings.

B. Valves shall be opened during initial filling of the water main. Valves shall be closed during hydrostatic testing. Once tested and the system is accepted for operation, valves shall be opened when water lines are put on-line.

3.4 CONNECTIONS OF WATER MAINS

A. Any physical connection of untested water mains with existing water mains is prohibited except when acceptable backflow prevention devices have been installed and checked by Engineer or Engineer's Representative.

1. Any new water main to be tested must be capped and restrained with retaining glands or thrust blocks to prevent blow out or leakage during the pressure testing.

2. Water for filling or flushing a new water main will be obtained through a Temporary Jumper Connection to the existing main. Appropriate taps of sufficient size must be made at the end of new system to allow air to escape during filling sequence.

3. This physical tie-in with the existing system must be physically disconnected after sufficient water for hydrostatic testing and disinfection has been obtained.

4. Once the new water system has demonstrated adequate hydrostatic testing and has been flushed and chlorinated in accordance with paragraph 3.5, the new system or main will then be subjected to bacteriological testing.

5. Permanent connection to the new system must be made with clean materials. The connection may be made with either solid or split ductile iron sleeves. Any connection with stainless steel or similar metal full circle clamps is prohibited. Once connection has been made, the new system must be flushed using water from existing system to insure adequate flow and velocity into new water system.

3.5 DISINFECTION

A. After the hydrostatic and leakage tests have been completed, water pipes shall be disinfected in accordance with AWWA C 651 and Regulations of the local Health Department.

All new mains shall be thoroughly flushed then chlorinated with not less than fifty parts per million (50 ppm) of available chlorine. Chlorine gas or 70% high-test calcium hypochlorite can be used. Water from existing distribution system or other source of supply should be controlled to flow slowly into the newly laid pipeline during application of chlorine. The solution shall be retained in pipeline for not less than 24 hours and a chlorine residual of 25 ppm shall be available at this time. Then system shall be flushed with potable water and the sampling program started. Prior to sampling, the chlorine residual must be reduced to normal system residual levels or be non-detectable in those systems not chlorinating. Normal system residual should be between 0.2 and 0.8 ppm. The chlorine residual shall be measured and reported. If the membrane filter method of analysis is used for coliform analysis, non-coliform growth must also be reported. If non-coliform growth is greater than eighty colonies per one hundred milliliters, the sample result is invalid and must be repeated.

A minimum of two samples from each sampling site shall be collected for total coliform analysis. The number of sites depends on amount of new construction, but must include all deadend lines, be representative of water in newly constructed mains, and shall be collected a minimum of every 1,200 linear feet. Each set of samples shall be taken at least 24 hours apart after disinfection and tested by a State approved lab and shall indicate bacteriological satisfactory water. Contractor shall submit the results to the Engineer.

3.6 PARTIAL ACCEPTANCE OF THE WORK

A. Owner reserves right to accept and use any portion of the work. Engineer shall have power to direct on what line Contractor shall work and the order thereof

3.7 GRASSING

A. Grassing of areas disturbed during construction shall be in accordance with the Section 02902 "Grassing."

3.8 SEPARATION BETWEEN WATER AND SANITARY SEWER OR FORCE MAIN

A. Water mains shall be laid at least 10 feet horizontally from any existing or proposed sanitary sewer or force main. Deviation may be allowed for installation of the water main closer to a sanitary sewer or force main, provided water main is laid in a separate trench, where bottom of water main is at least 18-inches above top of sanitary sewer or force main. Water mains crossing sanitary sewers or force mains shall be laid to provide a minimum vertical distance of 18 inches between the invert of water main and top of sanitary sewer or force main line; both water and sanitary sewer or force main lines must be ductile iron when laid in violation of separation requirements. At all water and sanitary sewer or force main crossings, one full length of water pipe shall be located so both joints will be as far from the sanitary sewer or force main as possible.

B. When it is impossible to obtain distances specified in Section R.61-58.4(D)(12)(a) and (b) of the State Primary Drinking Water Regulations, an alternate, SCDHEC accepted design may be allowed. The alternate design must:

1. maximize distances between the water main and sewer line and joints of each;

2. use materials which meet requirements cited in Section R.61-58.4(D)(1) of the State Primary Drinking Water Regulations for sewer line; and

3. Allow enough distance to make repairs to one of the lines without damaging other.

3.9 REMOVE AND REPLACE PAVEMENT

A. Pavement shall only be removed after prior written authorization by the Owner. Pavement removed and replaced shall be constructed in accordance with latest

specifications of the State Department of Transportation. Traffic shall be maintained and controlled per State Department of Transportation regulations.

Edges of the pavement shall be cut to a neat straight line with a masonry saw. Backfill shall be compacted and tested and a concrete base course of 5,000 p.s.i. placed on compacted fill as shown in the details. The concrete base shall be placed within 24 hours after water line is installed. A temporary wearing surface may be used provided it presents a smooth surface. The final wearing surface shall be 1-1/2 inches asphaltic concrete, Type C.

3.10 FIELD QUALITY CONTROL

A. Soil and density tests shall be made by a testing laboratory acceptable to Engineer. Laboratory tests of the soil shall be made in accordance with ASTM D 1557. In-place density tests shall be made in accordance with ASTM D 6938. Results of tests shall be furnished to the Engineer.

The minimum number of tests required shall be:

Backfill over pipe
in traffic areas. . . . . 1 per 100 linear feet or less for each 4 feet of depth or portion thereof.

Backfill over pipe
in non-traffic areas. . . . .1 per 500 linear feet or less for each 4 feet of depth or portion thereof.

The minimum percent of backfill compaction, in accordance to ASTM D1557, shall be the following:

In traffic Areas. . . . . 98% of maximum laboratory density.

In non-traffic Areas. . .90% of maximum laboratory density, unless otherwise accepted by the Engineer.

END OF SECTION

INDEX TO

SECTION 02902 - GRASSING

SECTION 02902

GRASSING

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Seeding, planting grass, and fertilizing graded areas behind the structures, pipeline rights-of-way, roadway shoulders and other disturbed areas.

B. Seed protection.

C. Maintaining seeded areas until final acceptance.

1.2 RELATED WORK

A. Civil and Landscape plans and specifications.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Deliver grass seed in original containers showing analysis of seed mixture, percentage of pure seed, year of production, net weight, date of packaging, and location of packaging. Damaged packages are not acceptable. Store in cool, dry locations away from contaminants.

B. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer. Damaged bags are not acceptable. Store in cool, dry locations away from contaminants.

C. Deliver sod on pallets.

D. All material shall be acceptable to Engineer prior to use.

1.4 PLANTING DATES

A. This specification provides for establishment of a permanent grass cover between the dates of March 1 and September 30. If finished earth grades are not completed in time to permit planting and establishment of permanent grass during the favorable season between dates specified above unless otherwise accepted, Contractor will be required to plant a temporary cover to protect new graded areas from erosion and to keep windborne dust to a minimum. The temporary cover shall be planted between October 1 and February 28 unless otherwise permitted.

1.5 MEASUREMENT AND PAYMENT

A. When the season or stage of project is such results of grassing work cannot be determined, conditional acceptance will be made on work completed. When conditional acceptance is made for items of work covered, Contractor shall be entitled to 50% of bid price for the actual work placed and shall receive remaining 50% of bid price when final acceptance is made. Conditional acceptance shall not apply to the remaining items of work, and full bid price payment shall be made

when work is acceptably placed and completed in accordance with specifications.

B. Payment for grassing will be included in the lump sum price for the item "Grassing" and such payment shall constitute full compensation for furnishing and placing seed and fertilizer or sod where directed and protecting and maintaining seed and sod in all graded and disturbed areas.

PART 2 – PRODUCTS

A. Contractor shall submit source and species certification documents to Engineer and Owner's Representative for review prior to installation. Supply complete information on all analysis/test methodologies and results; laboratory certifications, manufacturer's specifications, and agency approvals to the Landscape Architect/Project Engineer prior to placement of soil mixtures. In addition, provide the Landscape Architect/Project Engineer with thoroughly mixed sample of soil mixes for acceptance prior to placement. Landscape Contractor shall make modifications and improvements to soil mixes deemed necessary by the soil analysis to meet requirements specified here in before, and to ensure proper growing medium for plant material.

2.1 SEED

A. All seed shall conform to State Laws and requirements and regulations of the State Department of Agriculture.

B. The varieties of seed, as specified in Section 2.2, shall be individually-packaged or bagged, and tagged to show name of seed, net weight, origin, germination, lot number, and other information required by the State Department of Agriculture.

C. Engineer reserves the right to test, reject, or accept all seed before seeding.

2.2 SEEDING SCHEDULE

A.

SEED	RATE	PLANTING DATES
Bermuda	50-lbs/acre	March 1 – September 30
Rye	75-lbs/acre	October 1 – February 28

2.3 FERTILIZER

A. Commercial fertilizer of accepted type, conforming to State fertilizer laws at the rate as recommended by soils test.

2.4 LIME

A. Agricultural grade, ground limestone at the rate as recommended by soils test.

2.5 SPRIG

OMITTED

2.6 SPRIGGING SCHEDULE

OMITTED

2.7 SOD

A. Sod shall be premium grade, densely rooted, good quality grass of the species and certified variety as shown on the plans, free from noxious weeds with no surface soil being visible. The sod shall be obtained from areas where the soil is reasonably fertile. Sod of specified species shall be grown from seed or sprig with not less than 95 percent germination, 85 percent pure seed, and not more than 0.5 percent weed seed. The sod shall be machine cut to a uniform soil thickness that shall contain practically all of the dense root system and not be less than 1–inch thick.

B. Before cutting, sod shall be mowed to a height of not less that 1–1/2-inches or more than 2-inches. Sod shall be cut in minimum uniform widths of 12-inches and lengths of 24 inches.

C. Sod shall be delivered to site in a fresh, moist condition with healthy green foliage. It shall be unloaded from delivery trucks on pallets or in rolls and placed in final position within 24 hours of delivery. Sod shall be protected from wind and sun and shall not be allowed to dry out before planting.

D. Sod shall be strong enough to support its own weight and retain its size and shape when suspended vertically from a firm grasp on the upper 10 percent of the section.

2.8 ACCESSORIES

A. Straw Mulch: Oat or wheat straw, reasonably free from weeds, foreign matter detrimental to plant life, and in dry condition.

B. Excelsior Mulch: Excelsior mulch shall consist of wood fibers cut from sound, green timber. The average length of fibers shall be 4 to 6 inches. Cut shall be made in such a manner as to provide maximum strength of fiber, but at a slight angle to natural grain of the wood to cause splintering of fibers when weathering in order to provide adherence to each other and to soil.

C. Wood cellulose fiber shall be made from wood chip particles manufactured particularly for discharging uniformly on the ground surface when dispersed by a hydraulic water sprayer. It shall remain in uniform suspension in water under agitation and blend with grass seed and fertilizer to form a homogenous slurry. Mulch fibers shall intertwine physically to form a strong moisture holding mat on the ground surface and allow rainfall to percolate into underlying soil. The mulch shall be heat processed to contain no germination or growth-inhibiting factors. It shall be dyed (non-toxic) an appropriate color to facilitate metering of material.

2.9 PRODUCT REVIEW

A. Contractor shall provide the Engineer with a complete description of all products before ordering. The Engineer will review all products before they are ordered.

PART 3 – EXECUTION

3.1 PREPARATION

A. Areas to be seeded shall be made smooth and uniform and shall conform to the finished grade indicated on plans.

B. Remove foreign materials, plants, roots, stones, and debris from surfaces to be seeded.

C. Grassing areas, if not loose, shall be loosened to a minimum depth of 3 inches before fertilizer, seed or sod is applied.

D. Amendments to soils shall be incorporated into loosened 3-inch topsoil layer as recommended by soils tests.

E. Contractor shall provide Topsoil Analysis Tests performed by a State Agricultural Experiment Station, Soil and Water Conservation District, State University, or other qualified private testing laboratory, as acceptable to Landscape Architect/Project Engineer. Soils test shall identify existing pH and nutrient levels, as well as recommended adjustments based on the type of grass to be installed.

3.2 STAND OF GRASS

A. Before acceptance of seeding, sodding, or sprigging is performed for the establishment of permanent vegetation, Contractor will be required to produce a satisfactory stand of perennial grass whose root system shall be developed sufficiently to survive dry periods and winter weather and be capable of re-establishment in spring.

B. Before acceptance of seeding is performed for the establishment of temporary vegetation, Contractor will be required to produce a stand of grass sufficient to control erosion for a given area and length of time before the next phase of construction or establishment of permanent vegetation is to commence.

3.3 SEEDING DATES

A. Seeding shall be performed during periods and at rates specified in their respective schedules. Seeding and sprigging work may, at discretion of Contractor, be performed throughout the year using schedule prescribed for given period. Seeding work shall not be conducted when the ground is frozen or excessively wet. Contractor will be required to produce a satisfactory stand of grass regardless of the period of year work is performed.

3.4 APPLYING LIME AND FERTILIZER

A. Following advance preparation and placing selected material for shoulders and slopes, lime and fertilizer, if called for based on soil tests, shall be spread uniformly over the designated areas, and shall be thoroughly mixed with the soil to a depth of approximately 2 inches. Fertilizer and lime shall be applied at the rate recommended by required soils test. Unless otherwise provided, lime will not be applied for temporary seeding. In all cases where practicable, acceptable mechanical spreaders shall be used for spreading fertilizer. On steep slopes

subject to slides and inaccessible to power equipment, the slopes shall be adequately scarified. Fertilizer may be applied on steep slopes by hydraulic methods as a mixture of fertilizer and seed. When fertilizer is applied with combination seed and fertilizer drills, no further incorporation will be necessary. The fertilizer and seed shall be applied together when Wood Cellulose Fiber Mulch is used. Any stones larger than 2-1/2 inches in any dimension, larger clods, roots, or other debris brought to the surface shall be removed.

3.5 SEEDING

A. Seed shall be sown within 24 hours following application of fertilizer and lime and preparation of the seedbed as specified in Section 3.4. Seed shall be uniformly sown at rate specified by the use of acceptable mechanical seed drills. Rotary hand seeders, power sprayers or other satisfactory equipment may be used on steep slopes or on other areas inaccessible to seed drills.

B. Seeds shall be covered and lightly compacted by means of cultipacker or light roller if the drill does not perform this operation. On slopes inaccessible to compaction equipment, the seed shall be covered by dragging spiked chains, by light harrowing or by other satisfactory methods.

C. Apply water with fine spray immediately after each area has been sown.

D. Do not sow seed when ground is too dry, during windy periods or immediately following a rain.

E. If permitted by the special provisions, wood cellulose fiber mulch or excelsior fiber mulch may be used.

3.6 SEED PROTECTION (STRAW MULCH)

A. All seeded areas seeded with permanent grasses shall be uniformly mulched in a continuous blanket immediately following seeding and compacting operations, using at least 2 tons of straw per acre.

3.7 SEED PROTECTION (EXCELSIOR MULCH)

A. Seed shall be sown as specified in Section 3.5. Within 24 hours after covering of seed, excelsior mulch shall be uniformly applied at the rate of 2 tons per acre. The mulch may be applied hydraulically or by other acceptable methods. Should the mulch be placed in a dry condition, it shall be thoroughly wetted immediately after placing. Engineer may require light rolling of the mulch to form a tight mat.

3.8 SEED PROTECTION (WOOD CELLULOSE FIBER MULCH)

A. After the lime has been applied and ground prepared as specified in Section 3.4, wood cellulose fiber mulch shall be applied at a rate of 1,500 pounds per acre in a mixture of seed and fertilizer. Hydraulic equipment shall be used for application of fertilizer, seed, and slurry of the prepared wood pulp. This equipment shall have a built-in agitation system with an operating capacity sufficient to agitate, suspend, and homogeneously mix a slurry of the specified amount of fiber, fertilizer, seed, and water. The slurry distribution lines shall be large enough to prevent stoppage. The discharge line shall be equipped with a set of hydraulic spray nozzles which will

provide an even distribution of slurry on various areas to be seeded. The slurry tank shall have a minimum capacity of 1,000 gallons.

Seed, fertilizer, wood pulp mulch, and water shall all be combined into the slurry tank for distribution of all ingredients in one operation by hydraulic seeding method specified herein. Materials shall be combined in a manner recommended by the manufacturer. The slurry mixture shall be regulated so amounts and rates of application shall result in a uniform application of all materials at rates not less than amount specified. Using the color of wood pulp as a guide, equipment operator shall spray prepared seedbed with a uniform visible coat. The slurry shall be applied in a sweeping motion, in an arched stream to fall like rain, allowing wood fibers to build upon each other until an even coat is achieved.

3.9 SPRIGGING

OMITTED

3.10 SODDING

A. Sod shall be placed between March 1st and December 1st. However, if sod is to be placed during periods of temperatures over 90 degrees F., the Contractor shall take extra care for quick placement of sod with adequate, consistent watering necessary to ensure sod thrives as planted.

B. Sod shall be placed within 24 hours of cutting.

C. Place top elevation of sod 1/2 inch below adjoining paving or curbs.

D. All areas to be sodded shall be brought to the proper line grade or cross section as was existing prior to construction. Sod shall be placed so, upon completion, edges of sodded areas will be smooth and will conform to the proposed finished grade. Sod shall be laid smooth, edge to edge, with staggered joints. Sod shall be immediately pressed firmly into contact with the sod bed by tamping or rolling, to eliminate any air pockets. A true and even surface shall be provided, to insure knitting without displacement of the sod or deformation of the sodded areas surfaces. Do not stretch or overlap sod pieces. Following compaction, screened soil of good quality shall be used to fill all cracks. Excess soil shall be worked into the grass with rakes or other suitable equipment. On slopes steeper than 3 to 1, sod shall be fastened in place with suitable wood or metal pins to hold the sod in place. Any damage by erosion or other causes occurring after completion of grading operations shall be repaired, before commencing with the sodding operations.

E. Immediately before sodding, moisten topsoil with a fine spray to a minimum 1-inch depth. Sod shall not be laid on dry or powdery soil.

F. Sod shall be moist when laid and placed on moist ground. The sod shall be carefully placed by hand, beginning at the toe of slopes and working upwards. The length of strips shall be at right angles to flow of surface water. All joints shall be tightly-butted and end joints shall be staggered at least 12 inches. Sod shall be immediately pressed firmly into the ground by tamping or rolling. Fill all joints between strips with fine screened soil. Sod on slopes shall be pegged with sod pegs to prevent movement.

G. Within two hours after sod has been placed, thoroughly water to a minimum depth of 4-inches. After sod and soil have dried, roll sodded areas to ensure good bond between sod and soil and to remove depressions and irregularities. Roll sodded areas with a roller not exceeding 150 lbs. per foot of roller width.

PART 4 – MAINTENANCE, WARRANTY AND ACCEPTANCE

4.1 MAINTENANCE

A. Maintain grassed surfaces until final acceptance.

B. Maintenance shall consist of providing protection against traffic, watering to ensure uniform seed germination and to keep surface of soil damp, and repairing any areas damaged as a result of construction operations or erosion. Maintenance shall also include, but is not limited to, watering, weeding, cultivating, removal of dead material, lawn mowing, fertilizing, and other necessary operations.

C. The Contractor shall maintain all proposed plantings until the date of substantial completion issued by the Owner.

4.2 WARRANTY

A. All grassed areas shall be guaranteed by Contractor to be alive and healthy for a one-year period from date of substantial completion issued by the Owner. A final walk through with the Owner shall be conducted at end of warranty period to determine if any areas require replanting. At end of warranty period, sod shall show evidence of rooting to underlying soil and shall have no competitive weed growth from either the sod or from between sod joints.

B. Any grassed area which is dead or not showing satisfactory growth shall be replaced at Contractor's expense at the end of warranty period. All replacement shall be of original quality. Replacement required because of vandalism, excessive use, or other causes beyond the control of Contractor are not part of this contract.

4.3 ACCEPTANCE

A. Before acceptance of seeding performed for the establishment of permanent vegetation, Contractor will be required to produce a satisfactory stand of perennial grass whose root system shall be developed sufficiently to survive dry periods and winter weather and be capable of reestablishment in spring.

B. A minimum coverage of 80% density over 100% of the disturbed area is required for seeded areas before project acceptance. Sprig and sod areas shall have 95% coverage over 100% of the disturbed area prior project acceptance.

END OF SECTION

"General Decision Number: SC20210049 01/01/2021

Superseded General Decision Number: SC20200049

State: South Carolina

Construction Type: Heavy

Counties: Berkeley and Dorchester Counties in South Carolina.

HEAVY CONSTRUCTION PROJECTS

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.95 for calendar year 2021 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.95 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2021. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/01/2021

IRON0848-001 07/01/2020

	Rates	Fringes
IRONWORKER, STRUCTURAL	$ 26.00	15.80

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* PLUM0421-005 07/01/2020

	Rates	Fringes
PIPEFITTER	$ 29.35	12.41

SUSC2011-047 11/02/2011

	Rates	Fringes
CARPENTER, Includes Form Work	$ 14.85	0.00
LABORER: Common or General	$ 11.64	2.53

LABORER: Pipelayer.....$ 12.55 1.82

OPERATOR:
Backhoe/Excavator/Trackhoe.....$ 15.54 2.20

OPERATOR: Grader/Blade.....$ 20.11 1.39

OPERATOR: Loader.....$ 10.50 1.98

TRUCK DRIVER.....$ 15.65 2.79

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing

the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial

contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION
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U. S. DEPARTMENT OF COMMERCE
ECONOMIC DEVELOPMENT ADMINISTRATION

EDA CONTRACTING PROVISIONS
FOR CONSTRUCTION PROJECTS

These EDA Contracting Provisions for Construction Projects (EDA Contracting Provisions) are intended for use by recipients receiving federal assistance from the U. S. Department of Commerce - Economic Development Administration (EDA). They contain provisions specific to EDA and other federal provisions not normally found in non-federal contract documents. The requirements contained herein must be incorporated into all construction contracts and subcontracts funded wholly or in part with federal assistance from EDA.

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1. **DEFINITIONS**

Agreement – The written instrument that is evidence of the agreement between the Owner and the Contractor overseeing the Work.

Architect/Engineer - The person or other entity engaged by the Recipient to perform architectural, engineering, design, and other services related to the work as provided for in the contract.

Contract – The entire and integrated written agreement between the Owner and the Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

Contract Documents – Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents.

Contractor – The individual or entity with whom the Owner has entered into the Agreement.

Drawings or Plans – That part of the Contract Documents prepared or approved by the Architect/Engineer that graphically shows the scope, extent, and character of the Work to be performed by the Contractor.

EDA - The United States of America acting through the Economic Development Administration of the U.S. Department of Commerce or any other person designated to act on its behalf. EDA has agreed to provide financial assistance to the Owner, which includes assistance in financing the Work to be performed under this Contract. Notwithstanding EDA's role, nothing in this Contract shall be construed to create any contractual relationship between the Contractor and EDA.

Owner – The individual or entity with whom the Contractor has entered into the Agreement and for whom the Work is to be performed.

Project – The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.

Recipient – A non-Federal entity receiving a Federal financial assistance award directly from EDA to carry out an activity under an EDA program, including any EDA-approved successor to the entity.

Specifications – That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.

Subcontractor – An individual or entity having direct contract with the Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.

Work – The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

2. APPLICABILITY

The Project to which the construction work covered by this Contract pertains is being assisted by the United States of America through federal assistance provided by the U.S. Department of Commerce - Economic Development Administration (EDA). Neither EDA, nor any of its departments, entities, or employees is a party to this Contract. The following EDA Contracting Provisions are included in this Contract and all subcontracts or related instruments pursuant to the provisions applicable to such federal assistance from EDA.

3. FEDERALLY REQUIRED CONTRACT PROVISIONS

(a) All contracts in excess of the simplified acquisition threshold - currently fixed at $150,000 (*see* 41 U.S.C. §§ 134 and 1908) must address administrative, contractual, or legal remedies in instances where contractors violate or breach contract terms, and provide for such sanctions and penalties as may be appropriate.

(b) All contracts in excess of $10,000 must address termination for cause and for convenience by the Recipient including the manner by which it will be effected and the basis for settlement.

(c) All construction contracts awarded in excess of $10,000 by recipients of federal assistance and their contractors or subcontractors shall contain a provision requiring compliance with Executive Order 11246 of September 24, 1965, *Equal Employment Opportunity*, as amended by Executive Order 11375 of October 13, 1967, and Department of Labor implementing regulations at 41 C.F.R. part 60.

(d) All prime construction contracts in excess of $2,000 awarded by Recipients must include a provision for compliance with the Davis-Bacon Act (40 U.S.C. §§ 3141-3148) as supplemented by Department of Labor regulations at 29 C.F.R. part 5. The contracts must also include a provision for compliance with the Copeland "Anti-Kickback" Act (18 U.S.C. § 874 and 40 U.S.C. § 3145) as supplemented by Department of Labor regulations at 29 C.F.R. part 3.

(e) All contracts awarded by the Recipient in excess of $100,000 that involve the employment of mechanics or laborers must include a provision for compliance with 40 U.S.C. §§ 3702 and 3704 (the Contract Work Hours and Safety Standards Act) as supplemented by Department of Labor regulations at 29 C.F.R. part 5.

(f) All contracts must include EDA requirements and regulations that involve a requirement on the contractor or sub-contractor to report information to EDA, the Recipient or any other federal agency.

(g) All contracts must include EDA requirements and regulations pertaining to patent rights with respect to any discovery or invention which arises or is developed in the course of or under such contract.

(h) All contracts must include EDA requirements and regulations pertaining to copyrights and rights in data.

(i) All contracts and subgrants in excess of $150,000 must contain a provision that requires compliance with all applicable standards, orders, or requirements issued under the Clean Air Act (42 U.S.C. § 7401 *et seq.*) and the Federal Water Pollution Control Act (Clean Water Act) (33 U.S.C. § 1251 *et seq.*), and Executive Order 11738, *Providing for Administration of the Clean Air Act and the Federal Water Pollution Control Act With Respect to Federal Contracts, Grants, or Loans*.

(j) Contracts must contain mandatory standards and policies relating to energy efficiency which are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act (42 U.S.C.§ 6201).

(k) Contracts must contain a provision ensuring that contracts are not to be made to parties on the government wide Excluded Parties List System in the System for Award Management (SAM), in accordance with the OMB guidelines at 2 C.F.R. part 180.

(l) Contracts must contain a provision ensure compliance with the Byrd Anti-Lobbying Amendment (31 U.S.C. § 1352) under which contractors that apply or bid for an award of $100,000 or more must file the required certification. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant or any other award covered by 31 U.S.C. § 1352. Each tier must also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Such disclosures are forwarded from tier to tier up to the non-Federal award.

(m) If the Recipient is a state agency or agency of a political subdivision of a state, any contract awarded must contain a provision ensuring compliance with section 6002 of the Solid Waste Disposal Act (42 U.S.C. § 6962), as amended by the Resource Conservation and Recovery Act related to the procurement of recovered materials.

4. **REQUIRED PROVISIONS DEEMED INSERTED**

Each and every provision of law and clause required by law to be inserted in this contract shall be deemed to be inserted herein and the contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon the application of either party the contract shall forthwith be physically amended to make such insertion of correction.

5. INSPECTION BY EDA REPRESENTATIVES

The authorized representatives and agents of EDA shall be permitted to inspect all work, materials, payrolls, personnel records, invoices of materials, and other relevant data and records.

6. EXAMINATION AND RETENTION OF CONTRACTOR'S RECORDS

(a) The Owner, EDA, or the Comptroller General of the United States, or any of their duly authorized representatives shall, generally until three years after final payment under this contract, have access to and the right to examine any of the Contractor's directly pertinent books, documents, papers, or other records involving transactions related to this contract for the purpose of making audit, examination, excerpts, and transcriptions.

(b) The Contractor agrees to include in first-tier subcontracts under this contract a clause substantially the same as paragraph (a) above. "Subcontract," as used in this clause, excludes purchase orders that do not exceed $10,000.

(c) The periods of access and examination in paragraphs (a) and (b) above for records relating to (1) appeals under the disputes clause of this contract, (2) litigation or settlement of claims arising from the performance of this contract, or (3) costs and expenses of this contract to which the Owner, EDA, or Comptroller General or any of their duly authorized representatives has taken exception shall continue until disposition of such appeals, litigation, claims, or exceptions.

7. CONSTRUCTION SCHEDULE AND PERIODIC ESTIMATES

Immediately after execution and delivery of the contract, and before the first partial payment is made, the Contractor shall deliver to the Owner an estimated construction progress schedule in a form satisfactory to the Owner, showing the proposed dates of commencement and completion of each of the various subdivisions of work required under the Contract Documents and the anticipated amount of each monthly payment that will become due to the Contractor in accordance with the progress schedule. The Contractor also shall furnish the Owner (a) a detailed estimate giving a complete breakdown of the contract price and (b) periodic itemized estimates of work done for the purpose of making partial payments thereon. The costs employed in making up any of these schedules will be used only to determine the basis of partial payments and will not be considered as fixing a basis for additions to or deductions from the contract price.

8. CONTRACTOR'S TITLE TO MATERIAL

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

9. INSPECTION AND TESTING OF MATERIALS

All materials and equipment used in the completion of the Work shall be subject to adequate inspection and testing in accordance with accepted standards. The laboratory or inspection agency shall be selected by the Owner. Materials of construction, particularly those upon which the strength and durability of any structure may depend, shall be subject to inspection and testing to establish conformance with specifications and suitability for intended uses.

10. "OR EQUAL" CLAUSE

Whenever a material, article, or piece of equipment is identified in the Contract Documents by reference to manufacturers' or vendors' names, trade names, catalogue numbers, etc., it is intended merely to establish a standard. Any material, article, or equipment of other manufacturers and vendors that will perform adequately the duties imposed by the general design will be considered equally acceptable provided the material, article, or equipment so proposed is, in the opinion of the Architect/Engineer, of equal substance and function. However, such substitution material, article, or equipment shall not be purchased or installed by the Contractor without the Architect/Engineer's written approval.

11. PATENT FEES AND ROYALTIES

(a) Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device that is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Architect/Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by the Owner in the Contract Documents.

(b) To the fullest extent permitted by Laws and Regulations, the Contractor shall indemnify and hold harmless the Owner and the Architect/Engineer, and the officers, directors, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

12. CLAIMS FOR EXTRA COSTS

No claims for extra work or cost shall be allowed unless the same was done in pursuance of a written order from the Architect/Engineer approved by the Owner.

13. CONTRACTORS AND SUBCONTRACTORS INSURANCE

(a) The Contractor shall not commence work under this Contract until the Contractor has obtained all insurance reasonably required by the Owner, nor shall the Contractor allow any subcontractor to commence work on his/her subcontract until the insurance required of the subcontractor has been so obtained and approved.

(b) Types of insurance normally required are:

(1) Workmen's Compensation
(2) Contractor's Public Liability and Property Damage
(3) Contractor's Vehicle Liability
(4) Subcontractors' Public Liability, Property Damage and Vehicle Liability
(5) Builder's Risk (Fire and Extended Coverage)

(c) **Scope of Insurance and Special Hazards:** The insurance obtained, which is described above, shall provide adequate protection for the Contractor and his/her subcontractors, respectively, against damage claims that may arise from operations under this contract, whether such operations be by the insured or by anyone directly or indirectly employed by him/her and also against any of the special hazards that may be encountered in the performance of this Contract.

(d) **Proof of Carriage of Insurance:** The Contractor shall furnish the Owner with certificates showing the type, amount, class of operations covered, effective dates, and dates of expiration of applicable insurance policies.

14. CONTRACT SECURITY BONDS

(a) If the amount of this Contract exceeds $150,000, the Contractor shall furnish a performance bond in an amount at least equal to one hundred percent (100%) of the Contract price as security for the faithful performance of this Contract and also a payment bond in an amount equal to one hundred percent (100%) of the Contract price or in a penal sum not less than that prescribed by State, Territorial, or local law, as security for the payment of all persons performing labor on the Work under this Contract and furnishing materials in connection with this Contract. The performance bond and the payment bond may be in one or in separate instruments in accordance with local law. Before final acceptance, each bond must be approved by EDA. If the amount of this Contract does not exceed $150,000, the Owner shall specify the amount of the payment and performance bonds.

(b) All bonds shall be in the form prescribed by the Contract Documents except as otherwise provided in applicable laws or regulations, and shall be executed by such sureties as are named in the current list of *Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies* as published in Treasury Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent must be accompanied by a certified copy of the agent's

authority to act. Surety companies executing the bonds must also be authorized to transact business in the state where the Work is located.

15. **LABOR STANDARDS - DAVIS-BACON AND RELATED ACTS**
(as required by section 602 of PWEDA)

(a) **Minimum Wages**

(1) All laborers and mechanics employed or working upon the site of the Work in the construction or development of the Project will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act at 29 C.F.R. part 3, the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at the time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor, which is attached hereto and made a part hereof, regardless of any contractual relationship that may be alleged to exist between the Contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 C.F.R. § 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 C.F.R. § 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein, provided that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates determined under 29 C.F.R. § 5.5(a)(1)(ii) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

(2) (i) Any class of laborers or mechanics to be employed under the Contract, but not listed in the wage determination, shall be classified in conformance with the wage determination. EDA shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(A) The work to be performed by the classification requested is not performed by a classification in the wage determination;

(B) The classification is utilized in the area by the construction industry; and

(C) The proposed wage rate, including any bona fide fringe benefits, bears a

reasonable relationship to the wage rates contained in the wage determination.

(ii) If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and EDA or its designee agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by EDA or its designee to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210.

(iii) In the event the Contractor, the laborers or mechanics to be employed in the classification or their representatives, and EDA or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), EDA or its designee shall refer the questions, including the views of all interested parties and the recommendation of EDA or its designee, to the Administrator for determination.

(iv) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(2)(ii) or (iii) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(3) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the Contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(4) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, provided, that the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

(b) **Withholding**

EDA or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the Contractor under this Contract or any other federal contract with the same prime Contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees and helpers, employed by the Contractor or any subcontractor the full amount of wages required by the Contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee or helper employed or working on the site of the Work in the construction or development of the Project, all or part of the wages required by the Contract, EDA or its designee may, after written notice to the Contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations

have ceased. EDA or its designee may, after written notice to the Contractor, disburse such amounts withheld for and on account of the Contractor or subcontractor to the respective employees to whom they are due. The Comptroller General shall make such disbursements in the case of direct Davis-Bacon Act contracts.

(c) **Payrolls and basic records**

(1) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the Work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the Work in the construction or development of the Project. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 C.F.R. § 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records which show that the commitment to provide such benefits is enforceable, the plan or program is financially responsible, and the plan or program has been communicated in writing to the laborers or mechanics affected, and provide records that show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(2) (i) For each week in which Contract work is performed, the Contractor shall submit a copy of all payrolls to the Owner for transmission to EDA or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 C.F.R. part 5.5(a)(3)(i). This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose. It may be purchased from the Superintendent of Documents (Federal Stock Number 029-005-00014-1), U.S. Government Printing Office, Washington, D.C. 20402; or downloaded from the U.S. Department of Labor's website at https://www.dol.gov/whd/forms/wh347.pdf. The prime Contractor is responsible for the submission of copies of payrolls by all subcontractors

(ii) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the Contract and shall certify the following:

(A) That the payroll for the payroll period contains the information required to be maintained under 29 C.F.R. § 5.5(a)(3)(i) and that such information is correct and complete;

(B) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the Contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 C.F.R. part 3; and

(C) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the Contract.

(iii) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 15(c)(2)(ii) of this section.

(iv) The falsification of any of the above certifications may subject the Contractor or subcontractor to civil or criminal prosecution under section 1001 of Title 18 and section 3729 of Title 31 of the U.S. Code.

(3) The Contractor or subcontractor shall make the records required under paragraph 15(c)(1) of this section available for inspection, copying, or transcription by authorized representatives of EDA or its designee or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the Contractor or subcontractor fails to submit the required records or to make them available, EDA or its designee may, after written notice to the Contractor or Owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 C.F.R. § 5.12.

(d) **Apprentices and Trainees**.

(1) **Apprentices**. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training (Bureau), or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the Contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any

apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a Contractor is performing construction on a Project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an apprenticeship program, the Contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(2) **Trainees**. Except as provided in 29 C.F.R. § 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program that has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman's hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(3) **Equal employment opportunity**. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity

requirements of Executive Order 11246, *Equal Employment Opportunity*, as amended, and 29 C.F.R. part 30.

(e) **Compliance with Copeland Anti-Kickback Act Requirements**. The Contractor shall comply with the Copeland Anti-Kickback Act (18 U.S.C. § 874 and 40 U.S.C. § 3145) as supplemented by Department of Labor regulations (29 C.F.R. part 3, "Contractors and Subcontractors on Public Buildings or Public Works Financed in Whole or in Part by Loans or Grants of the United States"). The Act provides that the Contractor and any subcontractors shall be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public work, to give up any part of the compensation to which they are otherwise entitled. The Owner shall report all suspected or reported violations to EDA.

(f) **Subcontracts**. The Contractor and any subcontractors will insert in any subcontracts the clauses contained in 29 C.F.R. §§ 5.5(a)(1) through (10) and such other clauses as EDA or its designee may require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime Contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 C.F.R. § 5.5.

(g) **Contract termination; debarment**. The breach of the contract clauses in 29 C.F.R. § 5.5 may be grounds for termination of the contract, and for debarment as a Contractor and a subcontractor as provided in 29 C.F.R. § 5.12.

(h) **Compliance with Davis-Bacon and Related Act Requirements**. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 C.F.R. parts 1, 3, and 5 are herein incorporated by reference in this contract.

(i) **Disputes concerning labor standards**. Disputes arising out of the labor standards provisions of this Contract shall not be subject to the general disputes clause of this Contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 C.F.R. parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and EDA or its designee, the U.S. Department of Labor, or the employees or their representatives.

(j) **Certification of Eligibility**.

(1)By entering into this Contract, the Contractor certifies that neither it nor any person or firm that has an interest in the Contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 C.F.R. § 5.12(a)(1).

(2) No part of this Contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 C.F.R. § 5.12(a)(1).

(3) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. § 1001.

16. **LABOR STANDARDS - CONTRACT WORK HOURS AND SAFETY STANDARDS ACT**

As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.

(a) **Overtime requirements**. No Contractor or subcontractor contracting for any part of the Contract work, which may require or involve the employment of laborers or mechanics, shall require or permit any such laborer or mechanic in any workweek in which that person is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

(b) **Violation; liability for unpaid wages, liquidated damages**. In the event of any violation of the clause set forth in paragraph (a) of this section, the Contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such Contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (a) of this section, in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (a) of this section.

(c) **Withholding for unpaid wages and liquidated damages**. EDA or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any monies payable on account of work performed by the Contractor or subcontractor under any such Contract or any other federal contract with the same prime Contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime Contractor such sums as may be determined to be necessary to satisfy any liabilities of such Contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (b) of this section.

(d) **Subcontracts**. The Contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraphs (a) through (c) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime Contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (a) through (c) of this section.

17. **EQUAL EMPLOYMENT OPPORTUNITY**

(a) The Recipient hereby agrees that it will incorporate or cause to be incorporated into any contract for construction work, or modification thereof, as defined in the regulations of the Secretary of Labor at 41 C.F.R. chapter 60, which is paid for in whole or in part with funds obtained from EDA, the following equal opportunity clause:

During the performance of this contract, the Contractor agrees as follows:

(1) The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training including apprenticeship. The Contractor agrees to post in conspicuous places available to employees and applicants for employment notices to be provided setting forth the provisions of this nondiscrimination clause.

(2) The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.

(3) The contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the contractor's legal duty to furnish information.

(4) The Contractor will send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers representatives of the Contractor's commitments hereunder, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(5) The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965 and of the rules, regulations, and relevant orders of the Secretary of Labor.

(6) The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to its books, records, and accounts by EDA and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(7) In the event of the Contractor's noncompliance with the nondiscrimination clauses of

this Contract or with any of the said rules, regulations, or orders, this Contract may be canceled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts or federally-assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation or order of the Secretary of Labor, or as otherwise provided by law.

(8) The Contractor will include the portion of the sentence immediately preceding paragraph 17(a)(1) and the provisions of paragraphs 17(a)(1) through (8) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as EDA or the Secretary of Labor may direct as a means of enforcing such provisions, including sanctions for noncompliance. Provided, however, that in the event the Contractor becomes involved in or is threatened with litigation with a subcontractor or vendor as a result of such direction by EDA or the Secretary of Labor, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

(9) The Recipient further agrees that it will be bound by the above equal opportunity clause with respect to its own employment practices when it participates in federally-assisted construction work. Provided, however, that if the Recipient so participating is a State or local government, the above equal opportunity clause is not applicable to any agency, instrumentality, or subdivision of such government that does not participate in work on or under the Contract.

(10)The Recipient agrees that it will assist and cooperate actively with EDA and the Secretary of Labor in obtaining the compliance of contractors and subcontractors with the equal opportunity clause and the rules, regulations, and relevant orders of the Secretary of Labor, that it will furnish EDA and the Secretary of Labor such information as they may require for the supervision of such compliance, and that it will otherwise assist EDA in the discharge of the EDA's primary responsibility for securing compliance.

(11) The Recipient further agrees that it will refrain from entering into any contract or contract modification subject to Executive Order 11246 of September 24, 1965, with a Contractor debarred from, or who has not demonstrated eligibility for, Government contracts and federally assisted construction contracts pursuant to the Executive Order and will carry out such sanctions and penalties for violation of the equal opportunity clause as may be imposed upon contractors and subcontractors by EDA or the Secretary of Labor pursuant to Part II, Subpart D of the Executive Order. In addition, the Recipient agrees that if it fails or refuses to comply with these undertakings, EDA may take any or all of the following actions: Cancel, terminate, or suspend in whole or in part this EDA financial assistance; refrain from extending any further assistance to the applicant under the program with respect to which the failure or refund occurred until satisfactory assurance of future compliance has been received from such applicant; and refer the case

to the Department of Justice for appropriate legal proceedings.

(b) Exemptions to Above Equal Opportunity Clause (41 C.F.R. chapter 60):

(1) Contracts and subcontracts not exceeding $10,000 (other than Government bills of lading, and other than contracts and subcontracts with depositories of Federal funds in any amount and with financial institutions which are issuing and paying agents for U.S. savings bonds and savings notes) are exempt. The amount of the Contract, rather than the amount of the federal financial assistance, shall govern in determining the applicability of this exemption.

(2) Except in the case of subcontractors for the performance of construction work at the site of construction, the clause shall not be required to be inserted in subcontracts below the second tier.

(3) Contracts and subcontracts not exceeding $10,000 for standard commercial supplies or raw materials are exempt.

18. CONTRACTING WITH SMALL, MINORITY AND WOMEN'S BUSINESSES

(a) If the Contractor intends to let any subcontracts for a portion of the work, the Contractor shall take affirmative steps to assure that small, minority and women's businesses are used when possible as sources of supplies, equipment, construction, and services.

(b) Affirmative steps shall consist of:

(1) Placing qualified small and minority businesses and women's business enterprises on solicitation lists;

(2) Ensuring that small and minority businesses and women's business enterprises are solicited whenever they are potential sources;

(3) Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority businesses and women's business enterprises;

(4) Establishing delivery schedules, where the requirements of the contract permit, which encourage participation by small and minority businesses and women's business enterprises;

(5) Using the services and assistance of the U.S. Small Business Administration, the Minority Business Development Agency of the U.S. Department of Commerce, and State and local governmental small business agencies;

(6) Requiring each party to a subcontract to take the affirmative steps of this section; and

(7) The Contractor is encouraged to procure goods and services from labor surplus area firms.

19. **HEALTH, SAFETY, AND ACCIDENT PREVENTION**

(a) In performing this contract, the Contractor shall:

(1) Ensure that no laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to their health and/or safety as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation;

(2) Protect the lives, health, and safety of other persons;

(3) Prevent damage to property, materials, supplies, and equipment; and

(4) Avoid work interruptions.

(b) For these purposes, the Contractor shall:

(1) Comply with regulations and standards issued by the Secretary of Labor at 29 C.F.R. part 1926. Failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act (40 U.S.C. §§ 3701 – 3708); and

(2) Include the terms of this clause in every subcontract so that such terms will be binding on each subcontractor.

(c) The Contractor shall maintain an accurate record of exposure data on all accidents incident to work performed under this Contract resulting in death, traumatic injury, occupational disease, or damage to property, materials, supplies, or equipment, and shall report this data in the manner prescribed by 29 C.F.R. part 1904.

(d) The Owner shall notify the Contractor of any noncompliance with these requirements and of the corrective action required. This notice, when delivered to the Contractor or the Contractor's representative at the site of the Work, shall be deemed sufficient notice of the noncompliance and corrective action required. After receiving the notice, the Contractor shall immediately take corrective action. If the Contractor fails or refuses to take corrective action promptly, the Owner may issue an order stopping all or part of the Work until satisfactory corrective action has been taken. The Contractor shall not base any claim or request for equitable adjustment for additional time or money on any stop order issued under these circumstances.

(e) The Contractor shall be responsible for its subcontractors' compliance with the provisions of this clause. The Contractor shall take such action with respect to any subcontract as EDA, or the Secretary of Labor shall direct as a means of enforcing such provisions.

20. CONFLICT OF INTEREST AND OTHER PROHIBITED INTERESTS

(a) No official of the Owner who is authorized in such capacity and on behalf of the Owner to negotiate, make, accept, or approve, or to take part in negotiating, making, accepting, or approving any architectural, engineering, inspection, construction or material supply contract or any subcontract in connection with the construction of the Project, shall become directly or indirectly interested personally in this Contract or in any part hereof.

(b) No officer, employee, architect, attorney, engineer, or inspector of or for the Owner who is authorized in such capacity and on behalf of the Owner to exercise any legislative, executive, supervisory or other similar functions in connection with the construction of the Project, shall become directly or indirectly interested personally in this Contract or in any part thereof, any material supply contract, subcontract, insurance contract, or any other contract pertaining to the Project.

(c) The Contractor may not knowingly contract with a supplier or manufacturer if the individual or entity who prepared the Contract Documents has a corporate or financial affiliation with the supplier or manufacturer.

(d) The Owner's officers, employees, or agents shall not engage in the award or administration of this Contract if a conflict of interest, real or apparent, may be involved. Such a conflict may arise when: (i) the employee, officer or agent; (ii) any member of their immediate family; (iii) their partner or (iv) an organization that employs, or is about to employ, any of the above, has a financial interest in the Contractor. The Owner's officers, employees, or agents shall neither solicit nor accept gratuities, favors, or anything of monetary value from the Contractor or subcontractors.

(e) If the Owner finds after a notice and hearing that the Contractor, or any of the Contractor's agents or representatives, offered or gave gratuities (in the form of entertainment, gifts, or otherwise) to any official, employee, or agent of the Owner or EDA in an attempt to secure this Contract or favorable treatment in awarding, amending, or making any determinations related to the performance of this Contract, the Owner may, by written notice to the Contractor, terminate this Contract. The Owner may also pursue other rights and remedies that the law or this Contract provides. However, the existence of the facts on which the Owner bases such findings shall be an issue and may be reviewed in proceedings under the dispute resolution provisions of this Contract.

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

21. RESTRICTIONS ON LOBBYING

(a) This Contract, or subcontract is subject to 31 U.S.C. § 1352, regarding lobbying restrictions. The section is explained in the common rule, 15 C.F.R. part 28 (55 FR 6736-6748, February 26, 1990). Each bidder under this Contract or subcontract is generally prohibited from using federal funds for lobbying the Executive or Legislative Branches of the Federal Government in connection with this EDA Award.

(b) **Contract Clause Threshold**: This Contract Clause regarding lobbying must be included in each bid for a contract or subcontract exceeding $100,000 of federal funds at any tier under the EDA Award.

(c) **Certification and Disclosure**: Each bidder of a contract or subcontract exceeding $100,000 of federal funds at any tier under the federal Award must file Form CD-512, *Certification Regarding Lobbying – Lower Tier Covered Transactions*, and, if applicable, Standard Form-LLL, *Disclosure of Lobbying Activities*, regarding the use of any nonfederal funds for lobbying. Certifications shall be retained by the Contractor or subcontractor at the next higher tier. All disclosure forms, however, shall be forwarded from tier to tier until received by the Recipient of the EDA Award, who shall forward all disclosure forms to EDA.

(d) **Continuing Disclosure Requirement**: Each Contractor or subcontractor that is subject to the Certification and Disclosure provision of this Contract Clause is required to file a disclosure form at the end of each calendar quarter in which there occurs any event that requires disclosure or that materially affects the accuracy of the information contained in any disclosure form previously filed by such person. Disclosure forms shall be forwarded from tier to tier until received by the Recipient of the EDA Award, who shall forward all disclosure forms to EDA.

(e) **Indian Tribes, Tribal Organizations, or Other Indian Organizations**: Indian tribes, tribal organizations, or any other Indian organizations, including Alaskan Native organizations, are excluded from the above lobbying restrictions and reporting requirements, but only with respect to expenditures that are by such tribes or organizations for lobbying activities permitted by other federal law. An Indian tribe or organization that is seeking an exclusion from Certification and Disclosure requirements must provide EDA with the citation of the provision or provisions of federal law upon which it relies to conduct lobbying activities that would otherwise be subject to the prohibitions in and to the Certification and Disclosure requirements of 31 U.S.C. § 1352, preferably through an attorney's opinion. Note, also, that a non-Indian subrecipient, contractor, or subcontractor under an award to an Indian tribe, for example, is subject to the restrictions and reporting requirements.

22. HISTORICAL AND ARCHAEOLOGICAL DATA PRESERVATION

The Contractor agrees to facilitate the preservation and enhancement of structures and objects of historical, architectural or archaeological significance and when such items are found and/or unearthed during the course of project construction. Any excavation by the Contractor that uncovers an historical or archaeological artifact shall be immediately reported to the Owner and a representative of EDA. Construction shall be temporarily halted pending the notification process and further directions issued by EDA after consultation with the State Historic

Preservation Officer (SHPO) for recovery of the items. *See* the National Historic Preservation Act of 1966 (54 U.S.C. § 300101 *et seq.*, formerly at 16 U.S.C. § 470 *et seq.*) and Executive Order No. 11593 of May 31, 1971.

23. **CLEAN AIR AND WATER**

Applicable to Contracts in Excess of $150,000

(a) **Definition**. "Facility" means any building, plant, installation, structure, mine, vessel, or other floating craft, location, or site of operations, owned, leased, or supervised by the Contractor or any subcontractor, used in the performance of the Contract or any subcontract. When a location or site of operations includes more than one building, plant, installation, or structure, the entire location or site shall be deemed a facility except when the Administrator, or a designee, of the United States Environmental Protection Agency (EPA) determines that independent facilities are collocated in one geographical area.

(b) In compliance with regulations issued by the EPA, 2 C.F.R. part 1532, pursuant to the Clean Air Act, as amended (42 U.S.C. § 7401 *et seq*.); the Federal Water Pollution Control Act, as amended (33 U.S.C. § 1251 *et seq*.); and Executive Order 11738, the Contractor agrees to:

(1) Not utilize any facility in the performance of this contract or any subcontract which is listed on the Excluded Parties List System, part of the System for Award Management (SAM), pursuant to 2 C.F.R. part 1532 for the duration of time that the facility remains on the list;

(2) Promptly notify the Owner if a facility the Contractor intends to use in the performance of this contract is on the Excluded Parties List System or the Contractor knows that it has been recommended to be placed on the List;

(3) Comply with all requirements of the Clean Air Act and the Federal Water Pollution Control Act, including the requirements of section 114 of the Clean Air Act and section 308 of the Federal Water Pollution Control Act, and all applicable clean air and clean water standards; and

(4) Include or cause to be included the provisions of this clause in every subcontract and take such action as EDA may direct as a means of enforcing such provisions.

24. **USE OF LEAD-BASED PAINTS ON RESIDENTIAL STRUCTURES**

(a) If the work under this Contract involves construction or rehabilitation of residential structures over $5,000, the Contractor shall comply with the Lead-based Paint Poisoning Prevention Act (42 U.S.C. § 4831). The Contractor shall assure that paint or other surface coatings used in a residential property does not contain lead equal to or in excess of 1.0 milligram per square centimeter or 0.5 percent by weight or 5,000 parts per million (ppm) by weight. For purposes of this section, "residential property" means a dwelling unit, common areas, building exterior surfaces, and any surrounding land, including outbuildings, fences and play equipment affixed to the land, belonging to an owner and available for use by residents, but not

including land used for agricultural, commercial, industrial or other non-residential purposes, and not including paint on the pavement of parking lots, garages, or roadways.

(b) As a condition to receiving assistance under PWEDA, recipients shall assure that the restriction against the use of lead-based paint is included in all contracts and subcontracts involving the use of federal funds.

25. ENERGY EFFICIENCY

The Contractor shall comply with all standards and policies relating to energy efficiency which are contained in the energy conservation plan issued in compliance with the Energy Policy and Conservation Act (42 U.S.C. § 6201) for the State in which the Work under the Contract is performed.

26. ENVIRONMENTAL REQUIREMENTS

When constructing a Project involving trenching and/or other related earth excavations, the Contractor shall comply with the following environmental constraints:

(1) **Wetlands**. When disposing of excess, spoil, or other construction materials on public or private property, the Contractor shall not fill in or otherwise convert wetlands.

(2) **Floodplains**. When disposing of excess, spoil, or other construction materials on public or private property, the Contractor shall not fill in or otherwise convert 100 year floodplain areas delineated on the latest Federal Emergency Management Agency (FEMA) Floodplain Maps, or other appropriate maps, i.e., alluvial soils on Natural Resource Conservation Service (NRCS) Soil Survey Maps.

(3) **Endangered Species**. The Contractor shall comply with the Endangered Species Act, which provides for the protection of endangered and/or threatened species and critical habitat. Should any evidence of the presence of endangered and/or threatened species or their critical habitat be brought to the attention of the Contractor, the Contractor will immediately report this evidence to the Owner and a representative of EDA. Construction shall be temporarily halted pending the notification process and further directions issued by EDA after consultation with the U.S. Fish and Wildlife Service.

27. DEBARMENT, SUSPENSION, INELIGIBILITY, AND VOLUNTARY EXCLUSIONS

As required by Executive Orders 12549 and 12689, *Debarment and Suspension,* 2 C.F.R. Part 180 and implemented by the Department of Commerce at 2 C.F.R. part 1326, for prospective participants in lower tier covered transactions (except subcontracts for goods or services under the $25,000 small purchase threshold unless the subrecipient will have a critical influence on or substantive control over the award), the Contractor agrees that:

(1) By entering into this Contract, the Contractor and subcontractors certify, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared

ineligible, or voluntarily excluded from participation in this Contract by any federal department or agency.

(2) Where the Contractor or subcontractors are unable to certify to any of the statements in this certification, the Contractor or subcontractors shall attach an explanation to this bid.

See also 2 C.F.R. part 180 and 2 C.F.R. § 200.342.

28. **EDA PROJECT SIGN**

The Contractor shall supply, erect, and maintain in good condition a Project sign according to the specifications provided by EDA. To the extent practical, the sign should be a free standing sign. Project signs shall not be located on public highway rights-of-way. Location and height of signs will be coordinated with the local agency responsible for highway or street safety in the Project area, if any possibility exists for obstructing vehicular traffic line of sight. Whenever the EDA site sign specifications conflict with State law or local ordinances, the EDA Regional Director will permit such conflicting specifications to be modified so as to comply with State law or local ordinance.

29. **BUY AMERICA**

To the greatest extent practicable, contractors are encouraged to purchase American-made equipment and products with funding provided under EDA financial assistance awards.

NOTE: To find the Goals for minority participation (%), click "What to use?" and search for the project's County.

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NOTICE OF REQUIREMENTS FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246 AND 41 CFR PART 60-4)

The following Notice shall be included in, and shall be a part of all solicitations for offers and bids on all Federal and federally assisted construction contracts or subcontracts in excess of $10,000.

The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.

The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Timetables	Goals for minority participation for each trade	Goals for female participation for each trade
What % to use?	%	6.9%

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the contractor also is subject to the goals for both its federally involved and non federally involved construction.
The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade and the contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order, and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of $10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the subcontractor; employer identification number of the subcontractor; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the subcontract is to be performed.
As used in this Notice, and in the contract resulting from this solicitation, the "covered area" is:

State of _____

County of _____

City of _____

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FORM **CD-512**
(REV 12-04)

U.S. DEPARTMENT OF COMMERCE

CERTIFICATION REGARDING LOBBYING
LOWER TIER COVERED TRANSACTIONS

Applicants should review the instructions for certification included in the regulations before completing this form. Signature on this form provides for compliance with certification requirements under 15 CFR Part 28, "New Restrictions on Lobbying."

LOBBYING

As required by Section 1352, Title 31 of the U.S. Code, and implemented at 15 CFR Part 28, for persons entering into a grant, cooperative agreement or contract over $100,000 or a loan or loan guarantee over $150,000 as defined at 15 CFR Part 28, Sections 28.105 and 28.110, the applicant certifies that to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure occurring on or before October 23, 1996, and of not less than $11,000 and not more than $110,000 for each such failure occurring after October 23, 1996.

Statement for Loan Guarantees and Loan Insurance

The undersigned states, to the best of his or her knowledge and belief, that:

In any funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this commitment providing for the United States to insure or guarantee a loan, the undersigned shall complete and submit Standard Form-LLL, ''Disclosure Form to Report Lobbying,'' in accordance with its instructions.

Submission of this statement is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required statement shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure occurring on or before October 23, 1996, and of not less than $11,000 and not more than $110,000 for each such failure occurring after October 23, 1996.

As the duly authorized representative of the applicant, I hereby certify that the applicant will comply with the above applicable certification.

NAME OF APPLICANT	AWARD NUMBER AND/OR PROJECT NAME

PRINTED NAME AND TITLE OF AUTHORIZED REPRESENTATIVE

What % to use?

SIGNATURE	DATE
	NOTE: To find the Goals for minority particip

BUY AMERICA CERTIFICATION

Instructions:

Bidder to complete the Buy America Certification listed below. Bidder shall certify EITHER COMPLIANCE OR NON-COMPLIANCE (not both). This Certification MUST BE submitted with the Bidder's bid response.

Certification requirement for procurement of steel, iron, or manufactured products.

Certificate of Compliance with 49 U.S.C. 5323(j)(1)

The bidder or offeror hereby certifies that it **WILL MEET** the requirements of 49 U.S.C. 5323(j)(1) and the applicable regulations in 49 CFR Part 661 and any amendments thereto.

Signature_____

Company Name_____

Title _____

Date _____

Certificate of Non-Compliance with 49 U.S.C. 5323(j)(1)

The bidder or offeror hereby certifies that it **CANNOT COMPLY** with the requirements of 49 U.S.C. 5323(j)(1) and 49 C.F.R. 661.5, but it may qualify for an exception pursuant to 49 U.S.C. 5323(j)(2)(A), 5323(j)(2)(B), or 5323(j)(2)(D), and 49 C.F.R. 661.7.

Signature _____

Company Name _____

Title _____

Date _____

Special Note: Make sure you have signed only one of the above statements -- either Compliance OR Non-Compliance (not both).

EDA PROJECT SIGN

The Contractor shall supply, erect, and maintain in good condition a project sign according to the specifications set forth below:

EDA SITE SIGN SPECIFICATIONS

Size: 4' x 8' x ¾"

Materials: Exterior grade/MDO plywood (APA rating A-B)

Supports: 4" x 4" x 12' posts with 2" x 4" cross branching

Erection: Posts shall be set a minimum of three feet deep in concrete footings that are at least 12" in diameter.

Paint: Outdoor enamel

Colors: Jet Black, Blue (PMS300), and Gold (PMS7406). Specifically, on white background the following will be placed:

The U. S. Department of Commerce seal in blue, black, and gold;

"EDA" in blue;

"U. S. DEPARTMENT OF COMMERCE ECONOMIC DEVELOPMENT

ADMINISTRATION" in black;

"In partnership with" in blue;

(Actual name of the) "EDA Grant Recipient" in black;

Lettering: Specific fonts are named below; positioning will be as shown on the attached illustration.

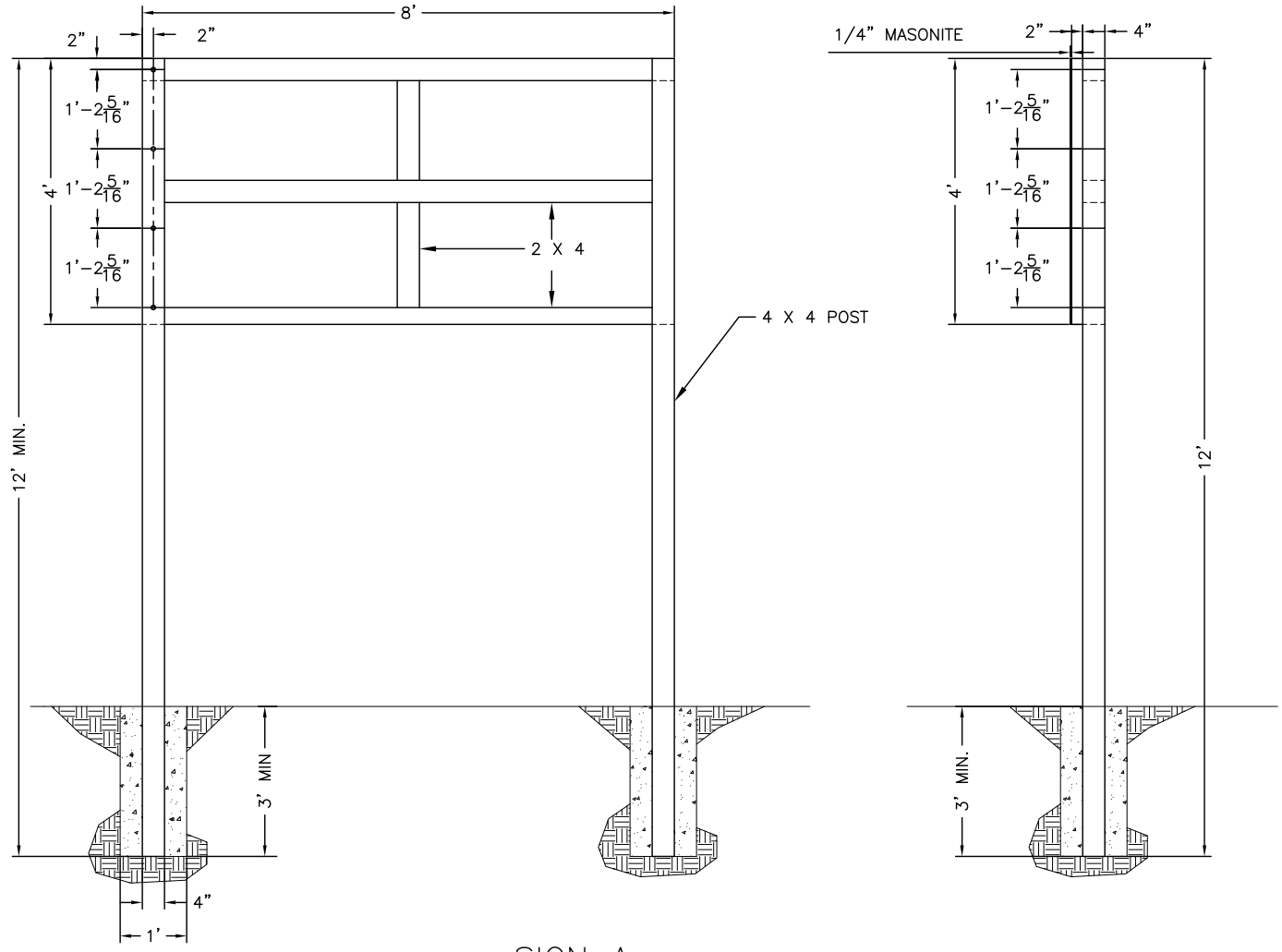
"U. S. DEPARTMENT OF COMMERCE ECONOMIC DEVELOPMENT ADMINISTRATION" use Bank Gothic Medium - BANK GOTHIC MED

"In partnership with" use Univers™ 55 Oblique - *Univers 55*

(Name of) "EDA Grant Recipient" use Univers™ Extra Black 85 **Univers 85**

Project signs will not be erected on public highway rights-of-way. If any possibility exists for obstruction to traffic line of sight, the location and height of the sign will be coordinated with the agency responsible for highway or street safety in the area.

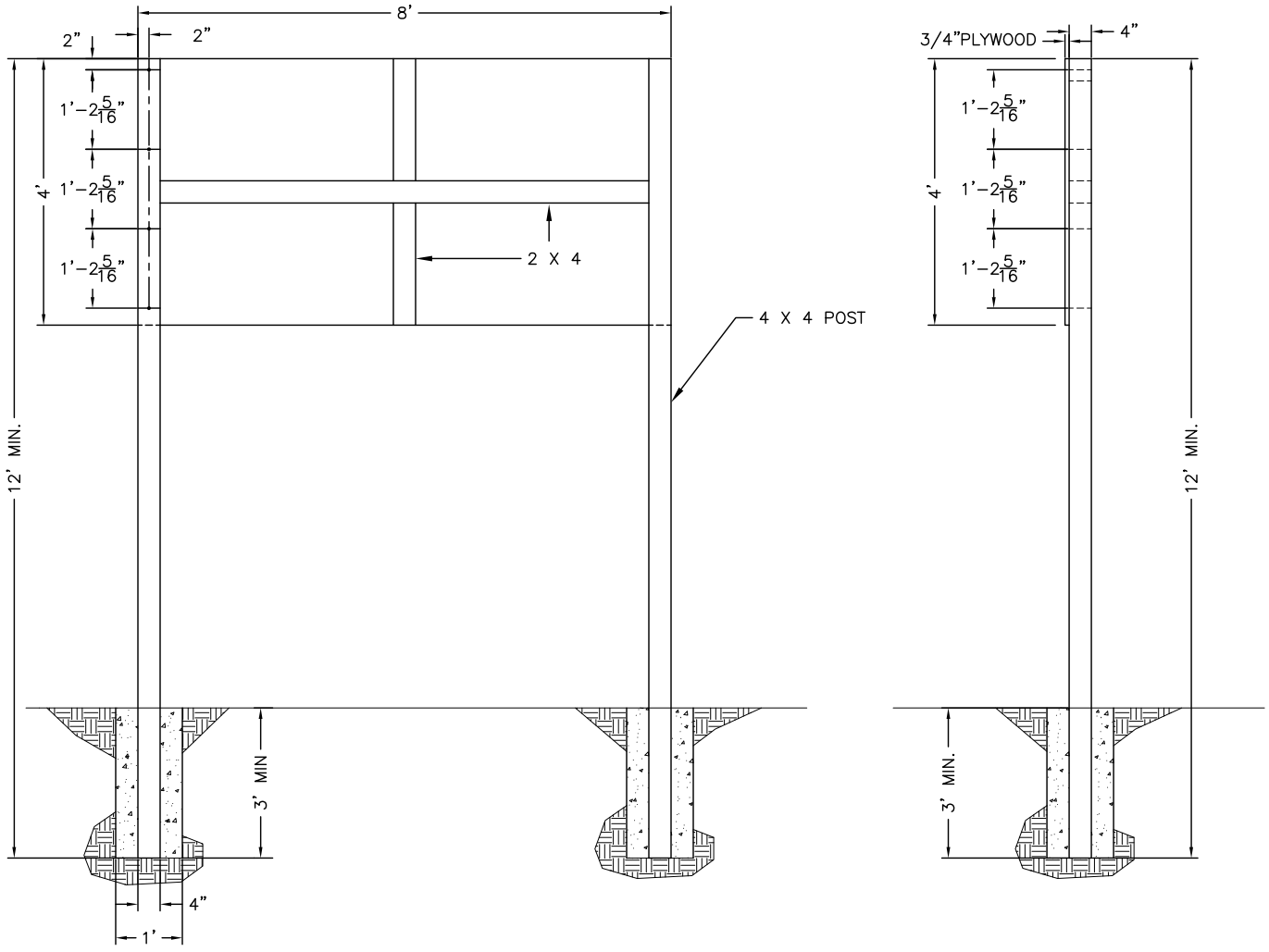
The EDA Regional Director may permit modifications to these specifications if they conflict with state law or local ordinances.



SIGN A
MASONITE SIGN

SCALE: 3/8" = 1'

PROJECT - SIGN A
ECONOMIC DEVELOPMENT ADMINISTRATION



SIGN B
PLYWOOD SIGN
SCALE: 3/8" = 1'

PROJECT - SIGN B
ECONOMIC DEVELOPMENT ADMINISTRATION

EDA

U.S. Department of Commerce Economic Development Administration

In partnership with

<EDA Grant Recipient Name>


2.25”
13.5”
1.75”
1.75”
EDA
10”
Black
Blue= PMS300
Gold= PMS7406
2.0”
1.5”
4.0”
3.0”
3.0”
3.75”
15.0”
U.S. DEPARTMENT OF COMMERCE ECONOMIC DEVELOPMENT ADMINISTRATION
48”
In partnership with
<EDA Grant Recipient Name>
96"

PART 1 GENERAL

1.1 GENERAL GUIDELINES

A. The following water system design guidelines are based on Federal, State and local health requirements and Berkeley County Water & Sanitation engineering design criteria.

B. Design criteria not indicated herein shall comply with “Ten States Standards” where applicable.

C. All installations are to meet the bacteriological and chemical quality standards of the South Carolina Department of Health and Environmental Control (SCDHEC).

D. No line extension shall be made from an existing line when the existing line does not meet the minimum pressure and flow requirements outlined in this section.

E. Water services and plumbing must conform to relevant local plumbing codes or the National Plumbing Code.

F. Individual home booster pumps are not allowed to meet the 25 psi minimum pressure at the service connection.

G. These design guidelines are applicable to all developments including but not limited to residential, commercial and industrial developments, subdivisions, and/or parks requiring water service from BCWS.

1.2 SYSTEM DESIGN CRITERIA

A. Distribution main size: minimum 4" diameter unless otherwise approved by BCWS. Water mains providing fire service shall be a minimum of 6" unless otherwise approved by BCWS. Larger size mains shall be required if necessary to allow the withdrawal of the required fire flow while maintaining the minimum required residual pressure. Water mains not designed for fire flows of 500 gpm shall not have hydrants.

B. When a variance to the minimum water main diameter of 4 inches is approved, small dead end lines shall not exceed the following lengths:
   1. 1-inch diameter: 150 feet
   2. 1 ¼-inch diameter: 200 feet
   3. 1 ½-inch diameter: 300 feet
   4. 2-inch diameter: 1,500 feet

C. Comply with all application requirements of Federal, State, and local regulations.

D. Hazen and Williams design coefficient:
   1. Ductile iron pipe: C = 120
   2. PVC pipe: C = 140

E. When a design is being considered for a project, a main depth of between 3'-5' below finish grade will be used to establish main and branch line profiles.

F. Where standard four to six inch diameter hydrants are proposed, the design flow shall not be less than 500 gpm over and above peak hourly flow. Standard hydrants shall not be placed on systems using only hydro pneumatic storage, unless standby power is provided and the pumping capacity from wells or ground storage exceeds the fire flow demand with the largest well or pump out of service. Standard hydrants shall not be connected to lines not designed to carry fire flows.

1.3 BCWS MASTER PLAN

A. Design system to comply and be compatible with BCWS' Water System Master Plan.

1.4 SIZING OF LINES

A. Size pipe 6" and larger based on the following criteria: (1) System pressures at maximum instantaneous demand (not less than twenty-five (25) pounds per square inch); or (2) fire flow in addition to peak hourly flow (not less than twenty five (25) pounds per square inch) or (3) flushing flow in addition to peak hourly flow (not less than twenty five (25) pounds per square inch), whichever is the worst case. Peak hourly demand shall be calculated by multiplying BCWS' peak hour demand factor of 3.5 by the average daily water usage (225 gpd/res. unit). When fire protection is to be provided, system design should be such that fire flows and facilities are in accordance with the requirements of BCWS and the state Insurance Service Office (ISO). Minimum fire flow shall be 500 gpm with a minimum residual pressure of 25 psi. For existing projects that may have additional phases, the DHEC's minimum requirement of 20 psi may be utilized if no other reasonable alternative exists.

B. Pipe size 4" and smaller: Size piping based on either maximum instantaneous demand or peak hour plus flushing flow, whichever is greater.

C. The maximum instantaneous demand is to be calculated using the Community Water System Source Book by Joseph S. Amen, as reference.

Table 1 - Maximum Instantaneous Flows for Residential Areas

Number of Residences Served	Flow per Residence in GPM
1 (First)	15.0
2 – 10*	5.0
11 – 20**	4.0
21 - 30	3.8
31 - 40	3.4
41 - 50	3.2
51 - 60	2.7
61 - 70	2.5
71 - 80	2.2
81 - 90	2.1
91 - 100	2.0
101 - 125	1.8
126 - 150	1.6
151 - 175	1.4
176 - 200	1.3
201 - 300	1.2
301 - 400	1.0
401 - 500	0.8
501 - 750	0.7
751 - 1,000	0.5

*Second, third, etc., through tenth residence served.
**Eleventh, twelfth, etc., through twentieth residence served.

Table 2 – Maximum Instantaneous Flows for Commercial Areas

Type of Business	GPM on Basis Shown
Barber Shop	3.0 gpm per chair
Beauty Shop	3.0 gpm per chair
Dentist Office	4.0 gpm per chair
Department Store*	1.0 – 2.0 – 3.0 gpm per employee
Drug Store	5.0 gpm
With Fountain Service	add 6.0 gpm per fountain area
Serving Meals	add 2.0 gpm per seat
Industrial Plants**	4.0 gpm plus 1.0 gpm per employee
Laundry	30.0 gpm per 1,000 pounds clothes
Launderette	8.0 gpm per unit
Meat Market, Super Market	6.0 gpm per 2,500 sq. ft. floor area
Motel, Hotel	4.0 gpm per unit
Office Building	0.5 gpm per 100 sq. ft. floor area or 2.0 gpm per employee
Physicians Office	3.0 gpm per examining room
Restaurant	2.0 gpm per seat

Single Service	6.0 to 20.0 gpm total
Drive-in	2.0 to 7.0 gpm total
Service Station	10.0 gpm per wash rack
Theater	0.2 gpm per seat
Drive-in	0.2 gpm per car space
Other Establishments***	Estimate at 4.0 gpm each

*Including customer service.
**Not including process water
***Non-water using establishments

Table 3 – Maximum Instantaneous Flows for Institutions

Type of Institution	Basis of Flow, GPM
Boarding Schools, Colleges	2.0 gpm per student
Churches	0.4 gpm per member
Clubs: Country, Civic	0.6 gpm per member
Hospitals	4.0 gpm per bed
Nursing Homes	2.0 gpm per bed
Prisons	3.0 gpm per inmate
Rooming Houses	Same as Residential*
Schools: Day, Elementary, Junior, Senior High	
Number of Students	GPM Per Student
0 - 50	2.00
100	1.90
200	1.88
300	1.80
400	1.72
500	1.64
600	1.56
700	1.44
800	1.38
900	1.32
1,000	1.2
1,200	1.04
1,400	0.86
1,600	0.70
1,800	0.54
2,000	0.40

*Each unit of an apartment building should be considered as an individual residence.

D. Design for flushing velocity per SCDHEC regulations.

E. All water mains, including those not designed to provide fire protection, shall be sized using a hydraulic analysis based on flow demands and

pressure requirements. The minimum pressure in all public water mains under conditions of maximum instantaneous demand shall be twenty-five (25) pounds per square inch at every customer's tap. Twenty (20) pounds per square inch will be acceptable at any tap when fire flows are provided in excess of maximum peak hourly flow [R61-58.4(D)(4)(a)]. The normal working pressure in the distribution system should be approximately 50 – 80 psi and not less than 30 psi.

F. The Developer's Design Engineer is to determine available static and residual pressures at the delivery point for the water to a new development. The data is to be obtained under the direction of an engineer who is registered in the State of South Carolina.

G. Flow test results, conducted in the past 12 months, are required at a location near the proposed connection to the existing system. The results should include: static pressure and residual pressure at a known flow, time and date of test, existing pipe size, type of pipe, and the elevation and distance between the test point and connection. The known flow must be in excess of the demand for the extension.

1.5. VALVES

A. Provide three (3) valves for a tee intersection.

B. Sufficient valves shall be provided on water mains so that inconvenience and sanitary hazards will be minimized during repairs. Valves should be located at not more than 1000 foot intervals in commercial districts and at not more than one block or 2000 foot intervals in other districts. Valves should be placed to minimize the number of BCWS customers out of service due to a main break and/or any maintenance operation. BCWS reserves the right to require additional valves if it is deemed in the best interest of current and future BCWS customers.

1.6 INDUSTRIAL OR SPECIAL DESIGN CONDITIONS

A. Design of water systems for industrial or other systems not covered under this section shall be approved on a special case basis only. Special requests need to be made to BCWS.

1.7 DEAD ENDS

A. Minimize dead ends by looping of all mains.

B. Where dead ends occur provide a fire hydrant on lines 6" and larger and a blow off on lines 4" in diameter and smaller. BCWS permits installation of post hydrants for the purposes of flushing so long as the line is capable of

providing a flow of 250 gpm. Flushing devices should be sized to provide flows which will give a velocity of at least 2.5 feet per second in the water main being flushed.

C. Do not connect any flushing device to any sanitary sewer.

1.8 SEPARATION OF WATER MAINS AND SEWERS

A. Where possible, locate water line at least ten (10) feet away, horizontally, from sewer pipes. The distance shall be measured edge to edge.

B. Should ten (10) foot separation not be practical, then the water main may be located closer provided:
   1. It is laid in a separate trench.
   2. It is laid in the same trench with the sewer main located at one side on a bench of undistributed earth.
   3. In either of the above cases, crown elevation of the sewer shall be at least 18" below invert elevation of water line.

C. Where water lines cross over sewers, maintain 18" minimum vertical distance between the outside of the water main and the outside of the sewer. This shall be the case where the water main is either above or below the sewer. At crossings, one full length of water pipe shall be located so both joints will be as far from the sewer as possible. Mechanical joints will be used for the transition in the sewer line. Fernco couplings **shall not** be allowed. Special structural support for the water and sewer pipes may be required.
   1. Special Cases:
      a. Water mains may not be placed in contaminated areas unless piping material is adequate to protect the water quality [R.61-58.4(D)(11)(h)].
      b. Water mains may not be less than 25 feet from any waste water tile field or spray field [R.61-58.4(D)(12)(f)].
      c. There may not be any connection between the distribution system and any pipes, pumps, hydrants, or tanks whereby unsafe water or other contaminated materials may be discharged or drawn into the system [R.61-58.4(D)(14)(a)].
      d. Neither steam condensate nor cooling water from jackets or other heat exchange devices may be returned to the potable water supply [R.61-58.4(D)(14)(b)].

1.9 SEWER AND STORM DRAINAGE SYSTEM INTERFERENCE

A. No water pipe shall pass through or come in contact with any part of a sewer manhole or storm drainage pipe or structure.

1.10 EXCEPTION

A. BCWS must specifically approve any variance from any requirements when it is impossible to obtain the specified distances.

1.11 SURFACE WATER AND WETLANDS CROSSINGS

A. Surface water and wetland crossing, whether over or under water, present special problems. BCWS should be consulted before plans are prepared. Water mains crossing surface waters must be adequately supported and anchored, protected from damage and freezing, and be accessible for repair or replacement [R.61-58.4(D)(13)(a)]. Any support or anchoring system should be designed to be corrosion resistant using concrete or 316 stainless steel. Water mains crossing under water must maintain a minimum cover of 3 feet. When crossing water courses which are greater than 15 feet in width, the following must be provided.
   1. The pipe material and joints shall be designed appropriately [R.61-58.4(D)(13)(b)(I)].
   2. Valves must be located so that the section can be isolated for testing or repair; the valves must be easily accessible, and not subject to flooding [R.61-58.4(D)(13)(b)(ii)].
   3. A blow-off must be provided on the side opposite the supply service, sized in accordance with R.61-58.4(D)(7)[R.61-58.4(D)(13)(b)(iii)].

1.12 THRUST BLOCK DESIGN

A. BCWS will approve the use of thrust blocking on a case by case basis.

B. Maximum soil pressure: 1000 lbs/sq ft. Minimize the use of thrust blocking by installing thrust restraint fittings when possible.

C. Minimum water pressure: 150 psi.

D. Safety factor: 2

E. Concrete: 3000 psi.

1.13 COVER

A. Provide suitable cover on all distribution mains. Minimal cover depth as follows:
   1. 4" - 12" diameter: 36".
   2. 16" diameter and larger: 48".
   3. All piping located within the right-of-way of the South Carolina Department of Transportation and Berkeley County Public Works shall have a minimum cover of 48" below the crown of the road when

installed within the limits of the paved roadway, 36" cover when installed in the shoulder of right-of-way and a minimum of 24" separation under the design invert of drainage structures. The greater dimension of the above shall dictate minimum depth where applicable.

4. Special conditions other than those listed above may be approved if requested in writing from BCWS.
5. Water lines crossing open ditches shall have a minimum of 36” of cover from bottom of ditch invert to top of pipe. If this is not possible, install a joint of the appropriate size RCP as approved by the governing agency, over the pipe to protect the water line.

1.14 DUCTILE IRON PIPE LOCATIONS

A. Where new water mains cross beneath new sewer mains, the sewer main shall transition to ductile iron pipe and the length of pipe shall be centered on the water main so that joints will be equidistant. The transition between PVC and DIP shall be made with mechanical joint sleeves or molded fittings. The use of Fernco couplings shall not be allowed.

B. Ductile iron pipe with mechanical joints shall be used for any water mains being installed in rock.

C. Ductile iron pipe with mechanical joints shall be used for any water mains under road and open drainage crossings.

1.15 TAP SIZE IN RELATION TO MAIN SIZE

A. All water service taps shall be a minimum of one size smaller than the water main being tapped unless the water main being tapped is part of a looped water distribution system. In these cases the water service tap can be the same size as the main being tapped but cannot be larger. BCWS reserves the right to stipulate the maximum size tap available off of any water main regardless of the main size and configuration, if it is deemed in BCWS’ best interest to do so.

1.16 AIR RELEASE VALVES

A. Mains shall be designed to minimize high points. At high points in water mains where air can accumulate, provisions shall be made to remove the air by means of an air release valve. Automatic air release valves shall not be used in situations where flooding of the manhole or chamber may occur. Air valves should be sized based on the size of the water main. Air valves should be detailed on the design drawings and approved by BCWS. Air release valves must incorporate an open end of an air relief pipe from automatic valves and must be extended to the top of the pit and provided with a screened downward facing elbow [R.61.58.4D(10)(b)].

1.17 BLOW OFF CHAMBERS

A. General

1. Post-type hydrants are acceptable for flushing on lines four to eight inches in diameter and can be used on 3-inch diameter lines where the design flow is increased to 100gpm in excess of the peak hourly flow.
2. Where post-type hydrants are proposed, they must meet the flow requirements for blow-offs. Post hydrants shall not be used on water lines smaller than 3-inches in diameter.
3. All 4" dead-end water mains shall be designed to include a 2-inch blow-off hydrant. Fire hydrants may be used as blow-offs on 6" mains and larger. Lines 6" and larger require a fire hydrant and 500 gpm to achieve a 2.5 fps scouring velocity. This would require a standard fire hydrant or other approved blow-off for flushing which must be designed to provide at least 500 gpm in excess of peak hourly flow and a minimum residual pressure of 20 psi. [R.61-58.4(7)(e)].
4. Where pipe size changes on a water main, a flushing device is required at the transition, unless the design engineer can demonstrate that there is adequate pressure to flush the lines. Plans should specify the size and type of the flushing device. Dead end lines shall be provided with a fire hydrant (if flow and pressure are sufficient), a post hydrant, or a blow-off valve in a box for flushing purposes, except for lines:
   a. 1 ½ inches in diameter and less will not require blow-offs but will require a service connection.
   b. 200 feet or less in length will not require blow-offs, unless specifically required by SCDHEC.
5. Chambers, pits, or manholes containing valves, blow-offs, or other such appurtenances to a distribution system shall not be connected directly to any storm drain or sanitary sewer, nor shall blow-offs or air relief valves be connected directly to any sewer. Such chambers or pits shall be drained to the surface of the ground where they are subject to flooding by surface water, or to absorption pits underground, and in the public right-of-way shall be installed at existing grade. Blow-off chambers must include a removable extension to direct the water away from the blow-off box.

Table 4 – Required Blowoff Device Orifice Sizes for Different Pipe Diameters

Pipe Diameter (inches)	Orifice Size (inches)
4	2.0
6	2.0 or FH*
8	2.5 or FH*
10	FH
12	FH

*A temporary blow-off may be utilized in cases where the main is to be extended.

B. Quality Assurance
   1. Reference Standards of the American National Standards Institute (ANSI).
      a. Thrust restraint section (AWWA C600-99 section 3.8).
      b. 21.53 Ductile Iron Compact Fittings, 3" through 16", for Water and Other Liquids (AWWA C153).

C. Materials
   1. Blow-off hydrants shall be a non-freezing, self-draining type, with an overall length of 2½ feet. Set underground in a 1.5' x 2' iron box, these hydrants will be furnished with a FIP inlet, a non-turning operating rod and shall open to the left. All of the working parts shall be of bronze-to-bronze design. The outlet shall be bronze with a 2½" NST.

1.18 WATER LOADING STATIONS

A. To prevent contamination of the public water supply, the following criteria for water loading stations must be met:
   1. Air Gap – A device must be installed on the fill line to provide an air break and prevent a submerged discharge line.
   2. Hose Length – The fill hose and cross connection control device must be constructed so that when hanging freely it will terminate at least two feet above the ground surface.
   3. Fill Line Terminus – The discharge end of the fill line must be unthreaded and constructed to prevent the attachment of additional hose, piping, or other appurtenances.

1.19 BACKFLOW PREVENTION AND METERING DURING CONSTRUCTION

Any extension to the BCWS water system must be constructed in a manner that eliminates the possibility of back-flow of water from the non-approved system into the active BCWS system and provides the ability to meter water use. To achieve this, the following method shall be used:

1. At the beginning of construction, a temporary backflow preventer and meter (both approved by BCWS) shall be supplied and installed by the Contractor in-line between the tapping valve, or stub-out, and the water extension. The backflow preventer shall be tested and certified by a SCDHEC licensed tester and the test results provided to BCWS prior to being placed into operation. The engineer shall determine the size backflow preventer necessary to achieve 2.5 feet/sec flushing velocity for a given size pipe.

2. Once the SCDHEC permit to operate has been issued for the new section, the backflow assembly shall be removed by the Contractor and replaced with a spool piece and MJ sleeve(s). Any other connection points to the BCWS system shall be provided with an air gap of three (3) feet between the new pipe and the existing stub out or wet tap. All temporary backflow installations shall be inspected and approved by a BCWS Inspector before being placed into operation.

In the case of a water project that has multiple connection points with the BCWS system, the BCWS Engineering Department will determine the optimum location for a single water-supply connection. Final tie-in to all other connection points shall only be made after the Permit to Operate has been issued by SCDHEC.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Furnishing of all plant, labor, equipment, appliances and materials, and in performing all operations in connection with the construction of the water mains, including valves, hydrants, and appurtenant structures, complete and in strict accordance with the specifications and drawings.

B. Setting of line stakes for all water mains, as required. Layout work to utilize points previously established by the OWNER as shown on the Drawings. Consult with the OWNER on any problems encountered.

1.2 RELATED SECTIONS

A. Section 02110 - Site Clearing and Grubbing

B. Section 02111 - Site Protection and Restoration

C. Section 02200 - Earthwork

D. Section 02511 - Flowable Fill

E. Section 02664 - Water Distribution System Design Guidelines

F. Section 02670 - Water Main Testing and Acceptance

G. Section 02675 - Disinfection of Potable Water Mains

H. Section 02900 - Erosion Control

I. Section 02936 - Seeding

PART 2 PRODUCTS

2.1 GENERAL

A. Materials used in the work to conform to the current specifications of the American Society for Testing Materials (ASTM), Section C of the American Water Works Association (AWWA) Standards, the American National Standard Institute (ANSI), and Commercial Standards (CS).

B. Only new materials shall be used in the construction of potable water mains and their associated appurtenances.

C. All water distribution pipe materials are to be lead free for all projects entering into contract with BCWS on or after January 1st, 2013. The term “lead free” means (1) not containing more than 0.2% lead when used with respect to solder and flux; and (2) not more than a weighted average of 0.25% lead when used with respect to the wetted surfaces of pipes, pipe fittings, plumbing fittings, and fixtures.

D. All chemicals and products added to the public water supply must be third party certified as meeting the specifications of ANSI/NSF Standard 60.

E. All materials and products that contact potable water must be third party certified as meeting the specifications of ANSI/NSF Standard 61.

F. Do not use lubricants that may support microbiological growth for slip-on joints. Do not use vegetable shortening to lubricate joints.

G. Do not use natural rubber or other material which may support microbiological growth for any gaskets, O-rings, or other products used for jointing pipes, setting meters or valves, or other appurtenances that may provide exposure to potable water.

H. The use of asbestos cement pipe is prohibited in the construction of potable water systems.

I. The use of butterfly valves less than 16” in size is not permitted without specific approval from BCWS on a case by case basis. Butterfly valves shall meet the requirements of AWWA C504.

2.2 DUCTILE IRON WATER PIPE AND FITTINGS

A. Conform to AWWA C150 (ANSI A21.50), pressure class 350 for 4” to 12” diameter and pressure class 250 for 14” to 20” diameter, except as otherwise noted; and AWWA C151 (ANSI A21.51).

B. Concrete Lining: In accordance with manufactures’ specifications.

C. Exterior Coating: Coal tar pitch applied in accordance with Sec. 51-8 of AWWA C151 (ANSI A21.51). All standards, latest revision.

D. Pipe Joints:
   1. Provide mechanical joints where indicated, with necessary accessories, conforming to AWWA C111 (ANSI A21.11). Provide gasket composition suitable for exposure to potable water.
   2. Provide push-on joints where the joint type is not indicated, with necessary accessories, conforming to AWWA C111 (ANSI

A21.11). Provide gasket composition suitable for exposure to potable water.

E. Fittings: Ductile iron, manufactured in accordance with AWWA C110 Class 350; or compact ductile iron, manufactured in accordance with AWWA C153 Class 350; provide with concrete lining in accordance with manufactures' specifications.

F. Fittings to be bituminous coated and designed to accommodate the type of pipe used.

G. Pipe Markings: Pressure rating, net weight of pipe without lining, length of pipe, and name of manufacturer clearly marked on each length of pipe.

H. Polyethylene Encasement: Provide encasement for all ductile iron piping using flowable fill (roadway open cuts) and any other areas where corrosive soil exists when ductile iron piping is used.

2.3 POLYVINYL CHLORIDE (PVC) WATER PIPE

A. 14" to 48" Diameter: Conform to AWWA C900 Standard for PVC pipe, with cast iron pipe equivalent outside diameters, class 235 (DR 18).

B. 4" to 12" Diameter: Conform to AWWA C900 Standard for PVC pipe, with cast iron pipe equivalent outside diameters, Class 235 (DR18).

C. Smaller Than Four Inch Diameter: Conform to ASTM D1784 and D2241. Schedule 80 PVC.

D. Joints: Join by means of a push on bell joint which is to be an integral part of the barrel in conformance with AWWA C900. Provide gasket composition suitable for exposure to potable water.

E. Fittings For PVC Pipe Less Than Four Inch Diameter: PVC conforming to the material requirements for PVC pipe described herein.

F. Fittings For PVC Pipe Four Inch Diameter and Larger: Mechanical joint conforming to paragraph 2.2(E) of this Section. Provide gasket composition suitable for exposure to potable water.

G. Pipe to bear the National Sanitation Foundation seal of approval. Comply with the requirements of Type I, Grade I of the ASTM resin specification D-1784. Certificates of conformance with the foregoing specifications to be furnished with each lot of pipe supplied.

H. PVC water mains shall be blue in color.

2.4 POLYETHYLENE WATER SERVICE TUBING

A. Service Tubing shall be 1” copper tubing size (CTS) polyethylene plastic tubing (PET) suitable for underground water services, in conformance with ASTM D2737 (PE 3406), with a rated working pressure of 160 psi. For dual service installation use 1” CTS tubing between service tee and meter box.

B. Fittings shall be in conformance with AWWA C901.

2.5 GATE VALVES (TWO INCH AND LARGER SIZE)

A. Minimum design working pressure of not less than 200 p.s.i. and a test pressure of not less than 400 p.s.i.

B. Valve body, bonnet, stuffing box, and disc castings to be manufactured of ASTM A 126 Class B gray iron, with resilient seated design conforming to AWWA C509, interior coating conforming to AWWA C550, and non-rising stems. Provide "O" ring seals.

C. End Connections: Provide mechanical joint end connections for buried applications.

D. Valve Manufacturer and Type: Please see Appendix F29 BCWS Approved Parts List.

E. Furnish one two inch square wrench nut with each valve.

F. Operation: Valves to open with counterclockwise turns.

G. Provide a concrete protector ring for each valve box location.

H. Valve Boxes:
   1. Two piece telescopic type with cast iron frames and covers as shown on the drawings.
   2. Valve boxes to have a suitable base that does not damage the pipe, and shaft extension sections to cover and protect the valve, and to permit easy access and operation.
   3. Valve boxes to be of suitable length for the bury depth and to provide a cover of not less than 3 1/2 feet over the pipe. The minimum thickness of metal of the valve box at any point shall not be less than 3/16 inch.
   4. Manufacturer and Type: Please see Appendix F29 BCWS Approved Parts List.

I. Provide a concrete valve marker post for each location of mainline valve boxes in rural areas.

J. Install a gate valve on a 2” service line in lieu of a corporation stop.

2.6 BUTTERFLY VALVES (SIXTEEN INCH AND LARGER SIZE)

A. Butterfly valves are only allowed on water mains 16” in diameter or larger.

2.7. CASING PIPE

A. Steel casing for water distribution mains installed under highways and railroads shall conform to AWWA C200 and SCDOT Utility Accommodations Policy, latest revision. Exterior of the pipe shall be coated with coal tar epoxy coating or bituminous coating.

B. All joints shall be butt welded unless otherwise shown on the Drawings.

C. Casing Spacers:
1. Provide stainless steel band casing spacers.
2. Pipe dunnage will not be used.

D. End Seals:
1. Provide flexible end seals with stainless steel bands, or
2. Use brick and mortar to seal the ends.

E. Minimum wall thickness for steel casing pipe shall be as follows:

D.I. Carrier Pipe (Restrained Joint) Nominal Diameter (Inches)	Coated Casing Pipe (Welded Steel) Nominal Diameter (Inches)	Coated Casing Pipe (Welded Steel) Nominal Thickness (Inches)
6	12	0.188
8	14	0.188
10	16	0.219
12	18	0.250
14	20	0.281
16	24	0.312
18	30	0.406
24	36	0.469
30	42	0.562

Note: Casing pipe specifications and carrier pipe clearances are more stringent for railroad crossings.

2.8 FIRE HYDRANTS

A. Conform to AWWA C502.

B. General:
   1. Provide with compression type shutoff and mechanical joint inlet connection.
   2. Provide with two 2 1/2" hose nozzles (NST threaded) and one 4 1/2" pumper nozzle (NST threaded). Nozzle caps to be chained to the hydrant.
   3. Hydrant operation: Hydrants to open by turning counterclockwise.
   4. The fire hydrant is to be of a dry barrel, dry top design; Provide for a bury depth as shown on the Drawings, with a two piece cast safety flange and stem coupling that breaks cleanly when struck. The main valve on the hydrant to remain closed, should the hydrant nozzle section be broken off by a traffic accident.
   5. Hydrant valve opening: 4-1/2 inches.
   6. The hydrant shoe to have a protective, thermosetting epoxy coating applied inside the assembly.
   7. Provide restrained joint assembly as indicated on the Drawings.
   8. Install blue reflector in paved roadways to identify the location of fire hydrants. Reflectors to be of the type approved for the intended purpose by the SCDOT and meet applicable standards. Reflectors shall be in the center of the travel lane on the hydrant side of the highway.
   9. No hydrant extensions are allowed unless approved by BCWS. Install a height adjustable assembly as specified in the hydrant details.

C. Manufacturer and Type: Please see Appendix F29 BCWS Approved Parts List.

D. Hydrants to be marked with the name of the manufacturer, size of the valve opening, and the year of manufacture, all in accordance with AWWA C502.

E. Interior Factory Coating: Electrostatically-applied, fusion-bonded, epoxy coating in accordance with AWWA C550.

F. Exterior Factory Coating:
   1. General: Electrostatically-applied, fusion-bonded, epoxy coating in accordance with AWWA C550.
   2. Base factory color: Standard Red.

G. Hydrants shall be painted Standard Red. Use two coats of an epoxy coating approved by the manufacturer for field painting.

2.9 RESIDENTIAL AND SMALL BUSINESS SERVICE CONNECTIONS

A. All service connections shall include physical connection to the existing water piping for each residence or small business. All service connections shall be placed at the appropriate property corner. Contractor shall ensure that this stub out connection is within 18” of the property corner marker of the lot being served.

B. Service Saddles: Minimum tap size – 1”. Please see Appendix F29 BCWS Approved Parts List. Use 1” stainless steel saddles on 2” water mains for service connections.

C. Corporation Stops: Minimum size – 1”. Shall be pressure rated at 300 psi. Please see Appendix F29 BCWS Approved Parts List.

D. Curb Stop: 18” before the grip join tee. Please see Appendix F29 BCWS Approved Parts List.

E. Insert Stiffener: Please see Appendix F29 BCWS Approved Parts List.

F. Single Service Installation: Install 1” 160 PSI CTS polyethylene tubing (PET) at the property corner. Install a curb stop at the end of the CTS tubing.

G. Dual Service Installation: To split 1” CTS polyethylene plastic tubing (PET) to serve two customers, Use 1”x1”x1” joint tee for CTS PET. Install 3’ of 1” CTS PET on both side of the grip joint tee to allow for BCWS meter box installation.

H. Meter: All meters regardless of size installed on BCWS system must be a Radio Read meter manufactured by Sensus to be complete with a lid.

I. BCWS will accept the responsibility of programming the meter transceiver unit (Flexnet) and recording the longitude and latitude.

J. Pressure Regulator: When required, Watts Series N35B Water Pressure Regulator. No substitution.

2.10 BACKFLOW PREVENTION

A. Conform to Berkeley County Ordinance governing Cross Connection and Control.

B. All meters 1” or greater shall have a backflow assembly installed. The type of assembly will be determined at the time the customer submits the application. The type of assembly is based on the type of hazard present at that particular service connection. This will be evaluated by

the Water Distribution System Superintendent and the information provided by the customer.

C. All backflow assemblies regardless of size shall be installed above ground. Effective 1 July 2006, BCWS no longer accepts vault installations.

D. All backflow assemblies shall meet SCDHEC specifications for the applicable application.

E. Only a Reduced-Pressure Principle Assembly or a Pressure Vacuum Breaker Assembly shall be allowed on lawn irrigation system (both residential and commercial).

F. Fire sprinkler lines will need to be evaluated at the time the construction prints are reviewed. A determination of the type of assembly being installed shall be made at that time and be included on the construction prints.

2.11 MARKER

A. Line Marker: Provide Composite Utility Markers, Model Number CUM 375 as manufactured by Carsonite, Carson City, Nevada. Markers to be 66" in length (1'-6" BURY) and 3.8" in width, blue with notation "CAUTION WATER PIPELINE". Additional notation to include "BEFORE DIGGING OR IN CASE OF EMERGENCY CALL BCWS (843) 572-4400.

B. Valve Marker: Provide 4"x4"x5' reinforced precast concrete monument to mark each water distribution valve. Cast the letters "WV" into the monument and attach a brass plate on top with distance and direction of the valve. Install valve markers behind the valves and within the R/W or general utility easement.

C. Service Marker Stake: Provide 2"x4" treated yellow pine stake, 4' in length maximum (18" bury maximum) to mark the end of service connections without meter boxes.

D. Mark curb with "***I*** " for locations of water services. Markings shall be stamped and no more than ½" deep, located on top of the curb. Markings shall not be located too close to an existing joint in the curb and shall not extend across the whole curb/gutter section.

E. Mark curb with "**V** " for locations of valves. Markings shall be stamped and no more than ½" deep, located on top of the curb. Markings shall not be located too close to an existing joint in the curb and shall not extend across the whole curb/gutter section.

2.12 TAPPING SLEEVE

A. Please see Appendix F29 BCWS Approved Parts List.

2.13 CUT-IN SLEEVE AND VALVE

A. Please see Appendix F29 BCWS Approved Parts List.

2.14 Tracer Wire

A. Place continuous 12-guage insulated solid copper tracer wire over all water mains. Insulation color shall be blue.

PART 3 EXECUTION

3.1 GENERAL

A. Perform all excavation of every description and of whatever substances encountered, to the depths indicated on the drawings or as otherwise specified. During excavation, pile material suitable for backfilling in an orderly manner a sufficient distance from the banks of the trench, or other excavation, to avoid overloading and to prevent slides or cave-ins. Remove all excavated materials not required or suitable for backfill and deposit where, and as, directed by the OWNER. Reference Section 02200 – Earthwork.

B. Grade work area as needed to prevent surface water from flowing into trenches or other excavations. Remove any accumulated water by pumping or by other approved method. Install sheeting and shoring as necessary for the protection of the work and for the safety of personnel. Where, in the opinion of the OWNER, damage is liable to result from withdrawing of the sheeting, it is to be left in place and the Contractor will be so notified in writing.

C. Comply with all pertinent provisions of the "Manual of Accident Prevention in Construction" issued by Associated General Contractors of America, Inc.

3.2 EXISTING UNDERGROUND UTILITIES AND OBSTRUCTIONS

A. The drawings indicate utilities or obstructions that are known to exist according to the best information available to the Owner. Conflicts must be disclosed to the OWNER as soon as encountered.

B. Call the Palmetto Utility Protection Service (1-888-721-7877) and all utilities or agencies potentially having underground utilities within the work vicinity at least three business days (72 hours) prior to construction.

C. Horizontal Conflict: When the actual horizontal separation between an existing utility and a proposed utility piping does not permit safe installation of the proposed utility by the use of sheeting, shoring, tying back, or temporarily suspending the service, the proposed alignment of the piping may be altered provided that the new alignment remains within the available right-of-way or easement, complies with regulatory agency requirements and permits, and written approval is issued by the owner of the existing utility and BCWS.

F. Vertical Conflict: When the actual vertical separation between an existing utility and a proposed utility piping does not permit the crossing without damage to the proposed or existing utility, the proposed grade of the piping may be altered provided that the new maintains adequate cover and grade, complies with regulatory agency requirements and permits, and written approval is issued by the owner of the existing utility and BCWS.

E. Water Crossings:
   1. In above-water crossings, pipes should be supported and anchored adequately, protected from damage caused by freezing or other means, and accessible for repairs or replacement.
   2. In under-water crossings a minimum of two (2) feet of cover shall be provided over the top of the pipe. Crossings over water bodies that are greater than 15 feet wide shall have:
      a. The pipe material and joints designed appropriately.
      b. Valves that are located so the under-water section can be isolated should testing or repair be necessary. The valves should also be easily accessible and not be subject to flooding.
      c. A blow-off device provided on the opposite side of the crossing from the supply service sized appropriately. Blow-off discharge should be directed away from the water body.
      d. DIP with mechanical joints used for lines being installed in rock.

F. Water Main and Storm Drain Separation:
   1. In open drainage crossing, a minimum of three (3) feet of cover shall be provided. Ductile iron pipe shall be used for all open drainage crossings. In piped drainage crossing, a minimum of three (3) feet horizontal separation or two (2) feet vertical separation shall be maintained. Ductile iron pipe shall be used when the above criteria cannot be met.
   2. Where ductile iron pipe is required, center a full joint of ductile iron pipe over/under the drainage pipe. Space the water pipe joint to maximize horizontal separation.

3. No water main shall pass through, or come into contact with, any part of a storm drain manhole or junction box.

G. Water Main and Wastewater System Separation:

1. Construct new water mains more than 25 feet (measured horizontally at any point along the main) from a wastewater tile field and/or a wastewater spray field.
2. Construct new water mains a minimum of 18 inches above or below a sewer line, preferably constructing the water main above the sewer line. Where new water mains cross under sewer lines, adequate structural support will be provided for the sewer line to prevent damage to the water main. In instances where a new water main crosses a new sewer main, a full length of pipe will be used for both mains with the lengths situated such that the joints of each line are as far from the point of crossing and each other as possible. In cases where the sewer main is existing, one full length of water main shall be located such that both joints are as far from the sewer line as possible. Reference Section R.61-58.4(D)(12) of the State Primary Drinking Water Regulations.
3. Construct new water mains at least 10 feet horizontally, measured from edge to edge, from any existing or proposed sewer.
4. Construct new water mains at least 10 feet horizontally from sanitary sewer force mains. In crossing situations, there will be a minimum of 18 inches of vertical separation at the crossing as required in 3.2.G.2 above.
5. As conditions occur that make the distances listed above in 3.2.G(1-4) impractical, SCDHEC may allow alternates on a case-by-case basis, so long as it is supported by data from the design engineer. An alternative design shall:
   a. maximize the distances between the water main and sewer line and the joints of each;
   b. use materials which meet the requirements of SCDHEC's State Primary Drinking Water Regulations, section R.61-58.4(D)(1) for the sewer line; and,
   c. allow enough distance to make repairs to one of the lines without damaging the other.
6. No water pipe shall pass through or come in contact with any part of a sewer manhole.

3.3 RIGHT-OF-WAY

A. The necessary rights-of-way and easements for water main construction will be secured by the Developer. Street widths and rights-of-way may in some cases be smaller than the Contractor would normally require when using standard construction methods.

B. Restore rights-of-way and easements to pre-construction conditions or better. Reference Section 02200 – Earthwork.

3.4 PROTECTION OF PROPERTY AND EXISTING STRUCTURES

A. Use every reasonable precaution to avoid damage to surrounding property and finished work of others. If it becomes necessary to remove fences, posts, or any valuable property, they are to be replaced in a “like or better” condition.

B. Particular attention should be paid to storm drains and temporary sediment and erosion control measures. Any drainage feature, either temporary or permanent, which is filled, is to be opened as soon as the progress of the work will allow.

3.5 PREPARATION

A. Perform all survey work required for construction, including the establishment of base lines and any detailed surveys and bench marks adjacent to the work. A base line is defined as “the line to which the location of the work is referenced, i.e. edge of pavement, road centerline, property line, right-of-way or survey line.” If required, stake permanent and temporary easements to ensure that the work does not deviate from the designated easements. Establish bench marks such that they will not be destroyed during construction.

B. Provide a level of survey detail as required for establishing the correct locations of all water mains, valves, hydrants, and accessories as shown on the Drawings.

C. Reference Points: Install construction reference points as necessary. Preserve and protect all reference points, base lines, permanent property staking, and benchmarks.

3.6 CLEARING AND GRUBBING

A. Clearing and grubbing is the responsibility of the Contractor, if required.

3.7 EXCAVATION

A. All excavation is unclassified regardless of nature of the material encountered.

B. Perform all excavations by open cut from the surface for the water main locations and depths shown on the Drawings. Exercise care to avoid cutting tree roots.

C. Excavate trenches to provide ample room for handling pipe and making joints. Minimum trench width no less than 12 inches greater than the external diameter of the pipe.

D. Accurately grade trench bottom to provide uniform bearing and support for each section of the pipe on undisturbed soil at every point along its entire length, except for the portions of the pipe sections where it is necessary to excavate for bell holes and for the proper sealing of pipe joints.

E. Dig bell holes and depressions for joints after the trench bottom has been graded and, in order that the pipe rest upon the prepared bottom for as nearly its full length as practicable, only of such length and width as required for properly making the particular type of joint.

F. Whenever the bottom of the trench is unstable and does not afford a good foundation, remove such part as may be necessary and replace with select fill material. Except for crushed bedding, stones shall not come in contact with the pipe or be within six inches of the pipe.

G. Install all water mains, unless otherwise indicated on the Drawings, to provide a depth of cover between the top of the pipe barrel and the original ground surface or finished grade of not less than 36” for pipelines up to 12” in diameter and not less than 48” for pipelines greater than 12” in diameter. Should conditions arise which prevent the depth of cover outlined above, the pipe material shall be DIP, and if exposed will be insulated to prevent freezing. Thermoplastic pipe shall not be used above grade.

3.8 PIPE LAYING

A. General:
   1. Materials used for piping as specified herein. Pipe and accessories to be new and unused materials. Rest the full length of each section of the pipe solidly upon the pipe bed of undisturbed earth, with the recesses only to accommodate pipe bells and joints. Take up and relay any pipe that has its alignment, grade or joints disturbed after laying.
   2. Thoroughly clean the pipe interior of all foreign matter before being lowered into the trench. Keep pipe interior clean during the laying operations by means of plugs or other approved methods. Do not lay pipe in standing water, or when the trench or weather conditions are unsuitable for the work. Keep water out of the trench until the jointing of the pipe is completed. When the work is not in progress, securely close the open pipe ends so that no trench water, earth or other foreign substance can enter the line.

3. Replace any section of pipe found to be defective, either before or after laying, with new pipe at no additional expense to the Owner.
4. Lay ductile iron pipe in accordance with AWWA C600.
5. Lay PVC pipe and make connections in strict accordance with AWWA C605.

B. Handling of Pipe and Accessories: In such a manner as to insure delivery to the site and installation in the trench in a sound, undamaged condition. Take particular care not to damage any ductile iron pipe coating, either interior or exterior.

C. Cutting and Trimming of the Pipe: Perform in a neat and workmanlike manner without damage to the pipe or its coating. Cut pipe utilizing a mechanical cutter with sharp blade approved for the material being cut or trimmed.

D. Placing and Laying of the Pipe:
1. Examine the pipe for defects and tap with a light hammer to detect cracks while suspended in the sling before lowering into the trench. Reject all damaged, defective or unsound pipe and remove from the site of the work.
2. Deflection from a straight line and grade, as may be required by vertical or horizontal curves and offsets, not to exceed the normal manufacturer's recommended allowance for the type of joint employed. If alignment requires deflections in excess of the above limitations, provide special bends or a sufficient number of shorter lengths of pipe to provide angular deflections within the limits set forth.
3. Place pipe in the trench and bed as specified in Section 3.8(A).

E. Tracer Wire: Install a continuous 12 gauge insulated tracing wire along all non-metallic pressure pipelines (Refer to Water Panel 10). The wire shall be secured to the pipeline by a minimum of one tie per joint or wrapped around the pipe one time per joint. Access to the wire shall be provided at every mainline and hydrant valve box. Color of wire insulation shall be blue. Maximum tracing wire length shall be 1000' without terminating in a valve box or intermediate detector site (dummy valve box). Intermediate detector sites shall not be located in pavement areas. Place precast circular concrete collar over dummy valve box (Ref. Water Panel 10). Splices shall be kept to a minimum, but if required, shall be made with a water tight connector rated for direct burial service. . Should the type of pipe material transition to iron pipe, the tracing wire shall be terminated at an intermediate detector site. All water mains shall be detectable within three (3) feet with electronic locating equipment. Water mains that are installed by a trenchless method (i.e. directional drill), four #14 wires shall be installed with the pipe and

connected to the tracer wire at both ends or cad welded to the existing iron pipe at both ends.

Prior to scheduling a final inspection with BCWS, the Contractor shall demonstrate that the locator wire functions properly by providing BCWS with a certificate of continuity test from a third party.

F. Warning Tape: Place continuous 6” wide brightly colored warning tape, imprinted to read in large capital letters “CAUTION - BURIED WATER MAIN BELOW”, or other similar wording approved by BCWS, over all new piping, 24” below grade.

G. Line Marker: Install Pipeline Marker every 1,000’ along water mains and above fittings where alignment changes, and/or as directed by BCWS.

3.9 BACKFILLING

A. General:
   1. Backfill to a point 2 feet above the top of the pipe with material free of roots, stones, clods, or other unsuitable material. Thoroughly tamp material in 6 inch layers by means of a mechanical tamper, tamping iron or similar tool. Perform tamping with care so as not to disturb the pipe. Place and tamp backfill under the haunches of the pipe with special care.
   2. Perform the remainder of backfilling with machinery. Place excess dirt over the ditch and keep in neat order at all times until the system is completed. Fill any holes or depressions that develop. At the completion of the work, level backfill material and leave in good condition.
   3. Place flowable fill as backfill material for utility trenches at street intersections and at street crossings. Reference Section 02511 – Flowable Fill.

B. The backfilling, up to the level of 2 feet above top of pipe, will not be permitted with water standing in the trench. If water is present, the trench must be dewatered and kept dewatered during the placing and tamping of the initial backfilling layer.

3.10 JOINTING

A. Install mechanical joints and restrained joints in accordance with Section 3.4 of AWWA C600.

B. Install rubber gasket joints for PVC pressure pipe in accordance with Section 5.5 of AWWA C605.

3.11 SETTING FIRE HYDRANTS

A. Set hydrants on a suitable base of concrete or crushed stone. Plumb all hydrant stems. Before installing any hydrant, take care to ensure that all foreign material is removed from the interior of the barrel. Open and close the hydrant to ensure that all parts are in proper working condition. After hydrant has been set and secured in place and reaction blocking concrete placed and cured, place clean crushed stone around base of each hydrant and about the supporting base to a height of 12" above the connecting pipe. Extend stone fill at least 18" away from the barrel in all directions. Thoroughly compact all backfill around hydrants to the surface of the ground or to grade for surfaced areas.

B. Set hydrants plumb in all directions and with pumper nozzle perpendicular to and facing the roadway.

C. Set hydrants to grade, with breaking flange two inches above ground.

D. Provide a drainage pit for the hydrant weep holes. Encase elbow of hydrant in gravel to 6 inches (150 mm) above drain opening. Hydrant drains shall not be connected to or located within 10 feet of sewer systems.

E. Provide joint restraint as indicated on the Drawings.

3.12 SETTING VALVES AND VALVE BOXES

A. Install valves and valve boxes as shown on the drawings or as directed by the OWNER. Clean valve interiors of all foreign matter before installation. Inspect valve in both opened and closed positions to ensure that all parts are in proper working condition.

B. Set valves on solid bearing.

C. Center and plumb valve box over valve. Set box cover flush with finished grade or as directed by the OWNER.

D. Valve Marker: Place valve marker at all water distribution system valve locations or as directed by the OWNER.

3.13 SETTING AIR RELEASE VALVES AND MANHOLES

A. Automatic air release valves shall be placed at high points in the water main to prevent air locking.

B. Install air release valves in precast manholes with frames and covers.

C. Install valves and manholes as shown on the Drawings or as directed by the Engineer. Clean valve interiors of all foreign matter before installation. Inspect valve in both the opened and closed positions to ensure that all parts are in proper working condition.

D. Provide thrust restraint as specified in paragraph 3.14 of this Section.

3.14 THRUST RESTRAINT

A. All sections of water main identified as “PVC” or “DI” on the drawings are to be constructed of standard pipe and ductile iron fittings as specified in this Section. All associated plugs, caps, valves, tees, branches, and bends utilized in conjunction with PVC or DI water mains are to be restrained.

B. All sections of water main that are to be restrained in accordance with BCWS standards are to be clearly identified on both the construction and record drawings.

C. Provide additional thrust restraint at any other points where, in the opinion of the OWNER, hydraulic thrust may develop (Refer to Common Panel 3).

D. Ductile Iron Push-on Joint Pipe, Fittings, and Valves : Please see Appendix F29 BCWS Approved Parts List.

E. Ductile Iron Mechanical Joint Pipe, Fittings, Hydrants, and Valves: Please see Appendix F29 BCWS Approved Parts List.

F. PVC Push-on Joint Pipe, Fittings, and Valves: Please see Appendix F29 BCWS Approved Parts List.

3.15 CONNECTIONS TO EXISTING SYSTEM

Connection to the existing system will be made by, and at the expense of, the Contractor. The Contractor will provide and install appurtenances as required and shown on the Drawings. Coordinate connections to existing system with BCWS.

3.16 INSPECTION AND TESTING

A. Perform pressure and leakage testing in accordance with the requirements of Section 02670 - Water Main Testing and Acceptance.

B. Pressure and leakage testing must be completed prior to disinfection.

3.17 DISINFECTION

A. Flush and disinfect system in accordance with Section 02675 - Disinfection of Potable Water Mains.

B. The lab report for analytical testing must provide the chlorine residual at each sample point as well as the bacteriological test result for each sample point. The Contractor is responsible for coordinating and providing these services.

C. Minimize the potentially adverse environmental impact of heavily chlorinated disinfecting water as specified in Section 02675. If any adverse impact occurs, promptly notify the SCDHEC and institute mitigating measures accordingly.

3.18 SETTING METER BOXES

All meter boxes will be installed as shown in the plans. Care of the box will be the Contractors and the Developers responsibility until final landscaping is complete and the meter has been installed.

3.19 BACKFLOW PREVENTOR ASSEMBLIES

A. A Reduced-Pressure Principle Assembly shall be installed 12” (from the bottom of the assembly) above the finished elevation.

B. A Pressure Vacuum Breaker shall be installed 12” above the highest irrigation head in the system.

C. A Double Check Valve Assembly shall be installed 12” (From the bottom of the assembly) above finished elevation.

D. All backflow assemblies shall be installed within 3 feet of the meter. Exceptions to this will be evaluated on a case by case basis.

END OF SECTION

WATER MAIN TESTING AND ACCEPTANCE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Hydrostatic testing of potable water mains.

1.2 RELATED SECTIONS

A. Section 02665 – Potable Water Mains

B. Section 02675 – Disinfection of Potable Water Mains

C. Section 02676 – New Construction Water Usage

PART 2 PRODUCTS

2.1 TEST MATERIALS

A. Furnish all equipment, necessary piping, pipe access taps, pumps, meters, gauges, and required labor for use in testing.

2.2 WATER USAGE

A. Once the new water mains are connected to the BCWS water system, the Contractor shall coordinate filling, pressure testing, disinfection, and flushing of the new mains.

B. Any use of BCWS water must be coordinated with BCWS (843 572-4400) in accordance with Section 02676 – New Construction Water Usage. BCWS will set water flow rates and volumes as well as the time and duration of availability.

PART 3 EXECUTION

3.1 GENERAL

A. Field test the entire length of all new potable water mains and appurtenant structures and devices for tightness as described in this Section. Devices include, but are not limited to, hydrants, curb stops on services without meter boxs, and water services that will be connected to meter boxes without the use of curb stop.

B. Schedule timing and sequence of testing, subject to the approval of BCWS. Provide BCWS with a minimum of 72 hours notice prior to the start of any test. The Engineer and BCWS representative must observe all tests. The Contractor shall successfully pre-test the system prior to scheduling testing with BCWS.

C. Repair any leaks discovered during the initial filling of the water mains and during the testing sequence. Repair all known and visible leaks, whether or not the leakage rate is within allowable limits.

D. Note presence of leaks and repair activities on the test report form for any affected section of water main and provide a copy to the Engineer and BCWS.

3.2 WATER MAIN FLUSHING PROCEDURE

A. Flush water main section thoroughly at flow velocities greater than 2.5 feet per second, adequate to remove debris from pipe and valve seats.

B. Exercise valves and hydrants during line flushing to clean out seats. Provide blow-off points, as shown on the drawings, to achieve flushing velocities.

3.3 WATER MAIN PRESSURE TESTING PROCEDURE

A. Pressure test all sections of the water main and appurtenances subject to internal pressure in accordance with AWWA C600. A section of the water main will be considered ready for testing after completion of all thrust restraint and backfilling.

B. Provide temporary blocking, bulkheads, flanges and plugs as necessary to assure all new pipe, valves and appurtenances will be pressure tested.

C. Before applying test pressure, completely expel air from the water mains and all appurtenances. Utilize blow-off points, as shown on the drawings, to expel air as line is filled with water.

D. Notify the BCWS in accordance with paragraph 2.2 of this Section. Fill pipeline slowly with water from the BCWS system. Utilize an accurate water meter and pump arrangement to pump the line to the specified test pressure.

E. If water main is tested in sections, ensure that the differential pressure at valves and hydrants does not exceed the manufacturer's pressure rating. Where necessary, provide temporary backpressure to meet any differential pressure restrictions. Do not operate valves and hydrants in either the opening or closing direction at differential pressures above their rated pressure.

F. Measure test pressure at the lowest point in the test segment. Maintain test pressure for a minimum of two hours. Provide a test pressure of 150 psi or 1.5 times the working pressure in the finished water main, whichever is greater.

G. Do not allow a variance in the test pressure of more than 5 psi for the test duration. If the pressure drops more than 5 psi at any time during the test period, restore the pressure to the specified test pressure. Provide an accurate pressure gauge, four inches in diameter, with a range of pressure large enough to allow the specific test pressure to fall in the middle of the range (i.e. for 150 psi test pressure need 300 psi range on gage). Face gradations shall be at 20 psi intervals with tick marks every one psi, or equal approved by BCWS.

H. Definition of Leakage: The quantity of water that is pumped and metered into the test section to maintain test pressure within 5 psi of the specified test pressure for the test duration, plus the quantity of water required to return line to test pressure at the end of the test.

I. Test Results: Reject test section if the leakage exceeds the limits determined by the AWWA allowable leakage rate as stated in Section C605 and C600 as follows:

Ductile Iron	PVC
$L = \frac{SD(P)^{0.5}}{148{,}000}$	$L = \frac{ND(P)^{0.5}}{8{,}223}$

For the ductile iron pipe equation, "L" is the allowable leakage in gallons per hour, "S" is the length of water main tested in feet, "D" is the nominal diameter of the water main in inches, and "P" is the test pressure in pounds per square inch (psi).

For the PVC pipe equation, "L" is the allowable leakage in gallons per hour, "N" is the number of joints in the length of water main tested, "D" is the nominal diameter of the water main in inches, and "P" is the test pressure in pounds per square inch (psi).

J. If the leakage test result is unacceptable, locate and repair the cause of the failed test, and then retest the affected portion of the water main. Repair leaks in accordance with paragraph 3.1 of this Section.

3.4 FINAL ACCEPTANCE

A. No pipeline installation will be accepted until all known and visible leaks have been repaired in accordance with paragraph 3.1 of this Section.

B. Certify that all required flushing and pressure testing has been successfully completed before final acceptance of BCWS.

END OF SECTION

DISINFECTION OF POTABLE WATER MAINS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Disinfection of potable finished water transmission main and water distribution system mains and any surfaces that will be in contact with potable water.

B. Testing and reporting results.

1.2 RELATED SECTIONS

A. Section 02665 - Potable Water Mains

B. Section 02670 - Water Main Testing and Acceptance

C. Section 02676 – New Construction Water Usage

1.3 REFERENCES (LATEST EDITION)

A. AWWA B300 - Standard for Hypochlorites.

B. AWWA B301 - Standard for Liquid Chlorine.

C. AWWA B303 - Standard for Sodium Chlorite.

D. AWWA C605 - Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water (Reference Section 7.4 - Disinfecting).

E. AWWA C651 - Standard for Disinfecting Water Mains.

F. South Carolina State Primary Drinking Water Regulations: R.61-58 (Reference paragraph R.61-58.4(D)(f)).

1.4 SUBMITTALS FOR INFORMATION

A. Section 01300 – Submittals: Procedure for submittals.

B. Test Reports: Include results comparative to specified requirements.

C. Cetificate: Certify that cleanliness of water distribution system meets or exceeds specified requirements.

1.5 PROJECT RECORD DOCUMENTS

A. Disinfection report:
   1. Type and form of disinfectant used.
   2. Date and time of disinfectant injection start and time of completion.
   3. Test locations.
   4. Initial and 24 hour disinfectant residuals (quantity in treated water) in ppm for each outlet tested.
   5. Date and time of flushing start and completion.
   6. Disinfectant residual after flushing in ppm for each outlet tested.

B. Bacteriological report:
   1. Date issued, project name, and testing laboratory name, address, and telephone number.
   2. Time and date of water sample collection.
   3. Name of person collecting samples.
   4. Test locations.
   5. Initial and 24 hour disinfectant residuals in ppm for each outlet tested.
   6. Coliform bacteria test results for each outlet tested.
   7. Certification that water conforms, or fails to conform, to bacterial standards of zero coliform and <80 non-coliform bacterial colonies per 100 ml.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with AWWA C651.

B. Testing Firm: Laboratory contracted to analyze samples shall be certified by the SCDHEC for coliform and non-coliform bacteria testing.

PART 2 PRODUCTS

2.1 DISINFECTION CHEMICALS

A. Chemicals: AWWA B300, Hypochlorite, AWWA B301, Liquid Chlorine, and AWWA B303, Sodium Chlorite.

2.2 WATER

A. Once the new water mains are connected to the BCWS water system, the Contractor shall coordinate the delivery of water for the purpose of filling, pressure testing, disinfection, and flushing of the new mains with the BCWS.

B. Any use of BCWS water must be coordinated with BCWS (843 572-4400) in accordance with Section 02676 – New Construction Water

Usage. BCWS will set water flow rates and volumes as well as the time and duration of availability.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that piping system has been cleaned, flushed, and pressure tested.

B. Perform scheduling and disinfecting activity with start-up, testing, adjusting and balancing, demonstration procedures, including coordination with related systems.

C. Engineer's representative shall verify chlorine residual levels to confirm that it is within the range of the existing distribution system, preferably using the Hach Pocket Colorimeter Model 46700-00 on the Low-End Levels.

3.2 EXECUTION

A. Perform disinfection of new water mains in accordance with AWWA Standard for Disinfecting Water Mains, C651. Use one of three methods of chlorination: Tablet Method, Continuous-Feed Method, or Slug Method.

B. Exercise all valves and hydrants contained within the section of main being tested. Maintain isolation of water mains to be disinfected and tested.

C. Dependent upon chlorination method used, achieve required chlorine concentrations and maintain disinfectant in system for the prescribed periods. At the end of the test period, check for the presense of the required free chlorine residual. Flush the tested section until free chlorine residual is no higher than that generally prevailing in the existing distribution system or is acceptable for domestic use. Include the chlorine residual reading on the Chain of Custody form.

D. Flush heavily chlorinated water in such a manner as not to damage the environment. Use neutralizing chemicals as may be required.

E. Two consecutive satisfactory bacteriological tests, taken at least 24 hours apart, are required at each sample site. The number of sample sites varies depending on the amount of new construction, but must be representative of the water in the newly constructed mains. Samples will be taken at each dead end and at a minimum of every 1,200 linear feet of

new water main. Include a schedule of how to determine the number of samples to be taken.

F. Upon completion of the disinfection procedure, reduce the chlorine residual to levels required for discharge to the environment. Treat disposed water with sulfur dioxide or other reducing agent to neutralize chlorine residual.

G. The lab report for analytical testing must provide the chlorine residual at each sample point as well as the bacteriological test result for each sample point. If the membrane filter analysis method is used for bacteriological testing, non-coliform growth must also be provided. If the non-coliform growth is greater than 80 colonies per 100 milliliters, the sample result is invalid and must be repeated. All samples analyzed must show the water line to be absent of total coliform bacteria. The Contractor is responsible for coordinating and providing these services.

3.3 FIELD QUALITY CONTROL

A. Representative of BCWS must be present during sample collection.

B. Collect and transport samples in accordance with the quality control procedures of the contract laboratory.

END OF SECTION

NEW CONSTRUCTION WATER USAGE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Procedures for coordinating and reporting water usage for filling, pressure testing, disinfection and flushing.

1.2 RELATED SECTIONS

A. Section 02665 – Potable Water Mains

B. Section 02670 – Water Main Testing

C. Section 02675 – Disinfection of Potable Water Mains

PART 2 EXECUTION

2.1 BACKFLOW PREVENTION AND METERING DURING CONSTRUCTION

Any extension to the BCWS water system must be constructed in a manner that eliminates the possibility of back-flow of water from the non-approved system into the active BCWS system and provides the ability to meter water use. To achieve this, the following method shall be used:

1. At the beginning of construction, a temporary backflow preventer and meter (both approved by BCWS) shall be supplied and installed by the Contractor in-line between the tapping valve, or stub-out, and the water extension. The backflow preventer shall be tested and certified by a SCDHEC licensed tester and the test results provided to BCWS prior to being placed into operation. The engineer shall determine the size backflow preventer necessary to achieve 2.5 feet/sec flushing velocity for a given size pipe.
2. Once the SCDHEC permit to operate has been issued for the new section, the backflow assembly shall be removed by the Contractor and replaced with a spool piece and MJ sleeve(s). Any other connection points to the BCWS system shall be provided with an air gap of three (3) feet between the new pipe and the existing stub out or wet tap. All temporary backflow installations shall be inspected and approved by a BCWS Inspector before being placed into operation.

In the case of a water project that has multiple connection points with the BCWS system, the BCWS Engineering Department will determine the optimum location for a single water-supply connection. Final tie-in to all other connection points shall only be made after the Permit to Operate has been issued by SCDHEC.

2.1 FILLING

A. After a new line is installed and prior to filling, the Engineer will calculate the volume of water needed to fill the line. This information will be forwarded to the BCWS Engineering Department along with a request to fill the line. This information will be required 7 days in advance of filling any new lines.

2.2 FLUSHING

A. Once the Contractor is ready to flush in preparation for bacteriological testing, the Contractor will coordinate with the BCWS Egnineering Department 7 days in advance.

END OF SECTION

WATER AND SANITATION

BERKELEY-DORCHESTER REACH INTERCONNECT DIVISION I

BERKELEY COUNTY, SC

EDA # 04-07-07-289

PREPARED FOR:

BERKELEY COUNTY

1003 HIGHWAY 52
PO BOX 6122
MONCKS CORNER, SC 29461

TM# MULTIPLE

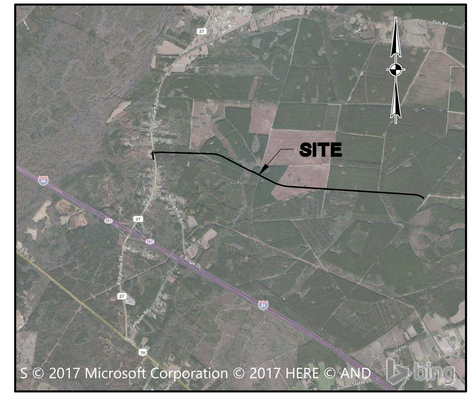
JANUARY 11, 2021

J-26926.0000

IF ARCHEOLOGICAL MATERIALS ARE ENCOUNTERED DURING CONSTRUCTION, THE PROCEDURES CODIFIED AT 22 CFR 800.13(B) WILL APPLY AND EDA AND THE SOUTH CAROLINA STATE HISTORICAL PRESERVATION OFFICE SHALL BE CONTACTED IMMEDIATELY. ARCHEOLOGICAL MATERIALS CONSIST OF ANY ITEMS, FIFTY YEARS OR OLDER WHICH WERE MADE OR USED BY MAN. THESE ITEMS INCLUDE, BUT ARE NOT LIMITED TO, STONE PROJECTILE POINTS (ARROWHEADS), CERAMIC SHERDS, BRICKS WORKED WOOD, BONE AND STONE, METAL AND GLASS OBJECTS, AND HUMAN SKELETAL REMAINS.

PREPARED BY:

THOMAS & HUTTON
Engineering | Surveying | Planning | GIS | Consulting



VICINITY MAP
SCALE: 1" = 4,000'

BERKELEY-DORCHESTER REACH INTERCONNECT
J-26926.0000
01/11/21

Sheet List Table	
Sheet Number	Sheet Title
C0	COVER SHEET
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EC1.0	EROSION CONTROL NOTES
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EC1.3	EROSION CONTROL DETAILS

REVISION HISTORY

REV. NO.	REVISION	BY	DATE
4	DIVISION 1	JTB	01-11-2021
3	PER 90% BCWS COMMENTS	JTB	10/17/2019
2	PER 60% BCWS COMMENTS	JTB	6/26/2019
1	PER 30% BCWS COMMENTS	JTB	9/9/2019

SUBMITTAL HISTORY

SUBMITTED TO	DATE
PTC	4/23/20
SCDHEC	1/22/20
USACE	1/14/20
SCDOT	11/7/19
BC ROAD & BRIDGE	10/31/19
BCWS	7/9/19

SOUTH CAROLINA PROFESSIONAL ENGINEER No. 29974 1/14/21 LEIGHAM TON BRANCH

SOUTH CAROLINA THOMAS & HUTTON ENGINEERING CO. No. C00285 CERTIFICATE OF AUTHORIZATION

811 Know what's below. Call before you dig.

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Engineering | Surveying | Planning | GIS | Consulting
1501 Main Street • Suite 760
Columbia, SC 29202
p.803.451.6789 f.803.451.6776
www.thomasandhutton.com

EROSION CONTROL LEGEND

DESCRIPTION	PLAN SYMBOL
SILT FENCE	
CLEARING LIMITS	CL CL
LIMITS OF DISTURBANCE	LOD
SUBSURFACE DRAIN	SSD
TREE PROTECTION	
TEMPORARY SEEDING	TS
PERMANENT SEEDING	PS
SODDING	SO
RIPRAP	
OUTLET PROTECTION – RIP RAP	
SEDIMENT TRAP	
ROCK CHECK DAM	OR
STABILIZED CONSTRUCTION ENTRANCE	
STORM DRAIN INLET PROTECTION – TYPE A FILTER FABRIC	A
STORM DRAIN INLET PROTECTION – TYPE E SURFACE COURSE CURB INLET FILTER	E

DRAINAGE LEGEND

DESCRIPTION	EXISTING	PROPOSED
PIPE		
DITCH		
CURB INLET		
GRATE INLET		
JUNCTION BOX		
OUTLET STRUCTURE		

WATER LEGEND

DESCRIPTION	EXISTING	PROPOSED
WATER MAIN	10"W	10"W
SINGLE SERVICE LATERAL		
DOUBLE SERVICE LATERAL		
VALVE AND BOX		
FIRE HYDRANT W/VALVE & BOX		
POST HYDRANT		
REDUCER		
BACKFLOW PREVENTOR		
CROSS		
TEE		
90° BEND – HORIZONTAL		
45° BEND – HORIZONTAL		
22–½° BEND – HORIZONTAL		
11–¼° BEND – HORIZONTAL		
BEND – VERTICAL		
CAP		

ABBREVIATIONS

HDPE	HIGH DENSITY POLYETHYLENE		JB	JUNCTION BOX		SDMH	STORM DRAINAGE MANHOLE
BOT	BOTTOM		LF	LINEAR FEET		SF	SQUARE FEET
CI	CURB INLET		MAX	MAXIMUM		SS	SANITARY SEWER
CPP	CORRUGATED PLASTIC PIPE		MIN	MINIMUM		TC	TOP OF CURB
DIP	DUCTILE IRON PIPE		MH	MANHOLE		TG	TOP OF GUTTER
EL	ELEVATION		OC	ON CENTER		TP	TOP OF PAVEMENT
FG	FINISH GRADE		PC	POINT OF CURVE		TW	TOP OF WALK
FH	FIRE HYDRANT		PH	POST HYDRANT		TYP	TYPICAL
FM	FORCE MAIN (SANITARY SEWER)		PT	POINT OF TANGENT		W	WATER
FP	FINISH PAD		PVC	POLYVINYL CHLORIDE		W/	WITH
FR	FRAME		RCP	REINFORCED CONCRETE PIPE		WV	WATER VALVE
GI	GRATE INLET		RJP	RESTRAINED JOINT PIPE		YI	YARD INLET
GV	GATE VALVE		R/W	RIGHT-OF-WAY			
INV	INVERT ELEVATION		SD	STORM DRAINAGE			

GENERAL NOTES

1. CONTRACTOR SHALL COORDINATE TIE-IN OF NEW WATER FACILITIES TO BERKELEY COUNTY WATER & SANITATION.
2. CONTRACTOR SHALL MAINTAIN MINIMUM COVER OVER THE WATER MAIN PIPE BARREL OF 4'-0" UNLESS OTHERWISE INDICATED IN NO CASE SHALL THE WATER MAIN BE INSTALLED AT A LOWER ELEVATION THAN THAT SHOWN.
3. SHOULD PIPE, FITTINGS, AND OTHER MATERIALS BE NEEDED IN ADDITION TO THAT SHOWN ON THE DRAWINGS BECAUSE PIPELINE WAS NOT INSTALLED TO THE ALIGNMENT AND PROFILE SHOWN, THEN THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING THOSE NECESSARY MATERIALS AND PROVIDING THE EQUIPMENT AND LABOR TO INSTALL THEM TO MEET THE DESIGN INTENT OF THE WATERMAIN AT NO ADDITIONAL COST TO THE OWNER.
4. THE CONTRACTOR SHALL NOTIFY THE OWNER AND THE ENGINEER 72 HOURS IN ADVANCE OF ALL REQUIRED TESTS AND INSPECTIONS.
5. THE CONTRACTOR WILL NOTIFY THE ENGINEER IF UNSUITABLE MATERIAL IS DISCOVERED PRIOR TO BEGINNING ANY REMOVAL OPERATION.
6. ALL WATERMAINS SHALL BE POLYVINYL CHLORIDE (PVC C905) UNLESS OTHERWISE INDICATED.
7. SURVEYING AND BOUNDARY INFORMATION BY THOMAS & HUTTON
8. ALL ELEVATIONS SHOWN ARE BASED ON NAVD88.
9. TOPOGRAPHIC SURVEY BY THOMAS & HUTTON.
10. CONTRACTOR IS TO VERIFY ACCURACY OF ANY TEMPORARY BENCHMARKS SHOWN PRIOR TO UTILIZING THEM FOR CONSTRUCTION.
11. THE EXISTING UNDERGROUND UTILITIES SHOWN HEREON ARE BASED UPON AVAILABLE INFORMATION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATION OF ALL UTILITIES OTHER THAN THOSE SHOWN ARE ENCOUNTERED DURING CONSTRUCTION , THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY AND TAKE STEPS TO PROTECT THE LINE(S) AND ENSURE CONTINUED SERVICE. DAMAGE CAUSED TO EXISTING UTILITIES BY THE CONTRACTOR SHALL BE REPAIRED BY THE CONTRACTOR. ADDITIONALLY, THE CONTRACTOR SHALL CONFIRM THE CONNECTION POINTS OF NEW UTILITIES TO EXISTING UTILITIES PRIOR TO BEGINNING NEW CONSTRUCTION.
12. IF WORK IS SUSPENDED OR DELAYED FOR 14 DAYS, THE CONTRACTOR SHALL TEMPORARILY STABILIZE THE DISTURBED AREA AT NO ADDITIONAL COST TO THE OWNER.
13. THE CONTRACTOR SHALL INSTALL ANY BARRICADES PRIOR TO BEGINNING CONSTRUCTION
14. ANY DAMAGE TO EXISTING PAVEMENT MUST BE REPAIRED AT CONTRACTORS EXPENSE AND TO THE SATISFACTION OF THE COUNTY ENGINEER AND THE PROJECT ENGINEER.
15. ALL RIGHT-OF-WAY AND DRAINAGE EASEMENT CONSTRUCTION SHALL MEET SCDOT STANDARD SPECIFICATIONS UNLESS SPECIFIED ELSEWHERE AND APPROVED IN WRITING BY THE COUNTY ENGINEER.
16. WHERE FIELD INSPECTIONS ARE REQUIRED BY THE COUNTY, THE CONTRACTOR SHALL NOTIFY THE ENGINEERING DIVISION A MINIMUM OF 72 HOURS IN ADVANCE TO SCHEDULE SUCH INSPECTIONS.
17. COMPLETE SET OF APPROVED DRAWINGS AND SPECIFICATIONS MUST BE MAINTAINED ON SITE AT ALL TIMES THAT THE CONTRACTOR IS PERFORMING WORK. THESE DRAWINGS SHALL BE MADE AVAILABLE UPON REQUEST.
18. THE CONTRACTOR SHALL INSTALL ALL EROSION CONTROL AND PREVENTION STRUCTURES SHOWN ON THE PLANS. BOTH MUST BE APPROVED BY BERKELEY COUNTY PRIOR TO BEGINNING ANY LAND DISTURBING ACTIVITIES.
19. CONTRACTOR WILL BE REQUIRED TO ADJUST MANHOLE FRAMES TO MATCH FINAL GRADE AT NO ADDITIONAL COST.
20. THE FOLLOWING NOTES ARE SPECIFIED BY THE SOUTH CAROLINA DEPARTMENT OF HEALTH ANDENVIRONMENTAL CONTROL – OFFICE OF OCEAN AND COASTAL RESOURCES MANAGEMENT (SCDHEC–OCRM) AND ARE TO BE EXECUTED BY THE CONTRACTOR:
    a. ALL SEDIMENT CONTROL MEASURES SHALL BE INSPECTED AT LEAST ONCE EVERY SEVEN CALENDAR DAYS AND AFTER ANY STORM EVENT OF GREATER THAN 0.5 INCHES OF PRECIPITATION DURING ANY 24–HOUR PERIOD. ALL SEDIMENT CONTROL FEATURES SHALL BE MAINTAINED UNTIL FINAL STABILIZATION HAS BEEN OBTAINED.
    b. STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE IN PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITIES HAVE TEMPORARILY OR PERMANENTLY CEASED, BUT IN NO CASE MORE THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED, UNLESS ACTIVITY IN THAT PORTION OF THE SITE WILL RESUME WITHIN 14 DAYS.
22. ALL EROSION AND SEDIMENT CONTROL DEVICES SHALL BE CONSTRUCTED SIMULTANEOUSLY WITH THE ARE STABILIZED. SILT BARRIERS WILL BE INSTALLED AS NECESSARY TO PREVENT EXCESSIVE
23. SEDIMENTATION OF DOWNSTREAM AREAS. DEVICES SHALL BE IN ACCORDANCE WITH THE MANUAL OF "EROSION AND SEDIMENT CONTROL PRACTICES FOR DEVELOPING AREAS" BY THE S.C. LAND RESOURCES CONSERVATION COMMISSION.
24. CONTRACTOR SHALL GRADE AREAS TO DRAIN FOR POSITIVE FLOW PRIOR TO FINAL APPROVAL.
25. ALL TRAFFIC CONTROL SIGNS AND PAVEMENT MARKINGS SHALL BE IN ACCORDANCE WITH THE MANUAL ON "UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS" AND "SOUTH CAROLINA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" BOTH CURRENT EDITIONS.
26. ALL AREAS DISTURBED WILL BE GRASSED IMMEDIATELY AFTER THE INSTALLATION. GRASSING SHALL BE IN ACCORDANCE WITH SECTION 810 OF THE SCDOT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION CURRENT EDITION. PAYMENT SHALL BE AS SHOWN IN THE BID FORM AND SHALL BE COMPENSATION FOR ALL NECESSARY WORK AND MATERIALS TO COMPLETE THE SEEDING IN ACCORDANCE WITH THESE SPECIFICATIONS. (SEE SPECIFICATIONS BELOW)
27. ALL DRAINAGE WILL BE MADE FUNCTIONAL DAILY AS WORK PROGRESSES.
28. EACH EXISTING ROAD WILL BE CLEANED UP AND RESTORED DAILY.
29. NEW PAVEMENT TO BE FLUSH WITH EDGE OF EXISTING PAVEMENT. ALL WATER VALVES SHALL COMPLY WITH SECTION 4.6 OF THE BCWS WATER SYSTEM STANDARDS AND SPECIFICATIONS.
30. FIRE HYDRANTS TO BE PLACED NO MORE THAN EVERY 1,000 FEET WHEN APPLICABLE.
31. SPACING ON ALL HYDRANTS SHALL BE 1,000' MEASUREMENTS WITHIN THE EXCEPTION OF AREAS WHERE DIRECTIONAL DRILL LENGTHS EXCEED 1,000 LF.

GENERAL INFORMATION

COUNTY	BERKELEY
TOWN	RIDGEVILLE
ZONING	FLEX–1 RNC GC

OWNER:
BERKELEY COUNTY
WATER & SANITATION
212 OAKLEY PLANTATION DRIVE
MONCKS CORNER, SC 29461
843–719–4028

ENGINEER:
THOMAS & HUTTON
1501 MAIN STREET, SUITE 760
COLUMBIA, SC 29201
803–451–6782

PREPARED FOR:

BERKELEY COUNTY WATER & SANITATION

212 OAKLEY PLANTATION DRIVE

843–719–4028

SURVEYOR: THOMAS & HUTTON
682 JOHNNIE DODDS BOULEVARD, SUITE 100
MOUNT PLEASANT, SC 29464

UTILITY: BERKELEY COUNTY WATER & SANITATION
212 OAKLEY PLANTATION DRIVE
MONCKS CORNER, SC 29461
843–761–8817

SOUTH CAROLINA — THOMAS & HUTTON ENGINEERING — No. C00285 — CERTIFICATE OF AUTHORIZATION

SOUTH CAROLINA — REGISTERED PROFESSIONAL ENGINEER — No. 29974 — 1/14/21 — LAUREN H. BROWN

NO.	REVISIONS	BY	DATE

THOMAS & HUTTON
1501 Main Street • Suite 760
Columbia, SC 29201 • 803.451.6789
www.thomasandhutton.com

BERKELEY COUNTY
BERKELEY COUNTY, SC

BERKELEY–DORCHESTER REACH INTERCONNECT

DIV. I – GENERAL NOTES & INDEX

JOB NO:	J-26926.0000
DATE:	01/11/21
DRAWN:	JTB
DESIGNED:	LHB
REVIEWED:	PLB
APPROVED:	LHB
SCALE:	N/A

G0.1

WESTVACO ROAD

SC HWY 27

T&H CONTROL POINT
PK NAIL
N: 479436.4592
E: 2212395.6381
ELEV.: 58.94 (NAVD88)

TMS
175-00-01-001
GREEN,
MARION &
GREEN, BETTY

TMS
175-00-01-003
JEFFERSON,
GEORGE

TMS 156-00-02-033
CAMP HALL ECONOMIC
DEVELOPMENT CORP.

TMS
157-00-00-003
SC PUBLIC
SERVICE
AUTHORITY

TMS
175-00-02-047
PAYNE, ANN

STA: 77+28
DIVISION I
BEGIN WATERLINE
CONSTRUCTION

C2.1 C2.2 C2.3 C2.4 C2.5 C2.6 C2.7 C2.8 C2.9 C2.10 C2.11 C2.12

AUTONOMOUS DRIVE

T&H CONTROL POINT
PK NAIL
N: 476458.7849
E: 2211964.3232
ELEV.: 57.24 (NAVD88)

T&H CONTROL POINT
3/4" REBAR ENCASED IN CONCRETE
WITH METAL CAP STAMPED "V-1"
N: 477,038.30
E: 2,227,841.24
ELEV.: 63.06 (NAVD88)

TMS
175-00-01-033
SR PROPERTIES
OF SUMMERVILLE
LLC

TMS
175-00-02-008
COMMERCIAL
PROPERTY
DEVELOPMENT
LLC

TMS
086-00-02-012.000
CARTER

TO COLUMBIA

INTERSTATE
SOUTH CAROLINA
26

TO CHARLESTON

STA: 234+53
DIVISION I
END WATERLINE
CONSTRUCTION

EXISTING 16" WATERLINE

VOLVO CAR DRIVE

TRAINING CENTER ROAD

TMS
176-00-01-001
SOUTH
CAROLINA
PUBLIC SVC
AUTH

GRAPHIC SCALE
600 0 300 600 1200 2400
(IN FEET)
1 inch = 600 ft.

STATE OF SOUTH CAROLINA
NOLTENIUS
THOMAS & HUTTON ENGINEERING
No. C00285
CERTIFICATE OF AUTHORIZATION

STATE OF SOUTH CAROLINA
LEE H. BARFIELD
No. 29974
1/14/21
REGISTERED PROFESSIONAL ENGINEER

NO.	REVISIONS	BY	DATE

THOMAS & HUTTON
1501 Main Street • Suite 760
Columbia, SC 29201 • 803.451.6789
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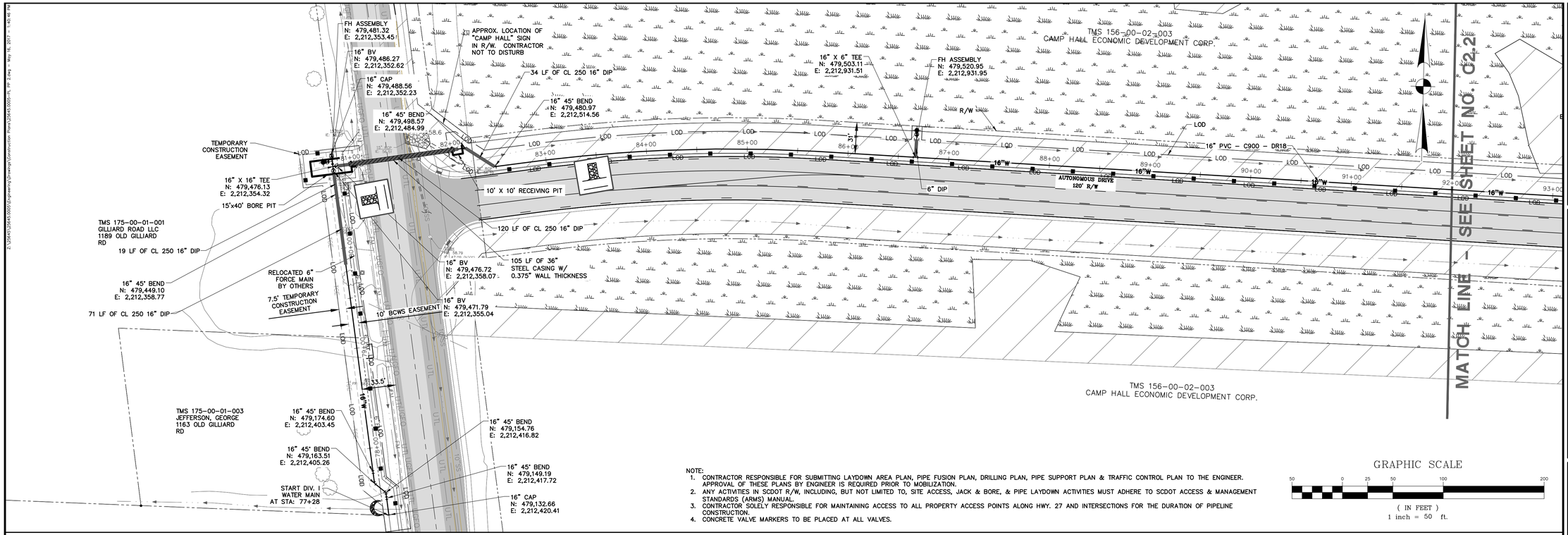
BERKELEY COUNTY
BERKELEY COUNTY, SC

BERKELEY–DORCHESTER REACH INTERCONNECT

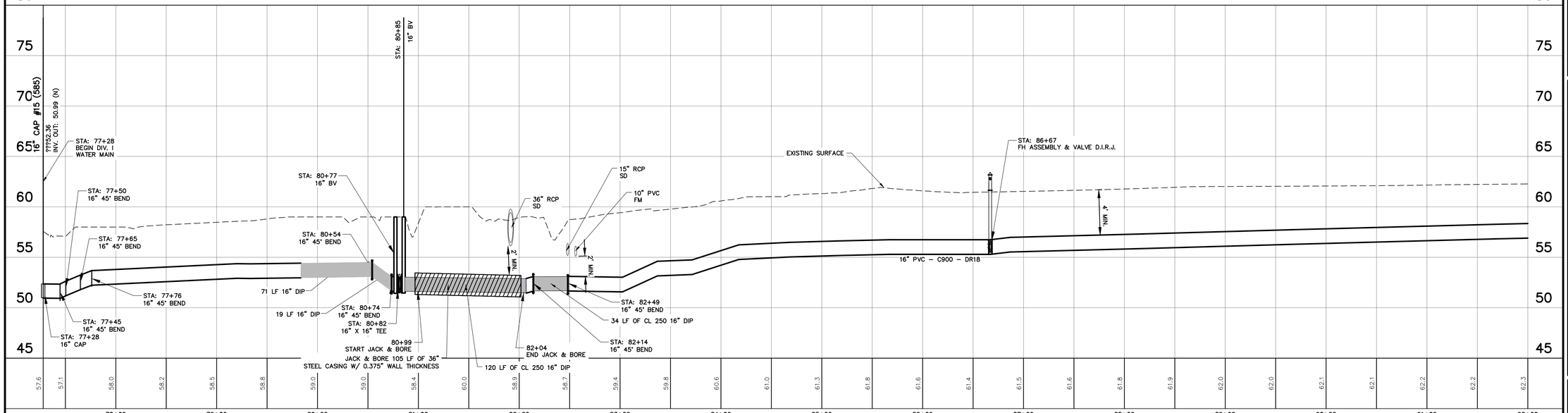
DIV. I – OVERALL SITE PLAN

JOB NO:	J-26926.0000
DATE:	01/11/21
DRAWN:	JTB
DESIGNED:	LHB
REVIEWED:	PLB
APPROVED:	LHB
SCALE:	1" = 600'

C1.0



NOTE:
1. CONTRACTOR RESPONSIBLE FOR SUBMITTING LAYDOWN AREA PLAN, PIPE FUSION PLAN, DRILLING PLAN, PIPE SUPPORT PLAN & TRAFFIC CONTROL PLAN TO THE ENGINEER. APPROVAL OF THESE PLANS BY ENGINEER IS REQUIRED PRIOR TO MOBILIZATION.
2. ANY ACTIVITIES IN SCDOT R/W, INCLUDING, BUT NOT LIMITED TO, SITE ACCESS, JACK & BORE, & PIPE LAYDOWN ACTIVITIES MUST ADHERE TO SCDOT ACCESS & MANAGEMENT STANDARDS (ARMS) MANUAL.
3. CONTRACTOR SOLELY RESPONSIBLE FOR MAINTAINING ACCESS TO ALL PROPERTY ACCESS POINTS ALONG HWY. 27 AND INTERSECTIONS FOR THE DURATION OF PIPELINE CONSTRUCTION.
4. CONCRETE VALVE MARKERS TO BE PLACED AT ALL VALVES.



26926.0000 – WATER MAIN
STATIONS: 77+28 – 92+00
SCALE: HORZ.: 1" = 50'
VERT.: 1" = 5'

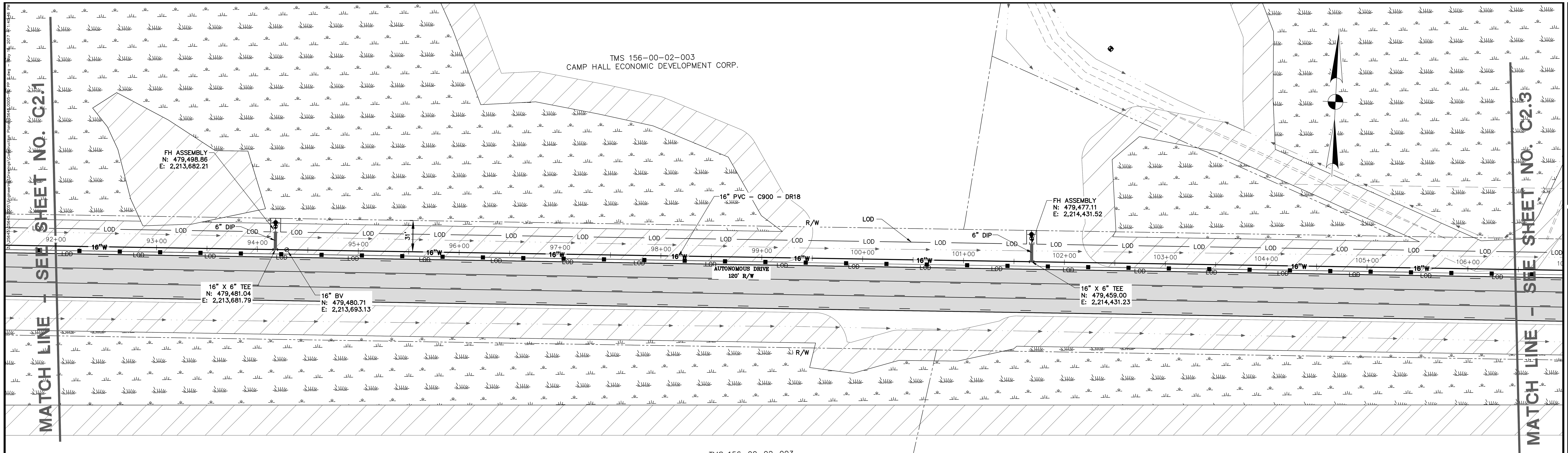
THOMAS & HUTTON
1501 Main Street • Suite 760
Columbia, SC 29201 • 803.451.6789
www.thomasandhutton.com

NO.	REVISIONS	BY	DATE

BERKELEY COUNTY
BERKELEY COUNTY, SC
BERKELEY–DORCHESTER REACH INTERCONNECT
DIV. I – WATER MAIN PLAN & PROFILE

JOB NO:	J-26926.0000
DATE:	01/11/21
DRAWN:	JTB
DESIGNED:	LHB
REVIEWED:	PLB
APPROVED:	LHB
SCALE:	AS NOTED

C2.1



NOTE:

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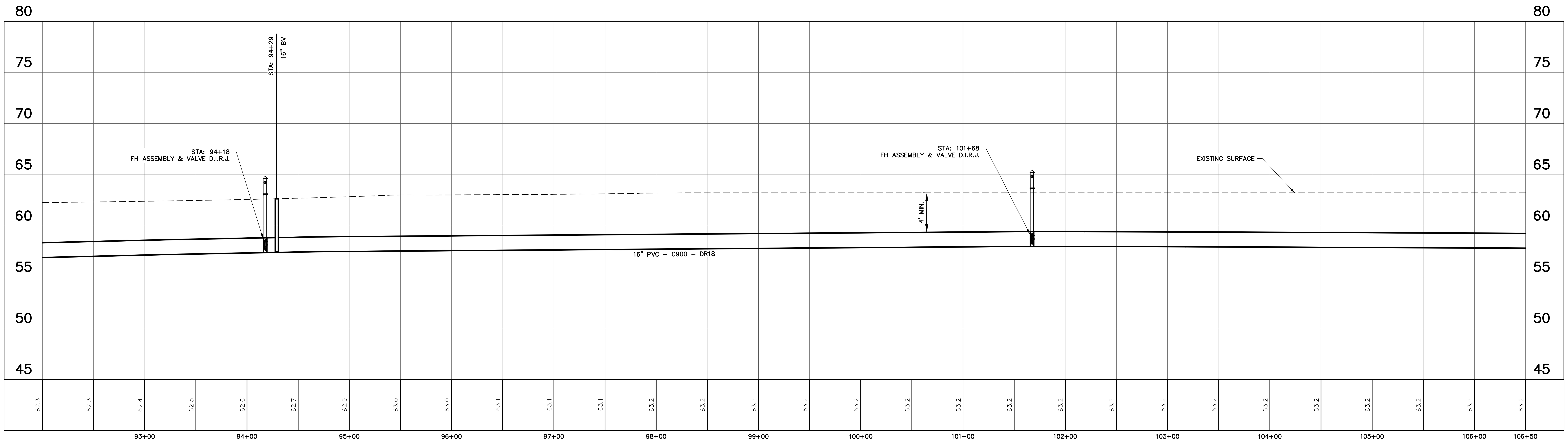
4. CONCRETE VALVE MARKERS TO BE PLACED AT ALL VALVES.

GRAPHIC SCALE

(IN FEET)
1 inch = 50 ft.



26926.0000 - WATER MAIN
STATIONS: 92+00 - 106+50
SCALE: HORZ.: 1" = 50'
VERT.: 1" = 5'

THOMAS & HUTTON
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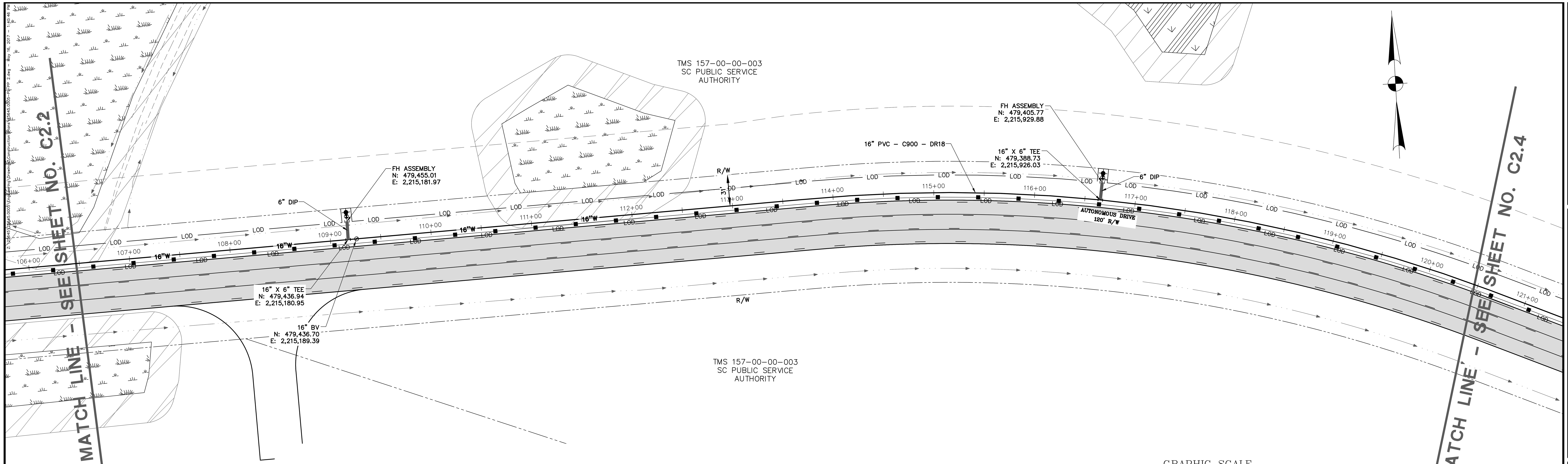
www.thomasandhutton.com

BERKELEY COUNTY
BERKELEY COUNTY, SC
BERKELEY-DORCHESTER REACH INTERCONNECT
DIV. I - WATER MAIN PLAN & PROFILE

JOB NO:	J-26926.0000
DATE:	01/11/21
DRAWN:	JTB
DESIGNED:	LHB
REVIEWED:	PLB
APPROVED:	LHB
SCALE:	AS NOTED

C2.2



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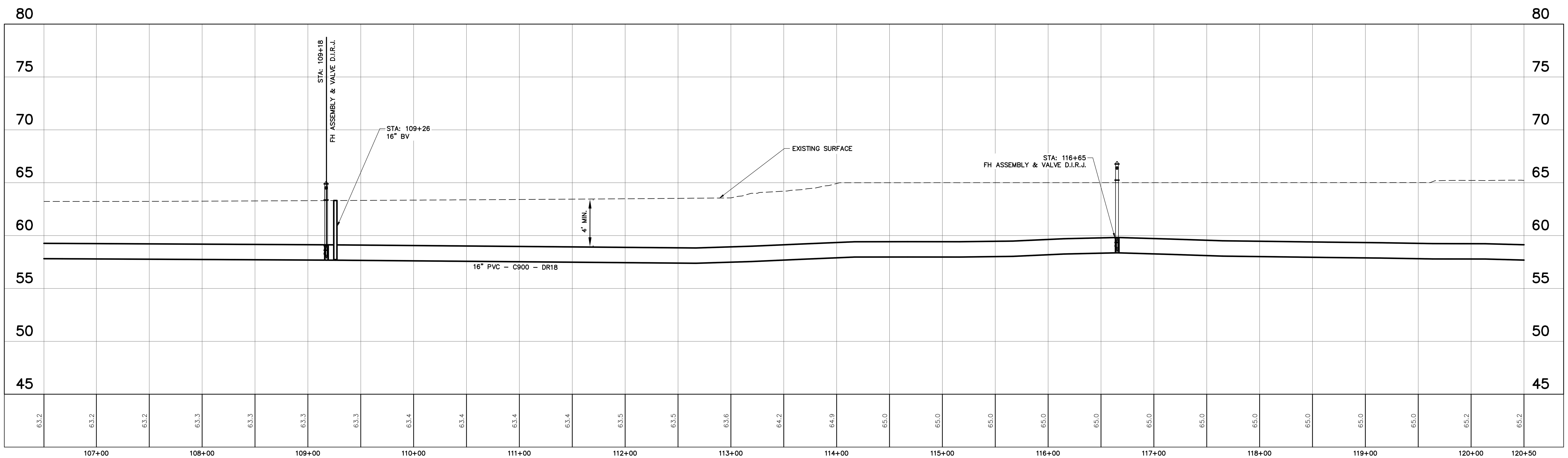

26926.0000 - WATER MAIN
STATIONS: 106+50 - 120+50
SCALE: HORZ.: 1" = 50'
VERT.: 1" = 5'

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BERKELEY COUNTY
BERKELEY COUNTY, SC
BERKELEY-DORCHESTER REACH INTERCONNECT
DIV. I - WATER MAIN PLAN & PROFILE

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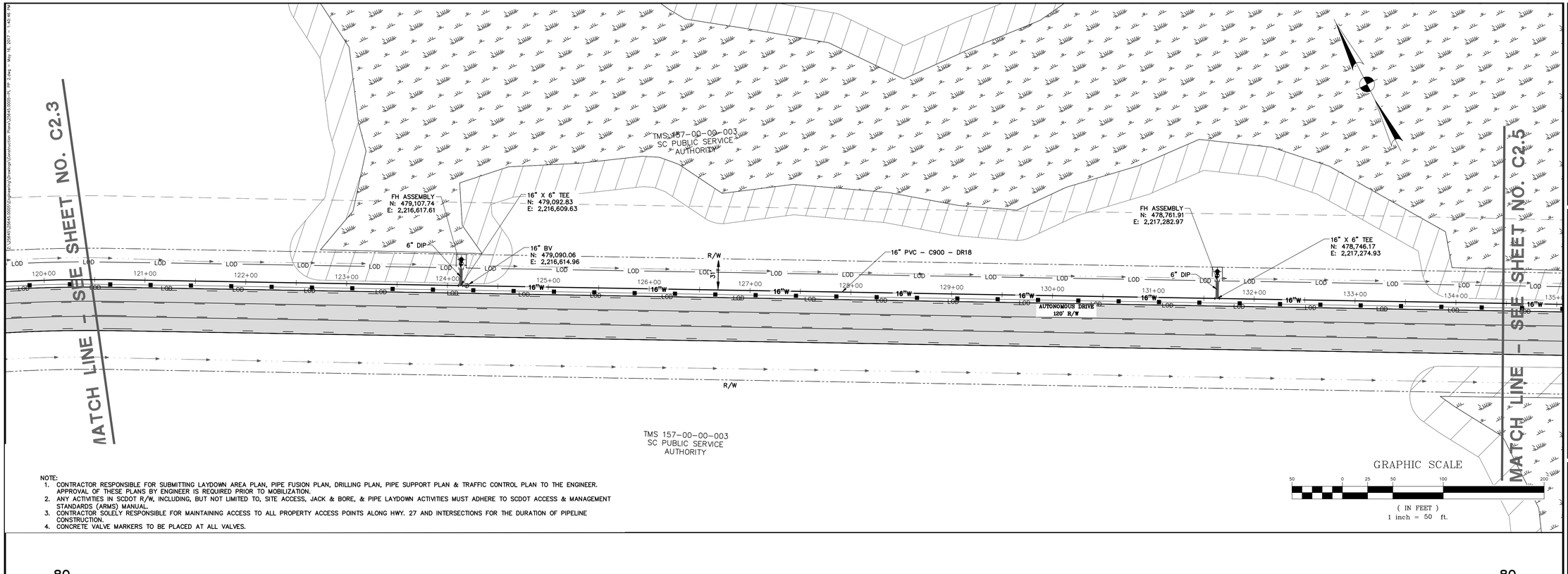
SCALE:	AS NOTED

C2.3



GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

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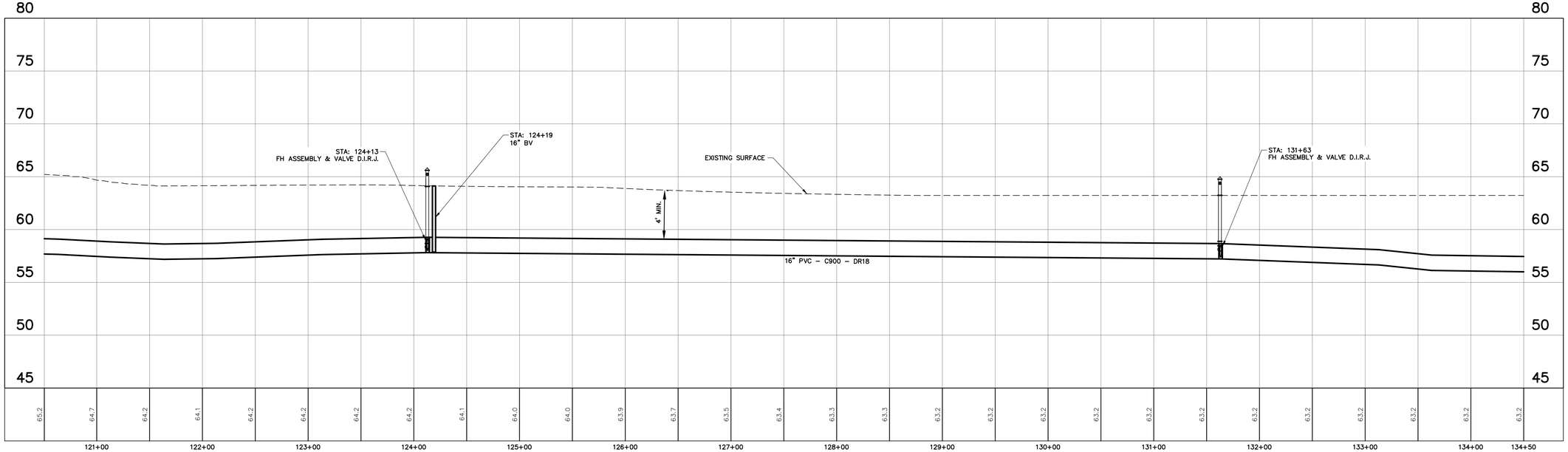

26926.0000 – WATER MAIN
STATIONS: 120+50 – 134+50
SCALE: HORZ.: 1" = 50'
VERT.: 1" = 5'

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DRAWN:	JTB
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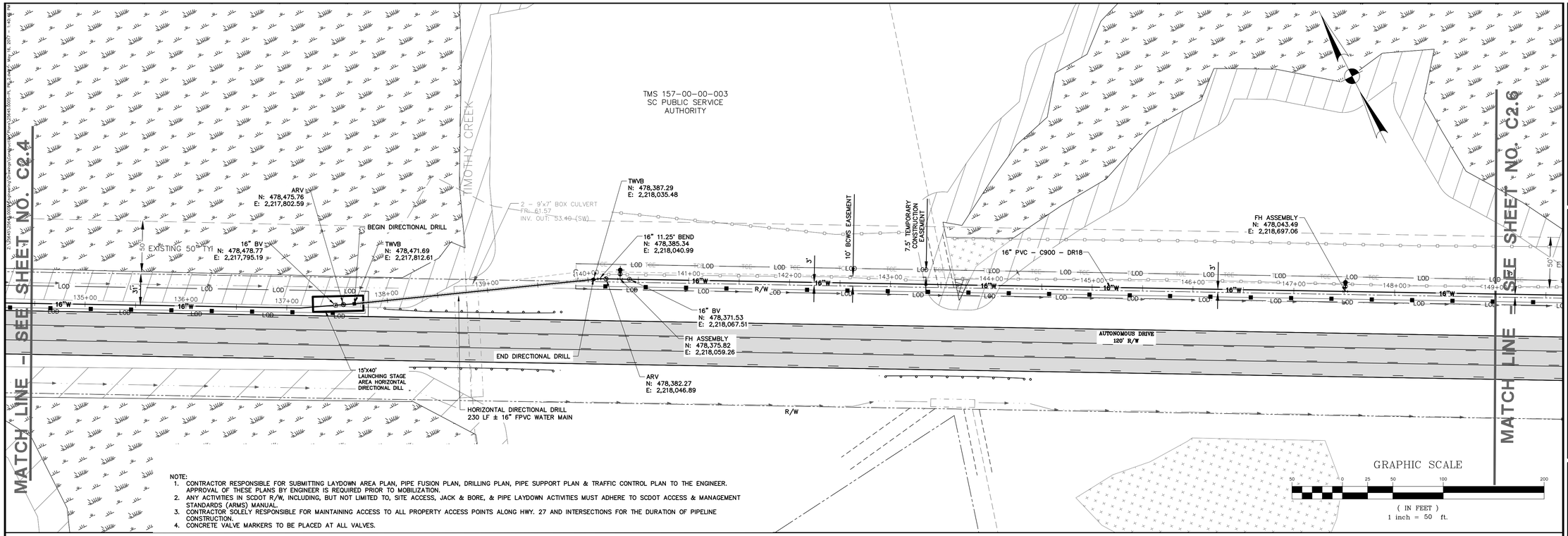
REVIEWED:	PLB
APPROVED:	LHB
SCALE:	AS NOTED

C2.4



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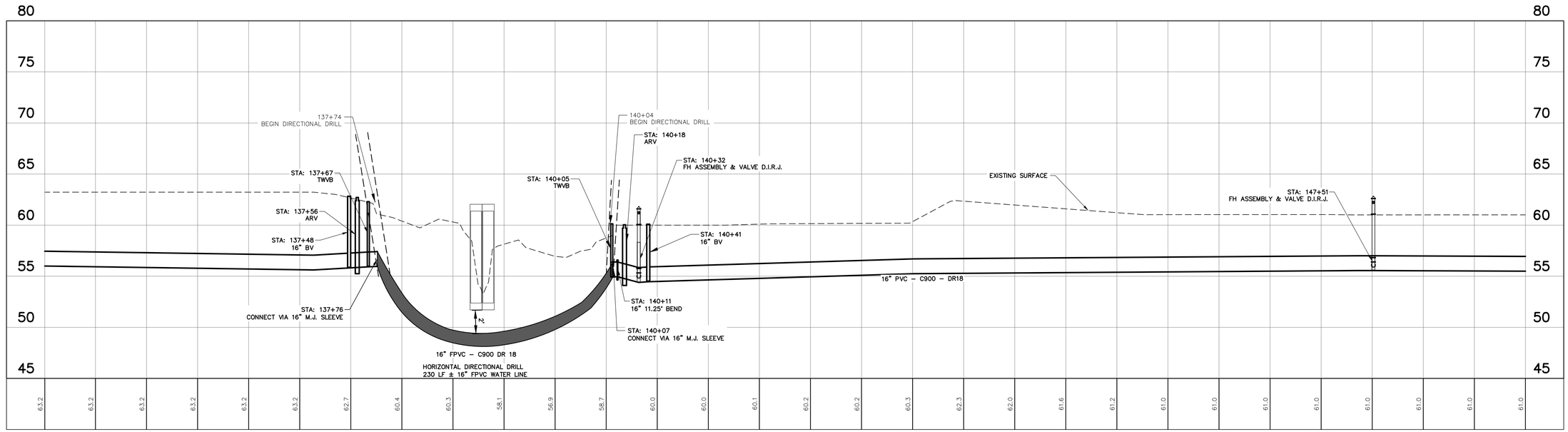

26926.0000 - WATER MAIN
STATIONS: 134+50 - 149+00
SCALE: HORZ.: 1" = 50'
VERT.: 1" = 5'

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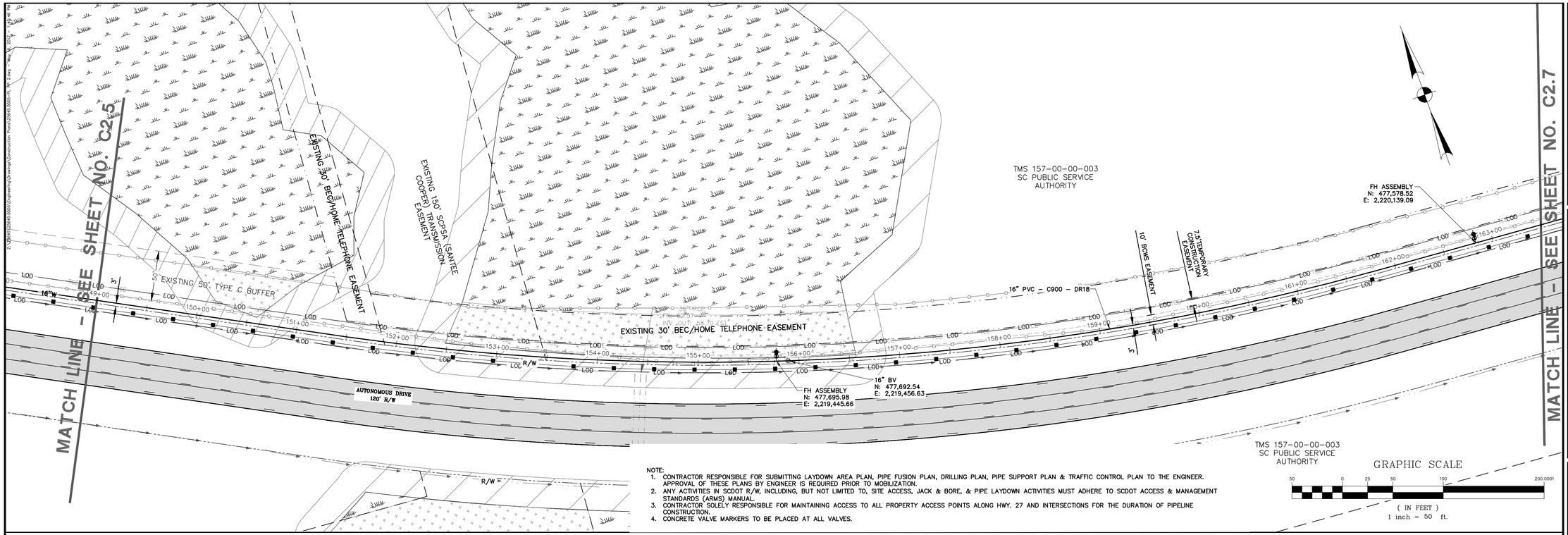
DRAWN:	JTB
DESIGNED:	LHB
REVIEWED:	PLB
APPROVED:	LHB
SCALE:	AS NOTED

C2.5



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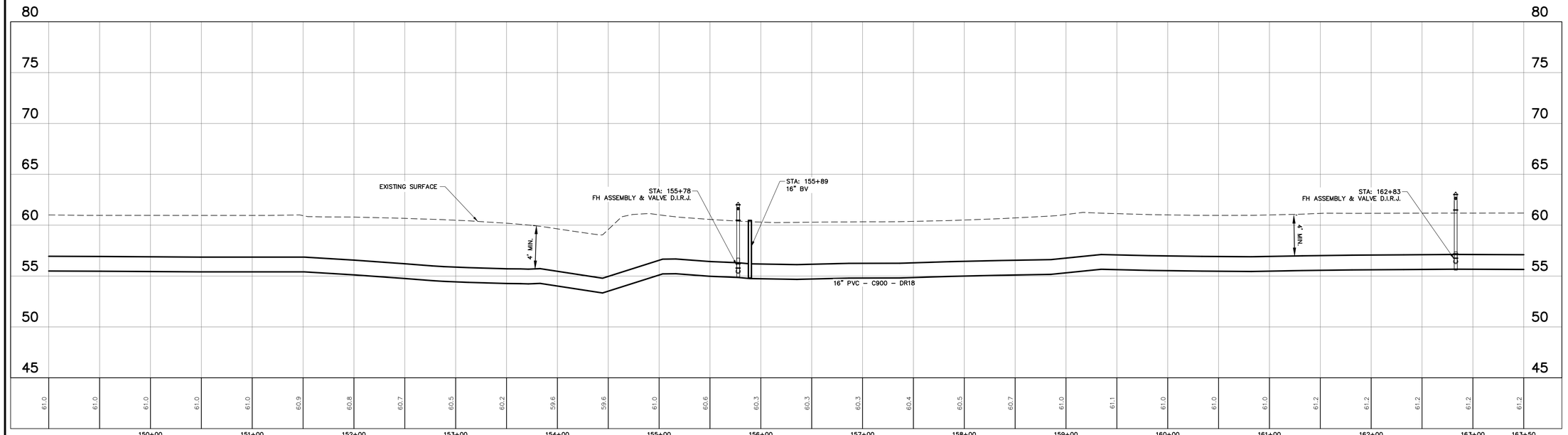

26926.0000 - WATER MAIN
STATIONS: 149+00 - 163+50
SCALE: HORZ.: 1" = 50'
VERT.: 1" = 5'

NO.	REVISIONS	BY	DATE

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BERKELEY-DORCHESTER REACH INTERCONNECT

DIV. I - WATER MAIN PLAN & PROFILE

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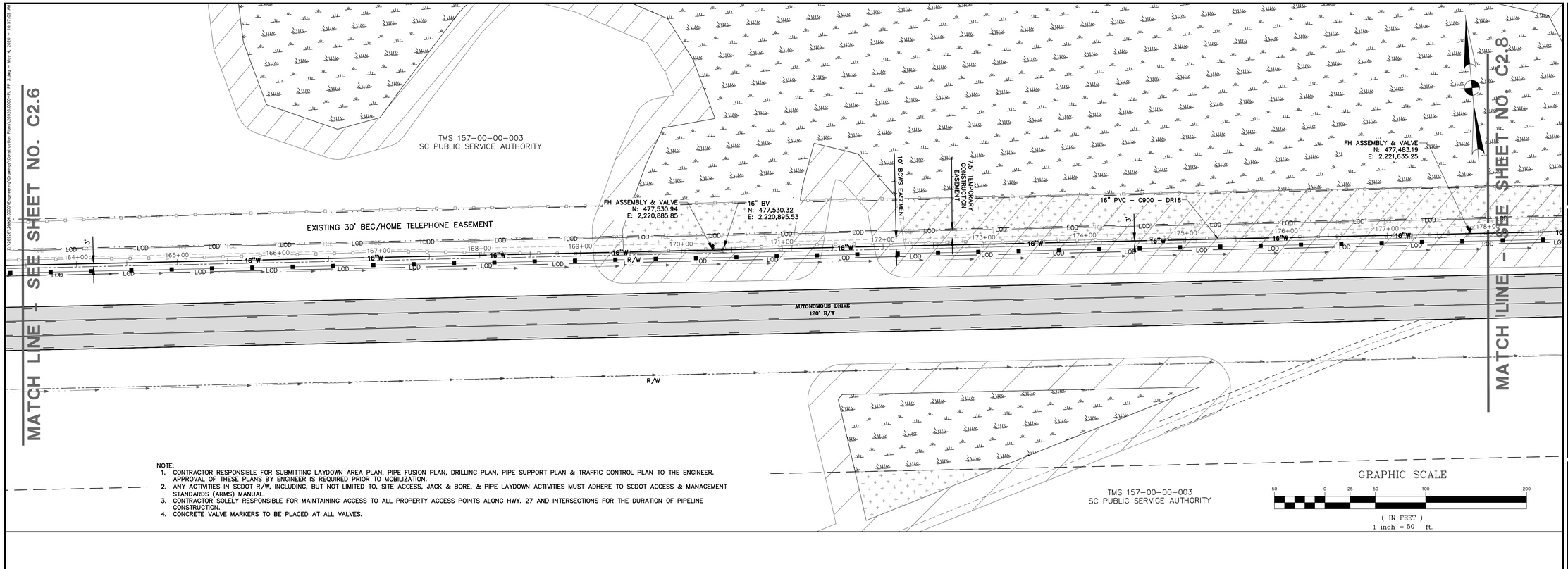
DATE:	01/11/21
DRAWN:	JTB
DESIGNED:	LHB
REVIEWED:	PLB
APPROVED:	LHB
SCALE:	AS NOTED

C2.6



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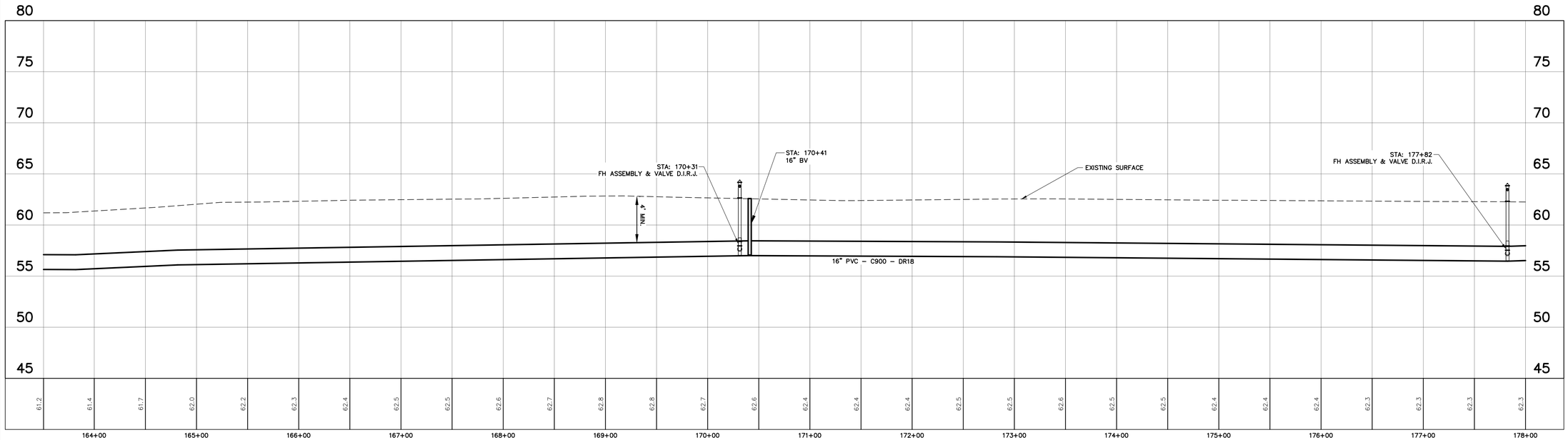

26926.0000 – WATER MAIN
STATIONS: 163+50 – 178+00
SCALE: HORZ.: 1" = 50'
VERT.: 1" = 5'

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REVIEWED:	PLB
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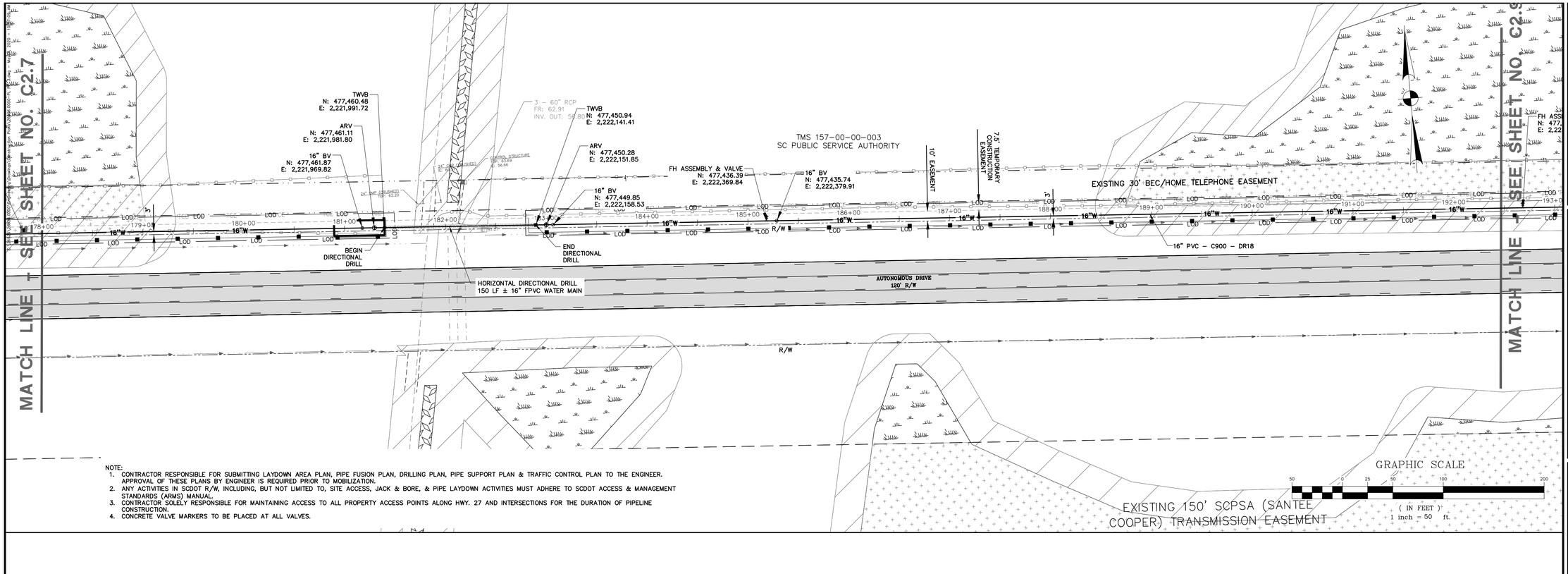
SCALE:	AS NOTED

C2.7



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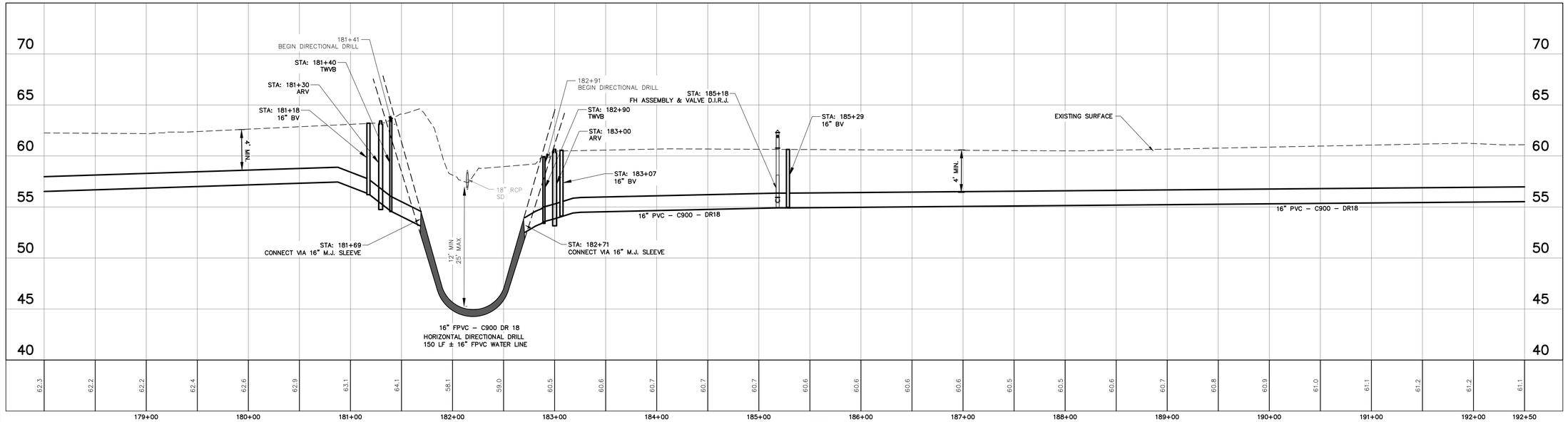

26926.0000 - WATER MAIN
STATIONS: 178+00 - 192+50
SCALE: HORZ.: 1" = 50'
VERT.: 1" = 5'

NOLTE VINCENT CAROLINA
THOMAS & HUTTON ENGINEERING
No. C00285
CERTIFICATE OF AUTHORIZATION
SOUTH CAROLINA
REGISTERED PROFESSIONAL ENGINEER
No. 29974
1/14/21
LEE HAMILTON

NO.	REVISIONS	BY	DATE

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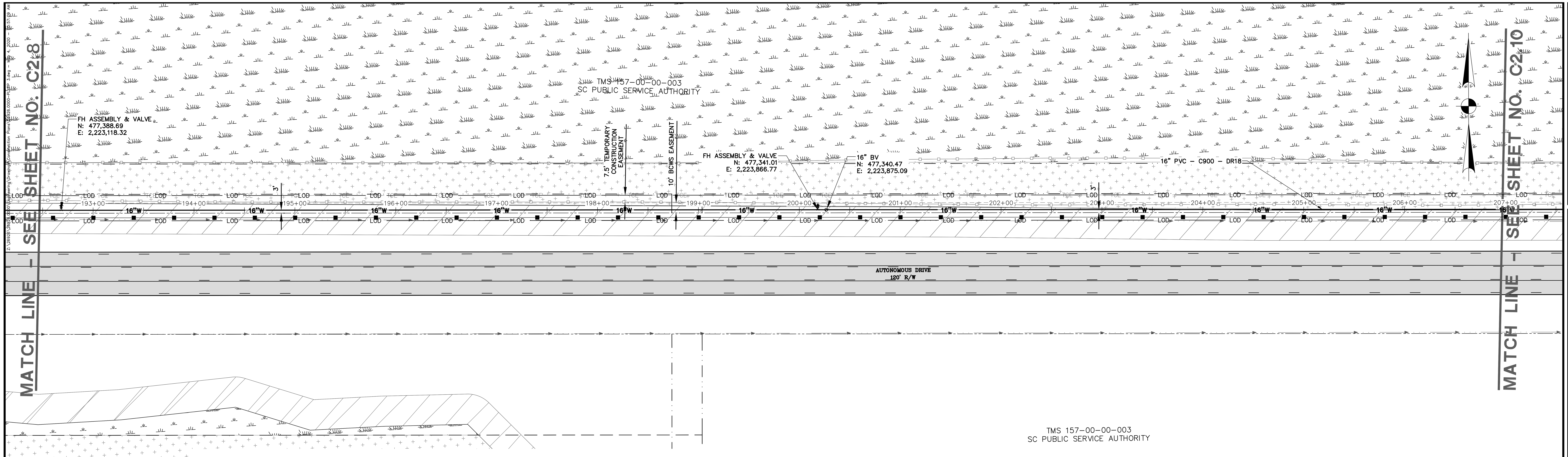
DESIGNED:	LHB
REVIEWED:	PLB
APPROVED:	LHB
SCALE:	AS NOTED

C2.8



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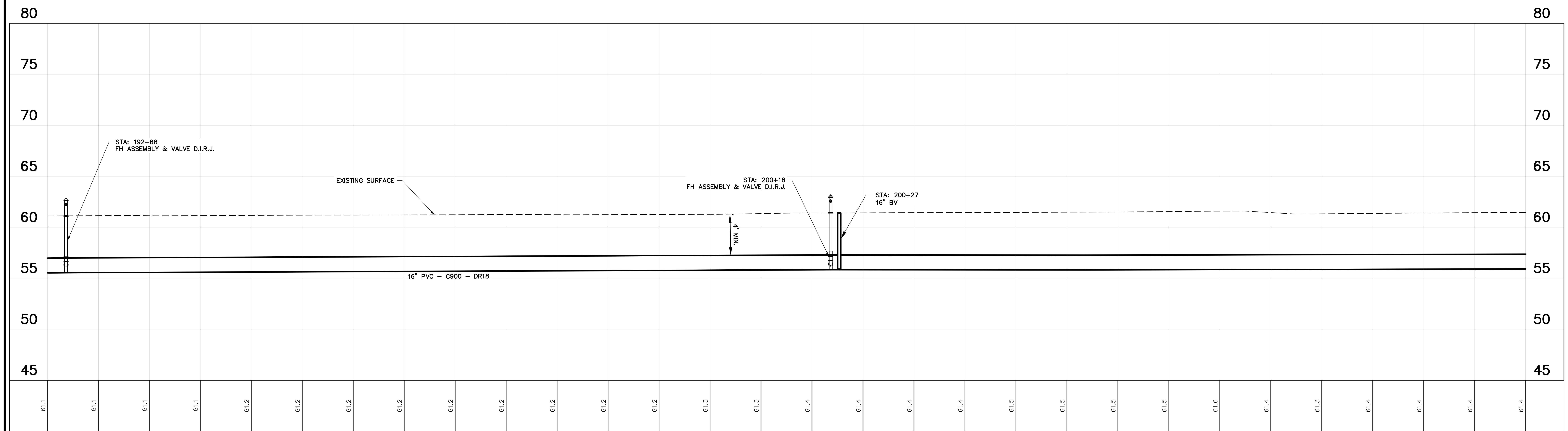

26926.0000 – WATER MAIN
STATIONS: 192+50 – 207+00
SCALE: HORZ.: 1" = 50'
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DIV. I – WATER PLAN & PROFILE

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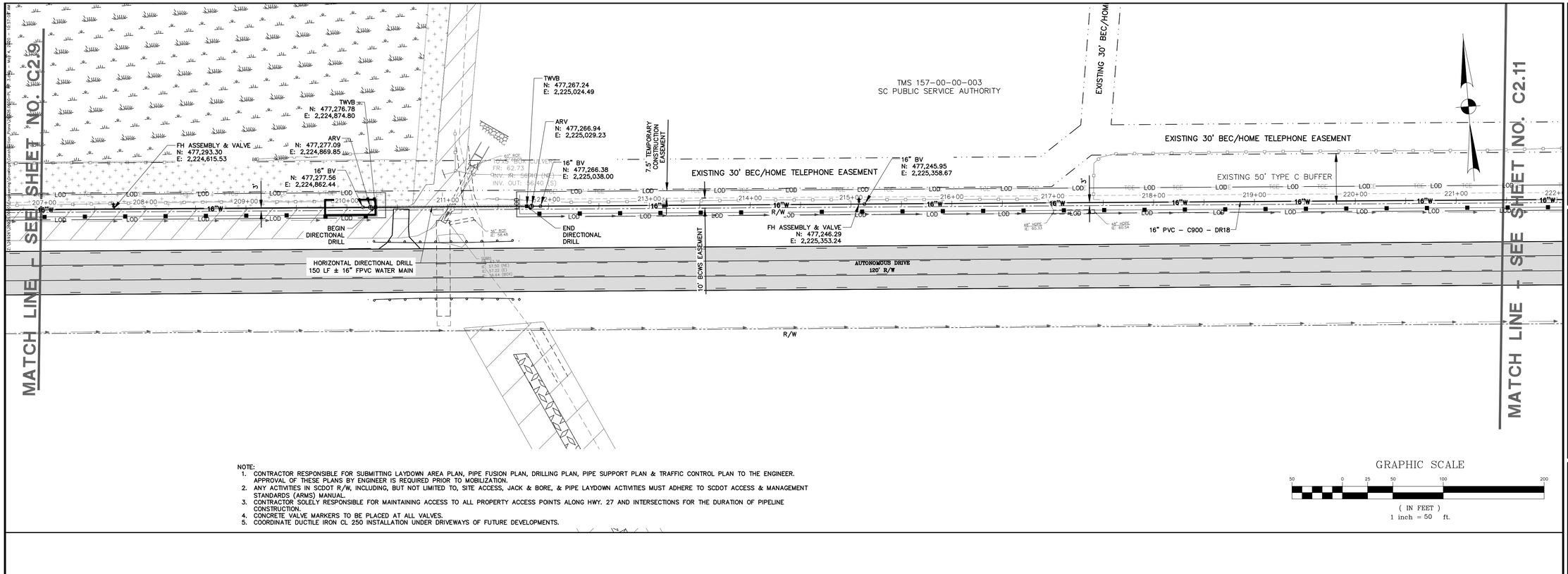
REVIEWED:	PLB
APPROVED:	LHB
SCALE:	AS NOTED

C2.9



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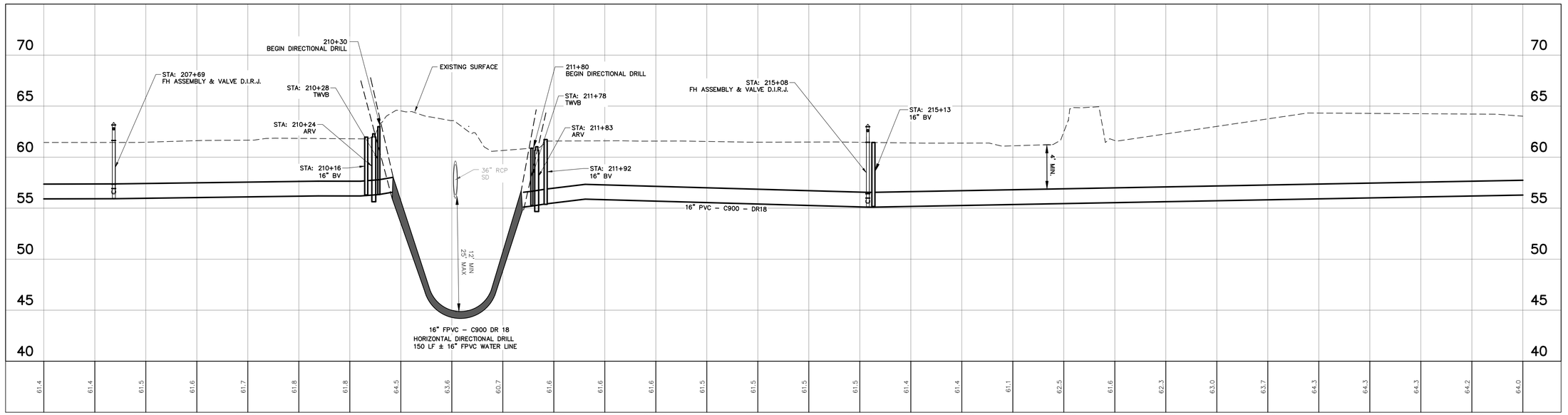
GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.



26926.0000 – WATER MAIN
STATIONS: 207+00 – 221+50
SCALE: HORZ.: 1" = 50'
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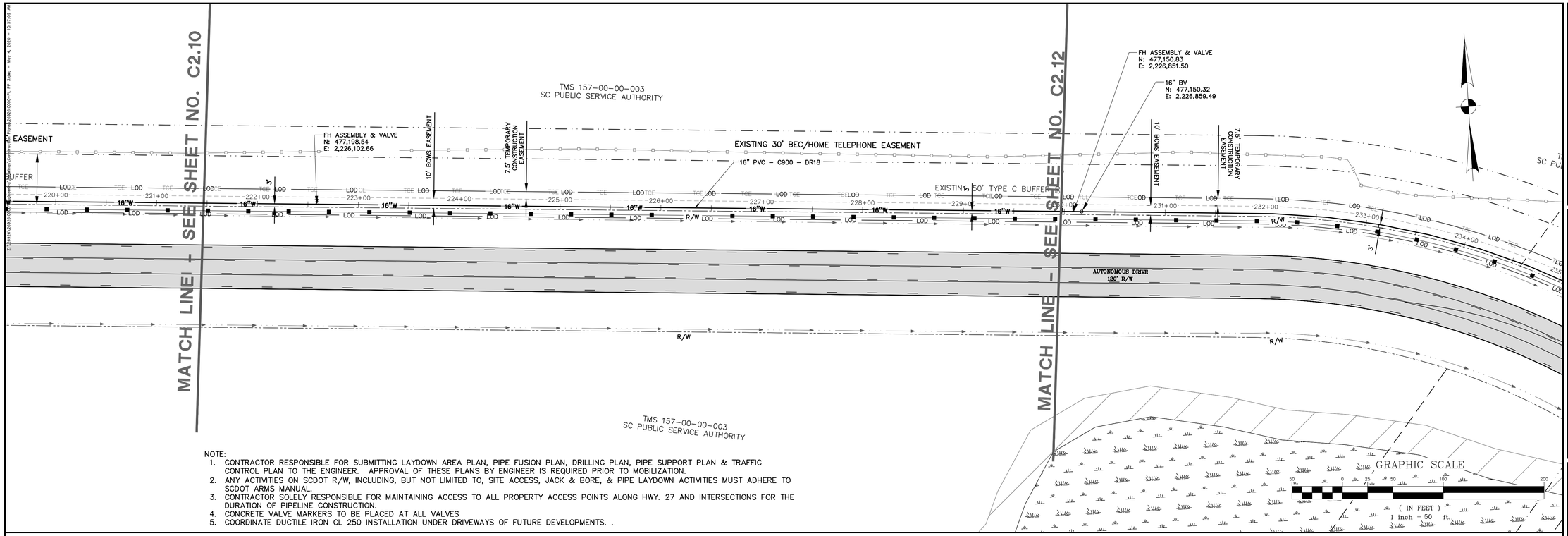
C2.10



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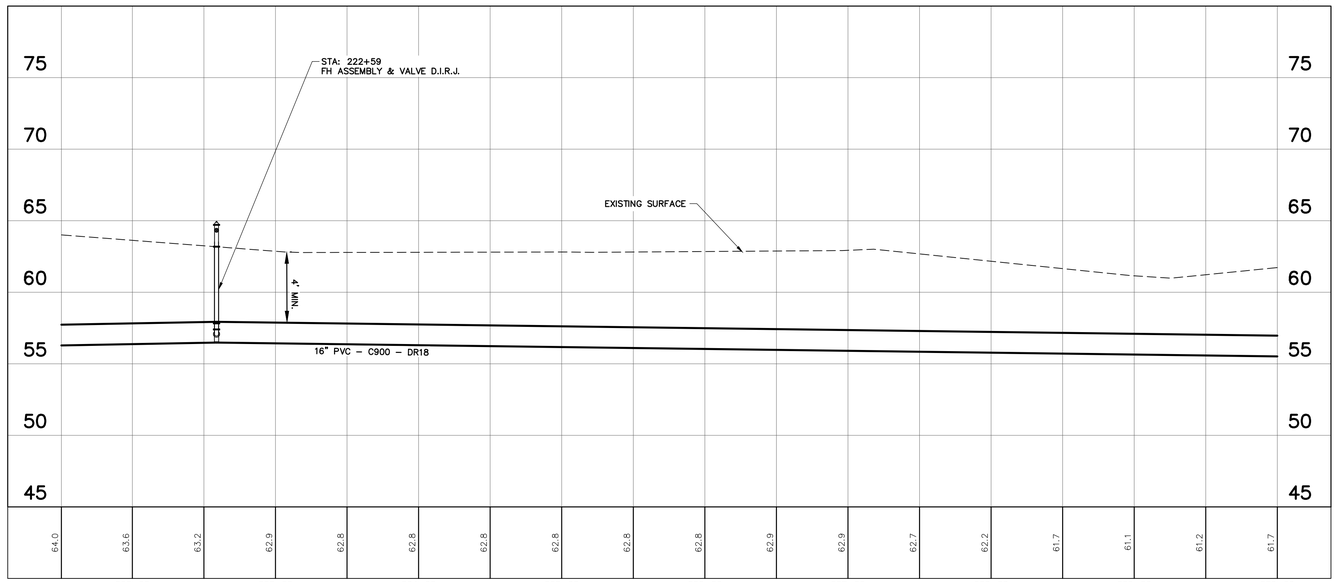

26926.0000 – WATER MAIN
STATIONS: 221+50 – 230+00
SCALE: HORZ.: 1" = 50'
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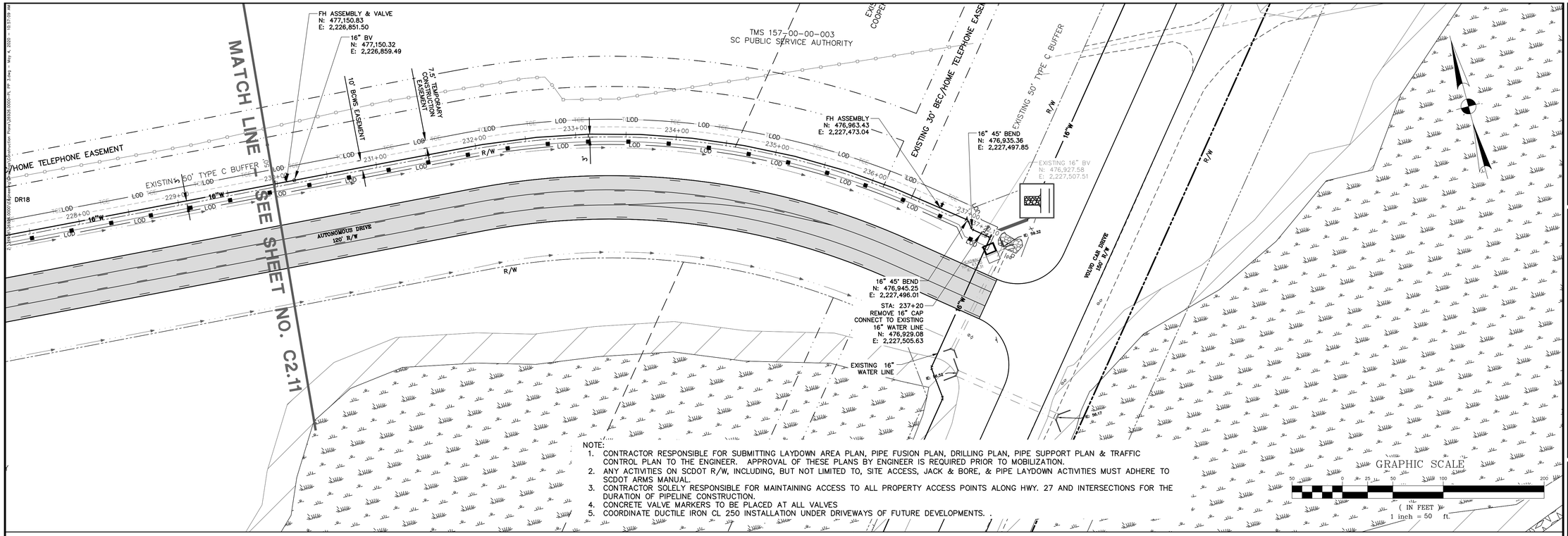
C2.11



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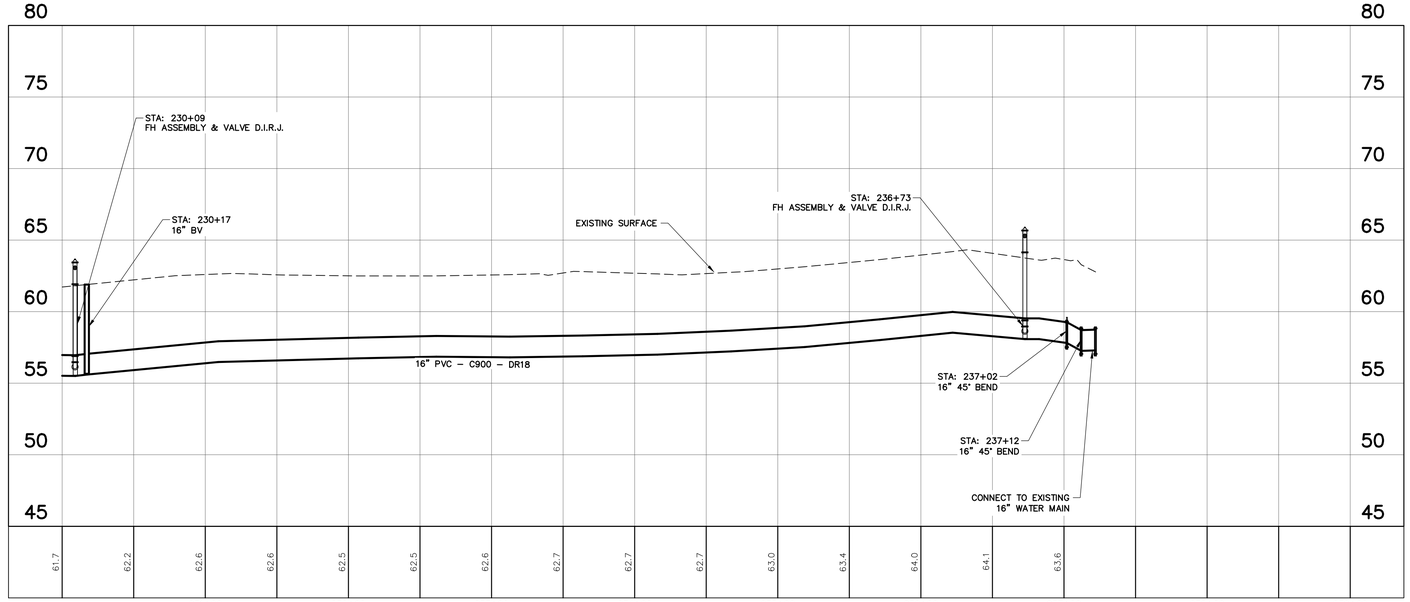

26926.0000 - WATER MAIN

STATIONS: 230+00 - 239+00
SCALE: HORZ.: 1" = 50'
VERT.: 1" = 5'

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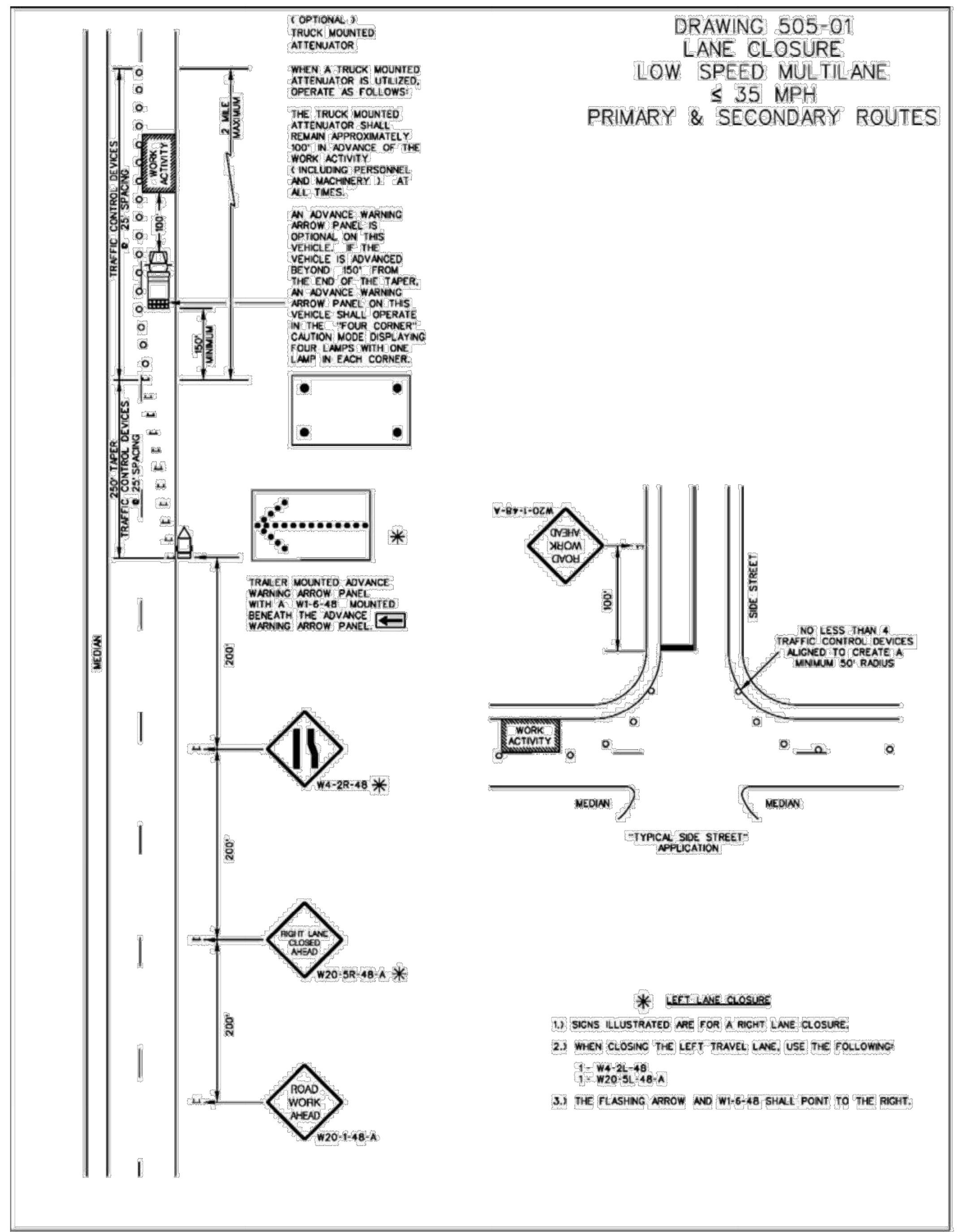
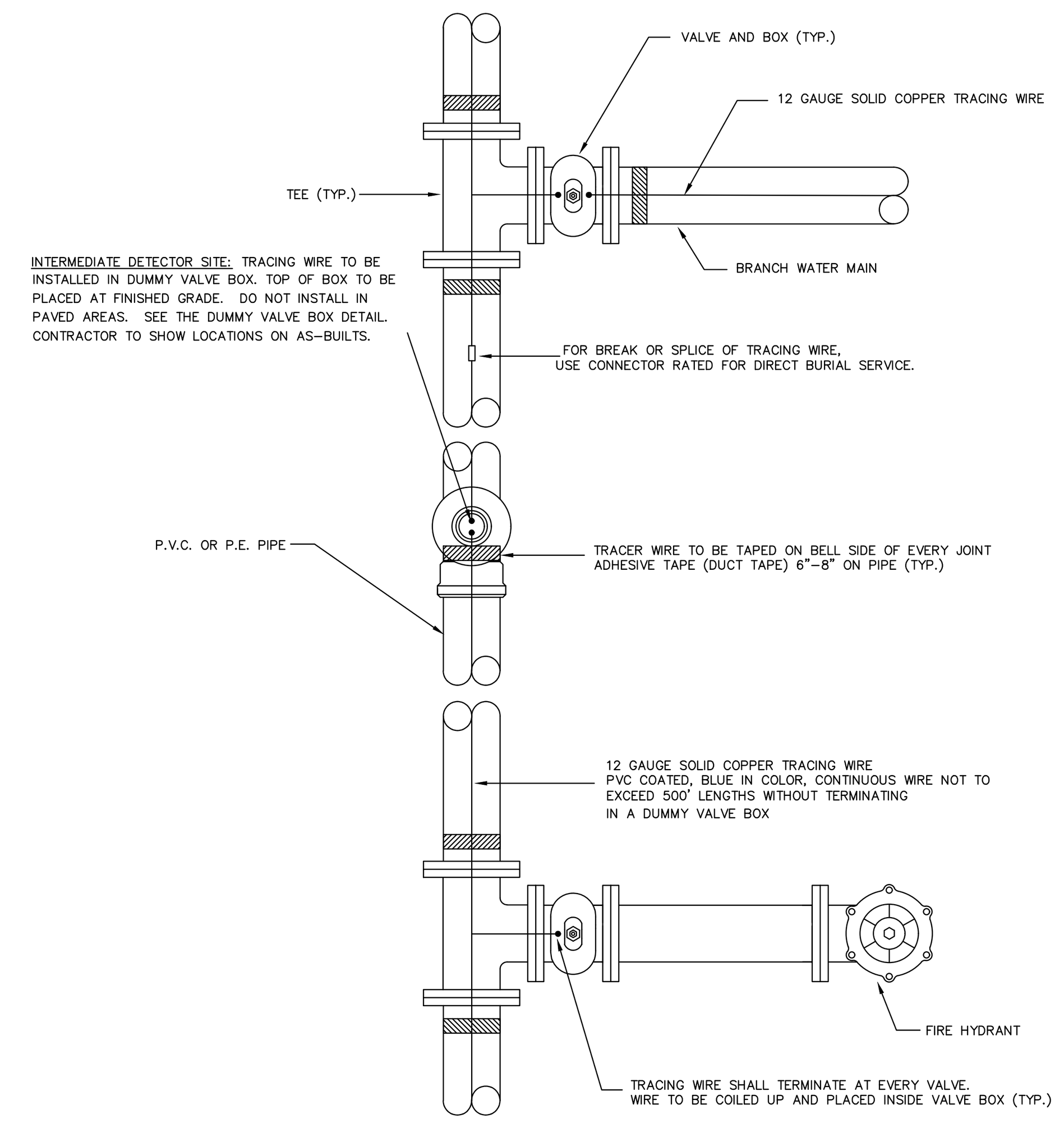
C2.12



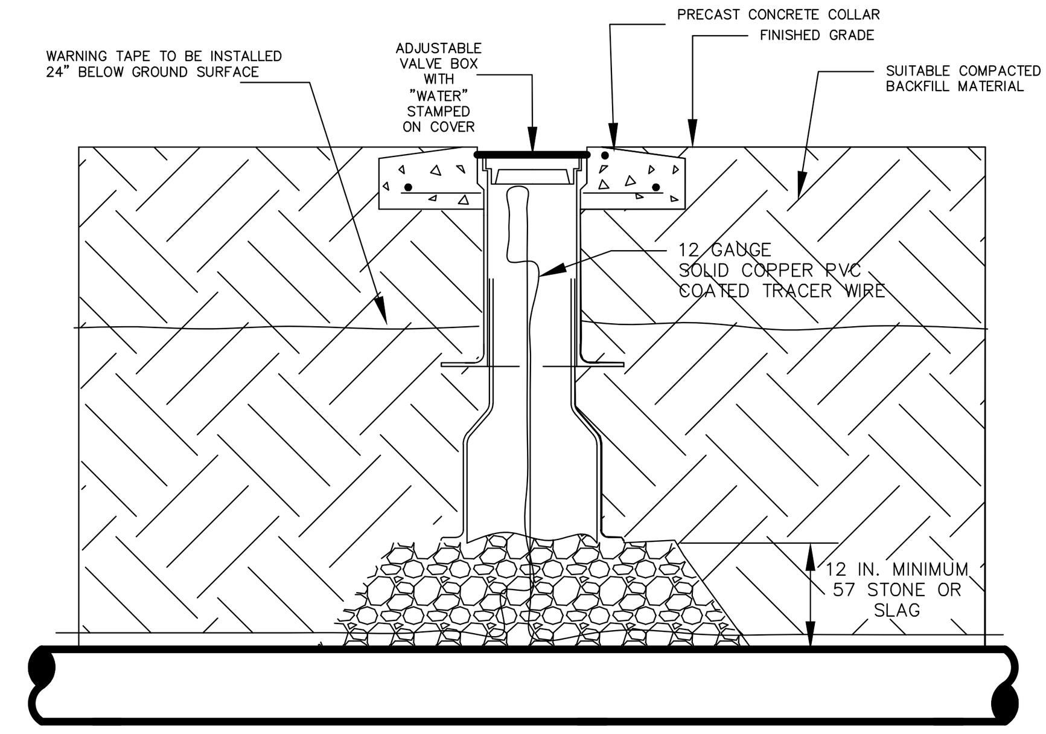
LCPS-3



TRACING WIRE INSTALLATION DETAIL

NOT TO SCALE

NOTES:
1. OPEN CUT INSTALLATIONS WILL REQUIRE 12 GAUGE PVC COATED COPPER WIRE.
2. TRENCHLESS INSTALLATIONS WILL REQUIRE FOUR #14 WIRES BEING INSTALLED WITH THE PIPE AND CONNECTED TO THE TRACER WIRE AT BOTH ENDS, OR CAD WELDED TO THE EXISTING IRON PIPE AT BOTH ENDS.
3. CONTRACTOR SHALL INSTALL DUMMY VALVE BOXES AT INTERVALS NO GREATER THAN 500 FEET.
4. THE WIRE AND TAPE SHALL MEET BCWS STANDARDS.
5. TRACER WIRE SHALL BE BLUE IN COLOR FOR WATER MAIN.



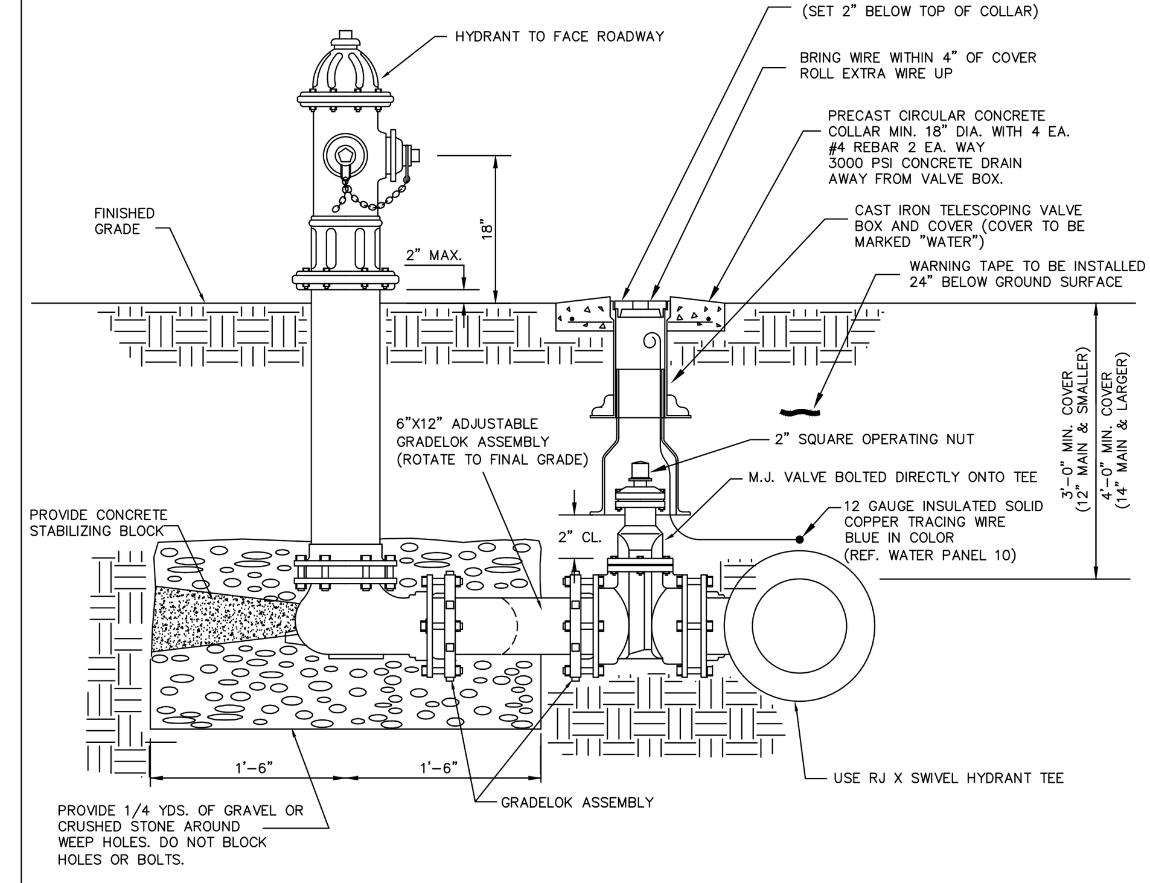
DUMMY VALVE BOX DETAIL

NOT TO SCALE

WATER PANEL 10

BERKELEY COUNTY WATER AND SANITATION
POTABLE WATER & SANITARY SEWER STANDARDS
Rev. 05/23/11

NOTE:
1. MEGALUG GLANDS SHALL BE USED ON ALL MECHANICAL JOINTS.
2. SEE APPENDIX F29 FOR BCWS APPROVED HYDRANTS
3. PAINTED RED TO OPEN LEFT.



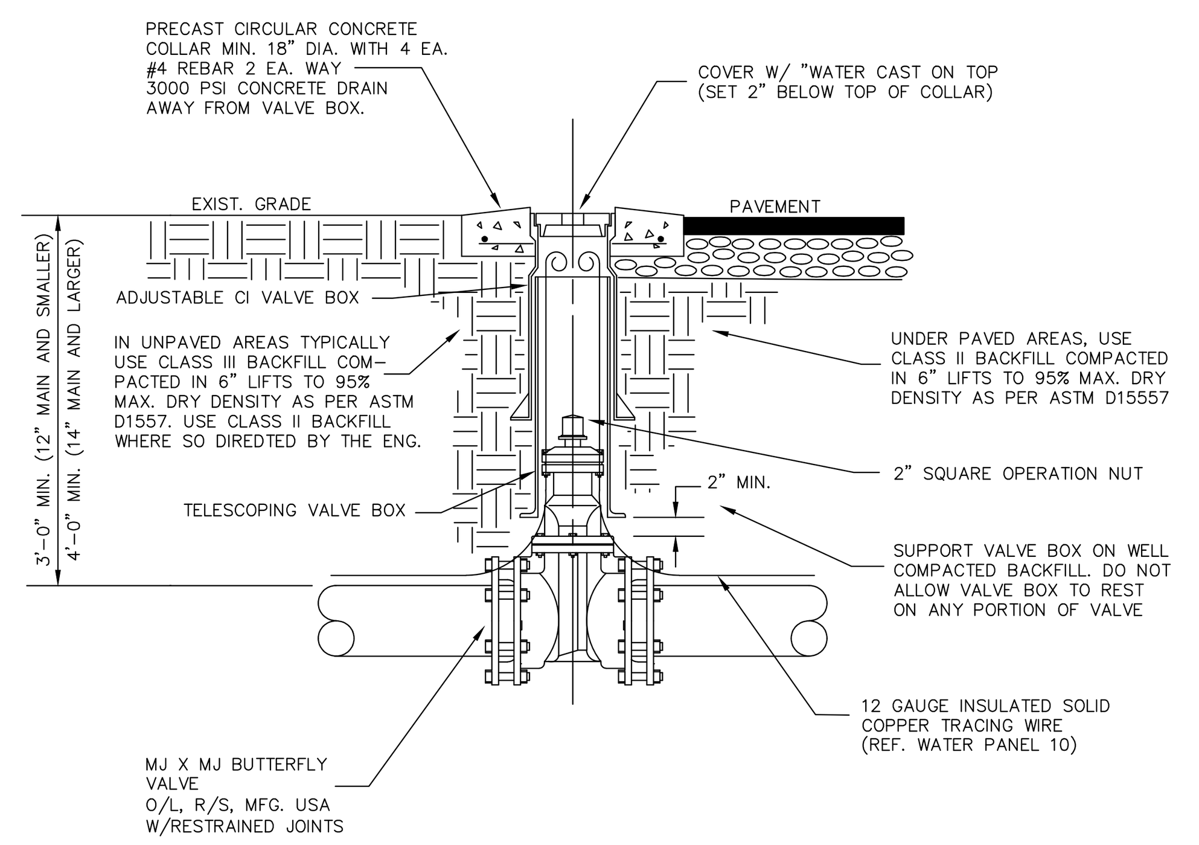
TYPICAL DETAIL
FIRE HYDRANT WITH VALVE AND BOX

NOT TO SCALE

WATER PANEL 4A

BERKELEY COUNTY WATER AND SANITATION
POTABLE WATER & SANITARY SEWER STANDARDS
REVISED 04/14/11

1. CENTER VALVE BOX OVER OPERATING NUT TO INSURE FREE VALVE OPERATION.
2. USE TELESCOPING VALVE BOX ON ALL VALVES.
3. SUPPORT VALVE BOX BOTTOM ON WELL COMPACTED BACKFILL. DO NOT ALLOW VALVE BOX TO REST ON ANY PORTION OF VALVE.
4. USE 6" D.I. RISER ON DEEP VALVE INSTALLATION. TELESCOPING VALVE BOXES ARE AVAILABLE FOR DEPTHS UP TO 6'10".

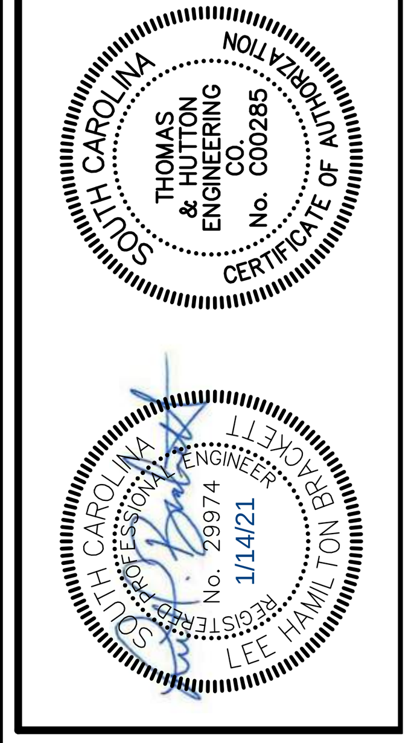


TYPICAL DETAIL
VALVE AND VALVE BOX INSTALLATION

NOT TO SCALE

WATER PANEL 3

BERKELEY COUNTY WATER AND SANITATION
POTABLE WATER & SANITARY SEWER STANDARDS
REVISED 08/01/08



NO.	REVISIONS	BY	DATE

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BERKELEY COUNTY
BERKELEY COUNTY, SC

BERKELEY-DORCHESTER REACH INTERCONNECT

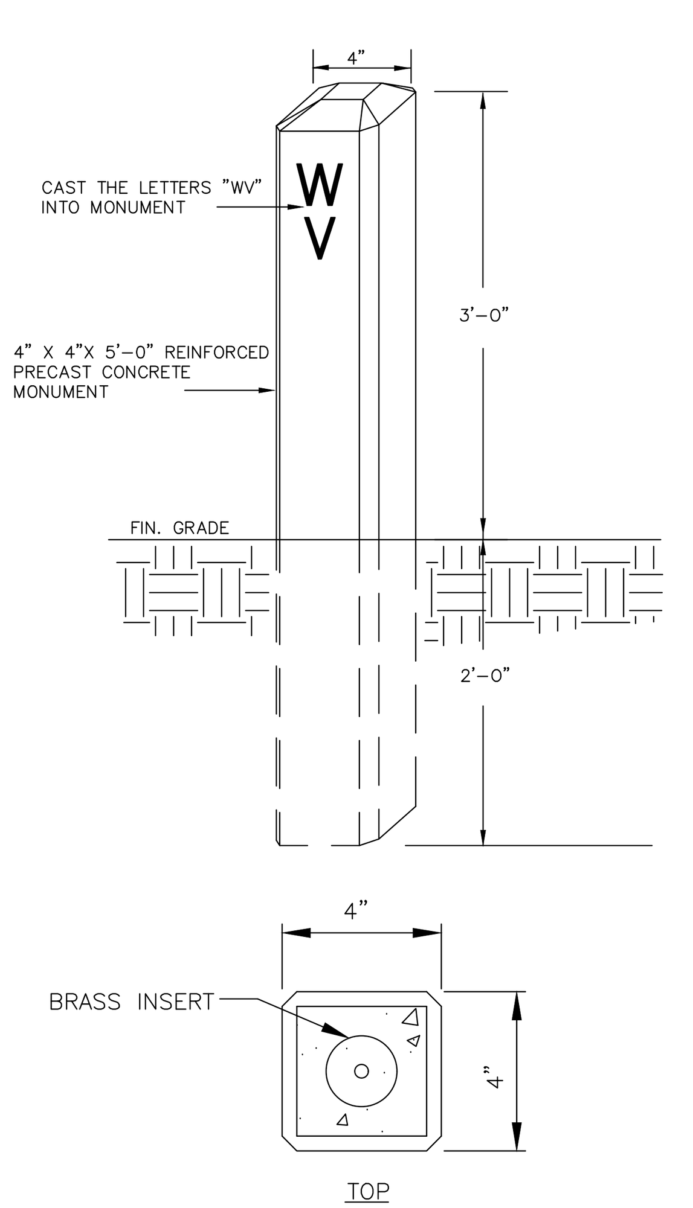
DIV. I – WATER MAIN DETAILS

JOB NO:	J-26926.0000
DATE:	01/11/21
DRAWN:	JTB
DESIGNED:	LHB
REVIEWED:	PLB
APPROVED:	LHB
SCALE:	N/A

C3.1

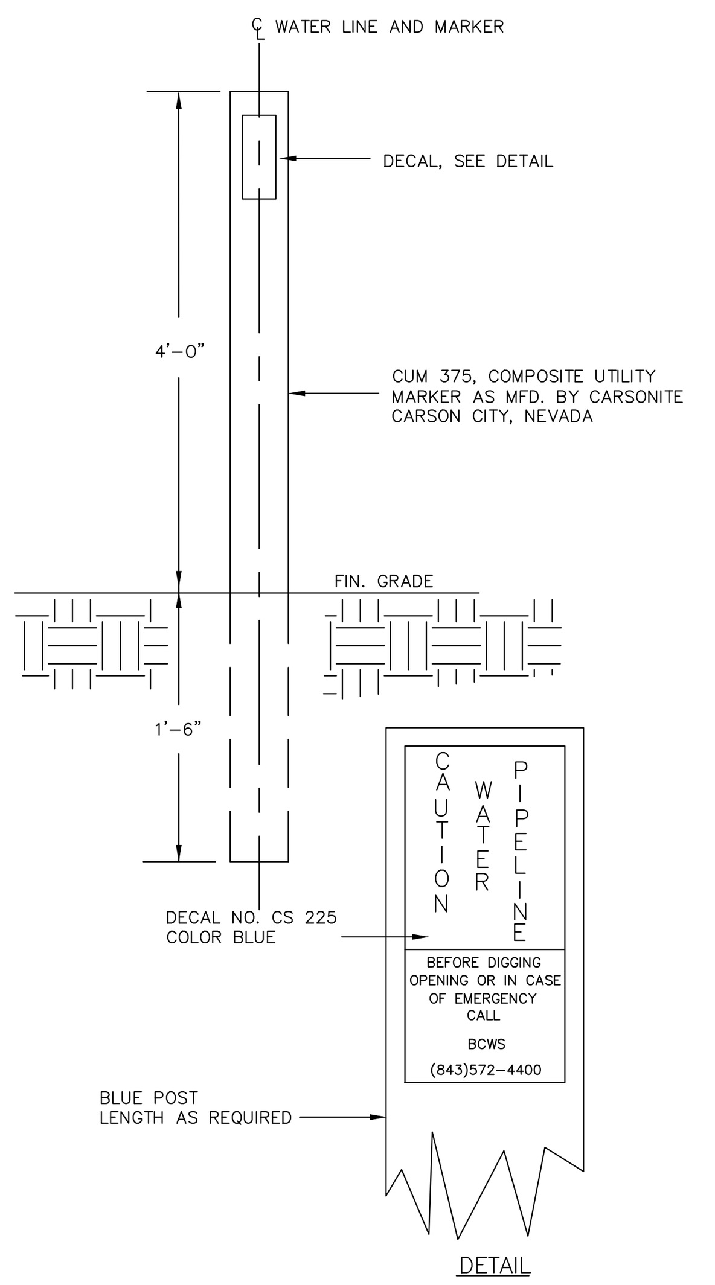
1. CHAMFER ON FRONT TWO SIDES.
2. BRASS PLATE ON TOP WITH DISTANCE AND DIRECTION OF VALVE.
3. TWO #3 REBAR REINFORCING.
4. CONCRETE 3000 PSI
5. LETTERING ON FRONT SIDE
6. PLACE AT ALL VALVE LOCATIONS OR AS DIRECTED BY ENGINEER

NOTE: PIPELINE MARKERS TO BE LOCATED EVERY 1000' ALONG THE WATER LINE & ABOVE FITTINGS WHERE THE ALIGNMENT CHANGES, OR AS DIRECTED BY THE ENGINEER.



VALVE MARKER

NOT TO SCALE



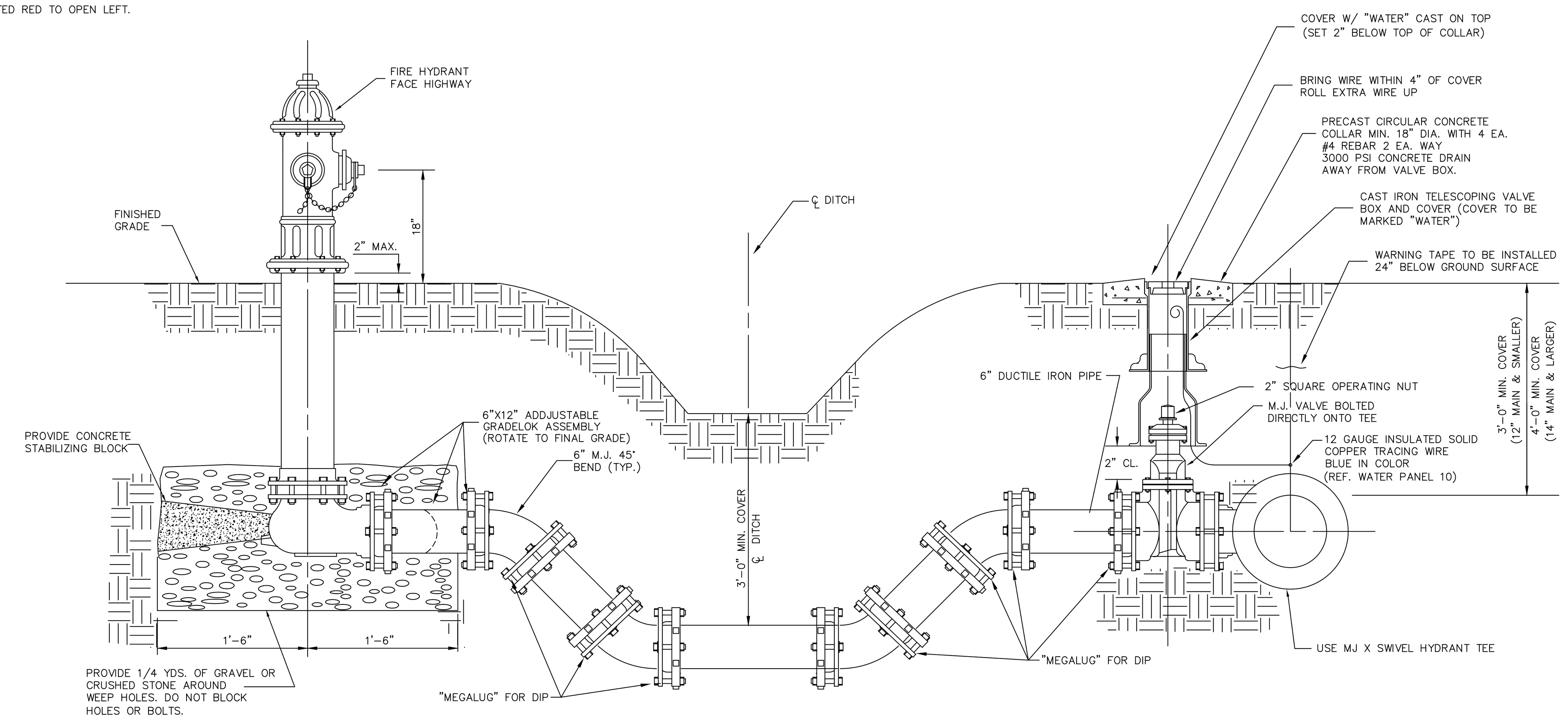
LINE MARKER

NOT TO SCALE

WATER PANEL 9

BERKELEY COUNTY WATER AND SANITATION
POTABLE WATER & SANITARY SEWER STANDARDS
REVISED 10/10/08

NOTE:
1. MEGALUG GLANDS SHALL BE USED ON ALL MECHANICAL JOINTS.
2. SEE APPENDIX F29 FOR BCWS APPROVED HYDRANTS
3. PAINTED RED TO OPEN LEFT.

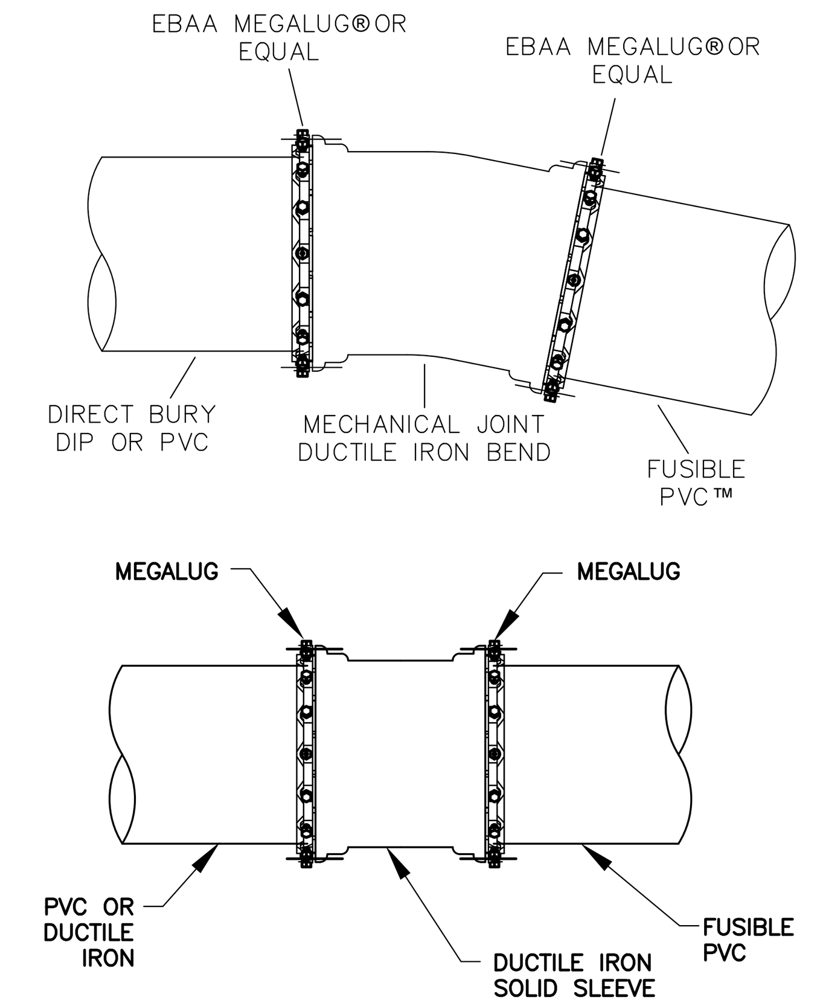


TYPICAL DETAIL
FIRE HYDRANT WITH VALVE AND BOX
FOR DRAINAGE CROSSING

NOT TO SCALE

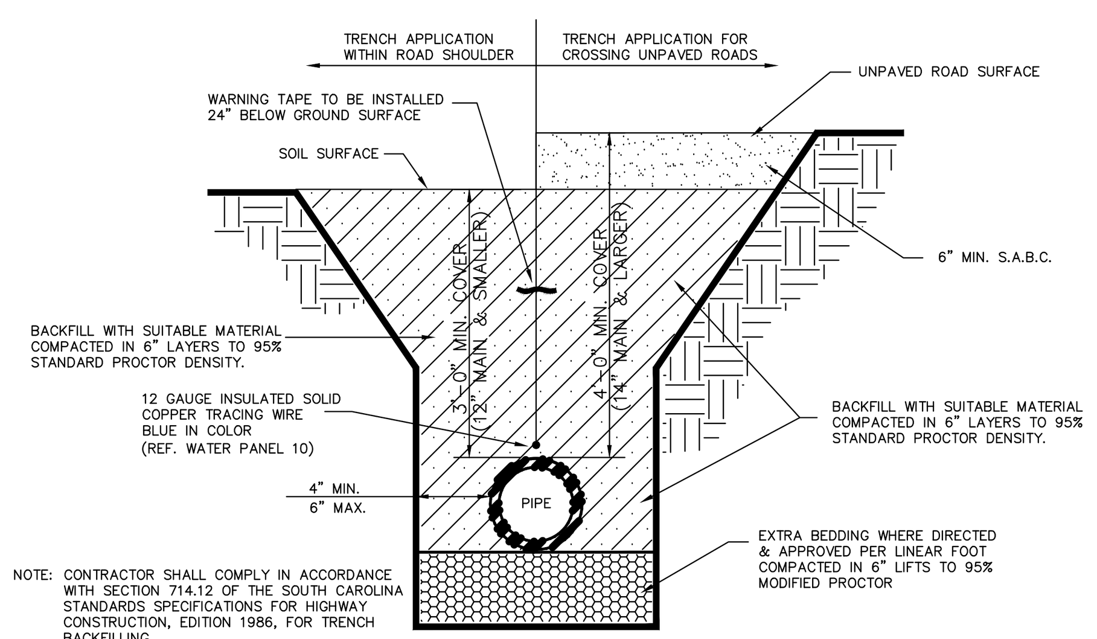
WATER PANEL 4B

BERKELEY COUNTY WATER AND SANITATION
POTABLE WATER & SANITARY SEWER STANDARDS
REVISED 04/14/11



FPVC CONNECTION DETAIL

SCALE: NONE



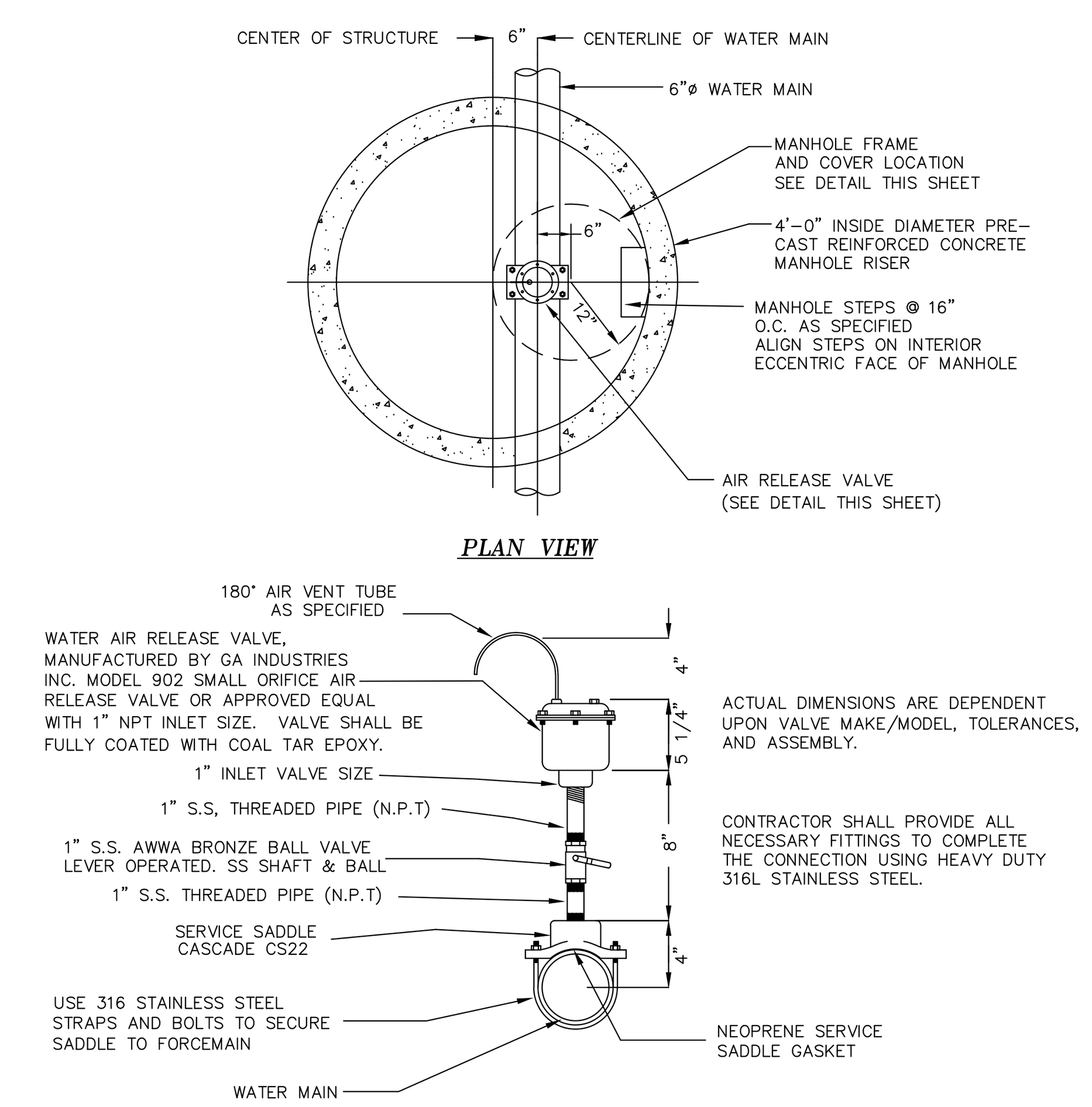
NOTE: CONTRACTOR SHALL COMPLY IN ACCORDANCE WITH SECTION 714.12 OF THE SOUTH CAROLINA STANDARDS SPECIFICATIONS FOR HIGHWAY CONSTRUCTION, EDITION 1986, FOR TRENCH BACKFILLING.

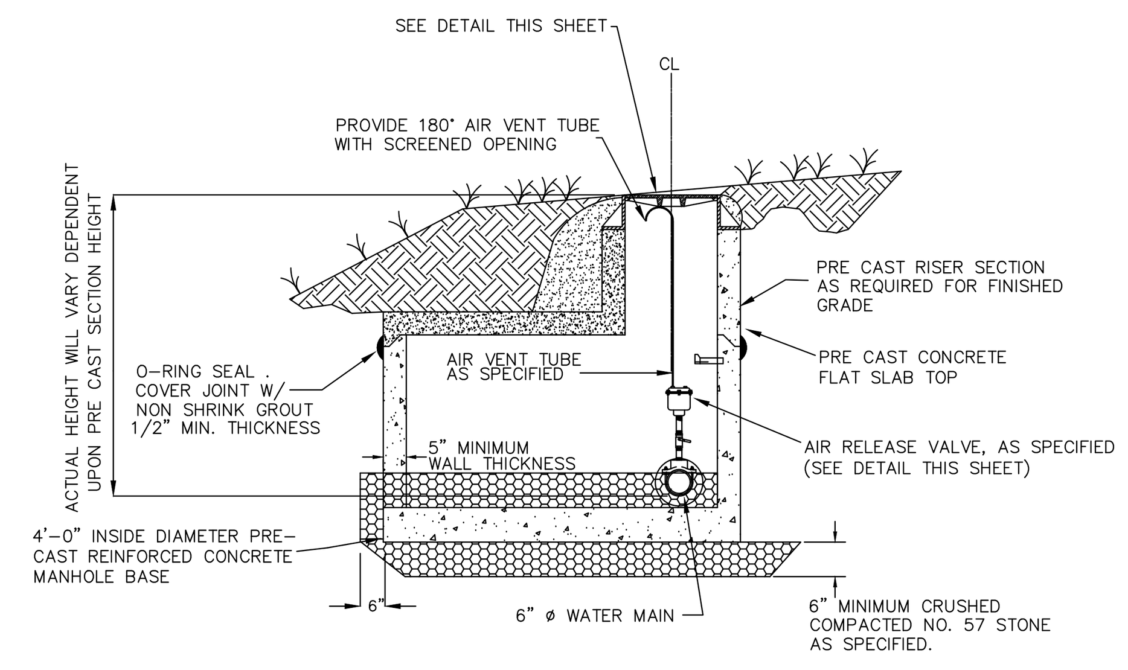
WATER MAIN TRENCH DETAIL

NOT TO SCALE

WATER PANEL 8

BERKELEY COUNTY WATER AND SANITATION
POTABLE WATER & SANITARY SEWER STANDARDS
REVISED 08/01/08





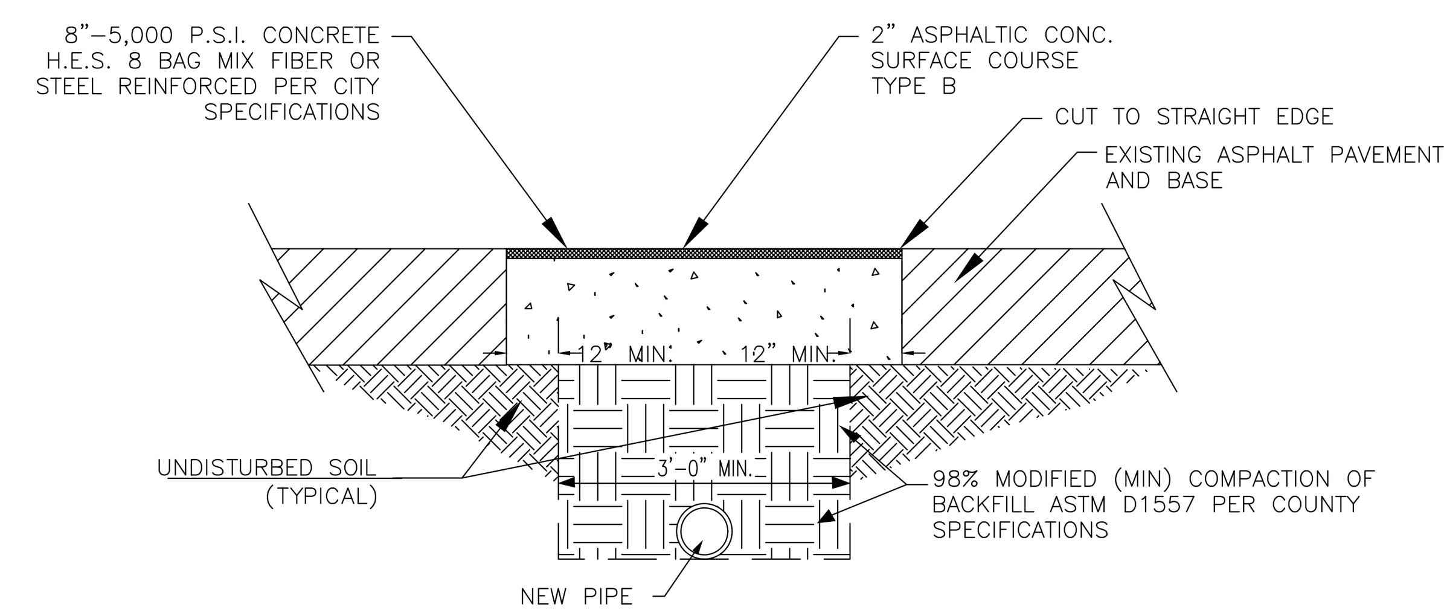
SECTION VIEW

WATER AIR RELEASE VALVE

NOT TO SCALE

WATER PANEL 11

BERKELEY COUNTY WATER AND SANITATION
POTABLE WATER & SANITARY SEWER STANDARDS
REVISED 08/01/08



NOTES:
1. COMPACT BASE AND SUB-BASE TO 98% MINIMUM MODIFIED (ASTM D1557)
2. CONCRETE IN THE ROW TO BE 5000PSI AND REINFORCED WITH FIBERMESH OR STEEL.
3. ALL LATERAL STREET CUTS MUST BE COVERED WITH STEEL PLATES OF SUFFICIENT THICKNESS TO SPAN THE CUT WITHOUT NOTICABLE DEFLECTION. PLATES TO REMAIN IN PLACE UNTIL THE CONCRETE BASE HAS GAINED SUFFICIENT STRENGTH TO WITHSTAND TRAFFIC LOADS (24 HOUR MINIMUM).
4. WITH LONGITUDINAL CUTS EXCEEDING 150 FEET IN LENGTH, THE CONCRETE IN THE TRENCH WILL BE BROUGHT FLUSH WITH THE EXISTING PAVEMENT. PAVING WILL BE SAW CUT TO A STRAIGHT EDGE AND THE ENTIRE WIDTH OF THE ROADWAY WILL BE RESURFACED WITH A MINIMUM OF 1.5" OF 9.5mm HOT CLASS B ASPHALT .
5. ALL STREET PATCHES MUST BE SQUARE OR RECTANGULAR WITH STRAIGHT, SAW CUT EDGES.

BITUMINOUS PAVEMENT REPLACEMENT

SCALE: NONE

NO.	REVISIONS	BY	DATE

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APPROVED:	LHB
SCALE:	N/A

C3.2

RESTRAINED JOINT TABLE FOR BENDS

Minimum length to be restrained each side of bend (Feet):

PVC Pipe (in.)	Horizontal Bends				Vertical Bends (upper/lower)			
	90°	45°	22½°	11¼°	90°	45°	22½°	11¼°
3	12	5	3	2	NOT RECOMMENDED	13/3	7/2	4/1
4	14	6	3	2		16/3	8/2	4/1
6	20	8	4	2		22/5	11/2	6/1
8	26	11	5	3		29/6	14/3	7/2
10	30	13	6	3		35/7	17/4	9/2
12	35	15	7	4		41/8	20/4	10/2
14	40	17	8	4		47/9	23/5	12/3
16	45	19	9	5		53/10	26/5	13/3
18	49	21	10	5		58/12	28/6	14/3
20	53	22	11	6		64/13	31/6	16/3
24	61	26	13	6		74/15	36/7	18/4
30	72	30	15	8		89/17	43/9	22/5
36	82	34	17	9		103/20	50/10	25/5

D.I. Pipe (in.)	Horizontal Bends				Vertical Bends (upper/lower)			
	90°	45°	22½°	11¼°	90°	45°	22½°	11¼°
3	10	4	2	1	NOT RECOMMENDED	9/3	4/1	2/1
4	12	5	3	2		10/3	5/2	3/1
6	16	7	4	2		14/4	7/2	4/1
8	21	9	5	3		19/5	9/3	5/2
10	25	11	5	3		22/6	11/3	6/2
12	29	12	6	3		26/7	13/4	7/2
14	33	14	7	4		30/8	15/4	7/2
16	37	16	8	4		34/9	16/4	8/2
18	41	17	9	4		37/10	18/5	9/3
20	44	19	9	5		41/11	20/5	10/3
24	51	21	11	5		47/12	23/6	12/3
30	60	25	12	6		56/15	27/7	14/4
36	69	29	14	7		65/17	32/8	16/4
42	76	32	16	8		73/19	35/10	18/5
48	83	35	17	9		81/21	39/11	20/5

Table is based upon Class II soil type SP, trench type 4, 150 psi testing pressure, a safety factor of 1.5, and an assumed minimum cover of 3' on upper vertical bends, and 6' on lower vertical bends. This table was derived from EBAA Iron, Inc. Restrained Length Calculation Program. For evaluation of other criteria, use this or other similar programs.

COMMON PANEL 3A

BERKELEY COUNTY WATER AND SANITATION
POTABLE WATER & SANITARY SEWER STANDARDS

Rev. 05/10

RESTRAINED JOINT TABLE FOR REDUCERS

Minimum length to be restrained on large size side of reducer (Feet):

PVC Pipe (in.)	Reducer Small Size (In.)													
	3	4	6	8	10	12	14	16	18	20	24	30	36	42
3														Not Recommended
4	13													
6	36	28												
8	57	50	30											
10	73	68	52	28										
12	90	86	72	52	29									
14	105	101	90	73	53	29								
16	120	117	107	93	75	54	29							
18	134	132	123	110	95	76	54	29						
20	148	146	138	126	113	96	77	54	29					
24	175	173	166	157	146	132	116	98	77	54				
30	211	209	204	197	188	178	165	151	135	117	75			
36	245	244	240	234	227	218	208	197	184	169	136	75		

D.I. Pipe (in.)	Reducer Small Size (In.)													
	3	4	6	8	10	12	14	16	18	20	24	30	36	42
3														
4	8													
6	23	18												
8	36	32	19											
10	47	44	33	18										
12	57	55	46	34	19									
14	67	64	57	47	34	19								
16	76	74	68	59	48	34	19							
18	85	84	78	70	60	48	34	19						
20	94	92	87	80	72	61	49	34	18					
24	111	109	105	99	92	84	74	62	49	34				
30	134	133	129	125	119	113	105	96	85	74	48			
36	155	154	152	148	144	138	132	125	116	107	86	48		
42	175	174	172	169	165	161	155	149	142	135	117	85	46	
48	193	193	191	188	185	182	177	172	166	160	145	118	84	46

Table is based upon Class II soil types SP, trench type 4, 150 psi testing pressure, a safety factor of 1.5, and an assumed minimum cover of 3'. This table was derived from EBAA Iron, Inc. Restrained Length Calculation Program. For evaluation of other criteria, use this or other similar programs.

COMMON PANEL 3C

BERKELEY COUNTY WATER AND SANITATION
POTABLE WATER & SANITARY SEWER STANDARDS

Rev. 05/10

RESTRAINED JOINT TABLE FOR TEES

Minimum branch length to be restrained (Feet):

PVC PIPE

Branch Pipe Size (in.)	Run Pipe Size (In.)													
	3	4	6	8	10	12	14	16	18	20	24	30	36	42
3	6	1	1	1	1	1	1	1	1	1	1	1	1	Not Recommended
4	17	12	1	1	1	1	1	1	1	1	1	1	1	
6	39	36	26	17	8	1	1	1	1	1	1	1	1	
8	61	58	50	42	33	26	18	11	4	1	1	1	1	
10	78	76	69	62	54	47	40	33	26	20	7	1	1	
12	97	95	89	82	75	68	61	54	48	41	28	12	1	
14	115	113	107	101	95	88	81	75	68	61	48	31	16	
16	133	131	126	120	114	108	101	94	88	81	68	50	34	
18	151	149	144	139	133	127	120	114	107	100	87	69	52	
20	168	166	162	157	151	145	139	132	126	119	106	87	69	
24	203	201	197	192	187	181	175	169	163	156	143	124	104	
30	253	252	248	244	239	234	228	222	216	209	196	176	155	
36	305	304	300	296	292	287	281	275	269	263	249	229	207	

DUCTILE IRON PIPE

Branch Pipe Size (in.)	Run Pipe Size (In.)													
	3	4	6	8	10	12	14	16	18	20	24	30	36	42
3	4	1	1	1	1	1	1	1	1	1	1	1	1	1
4	11	8	1	1	1	1	1	1	1	1	1	1	1	1
6	26	24	17	12	5	1	1	1	1	1	1	1	1	1
8	40	38	33	28	22	17	12	7	3	1	1	1	1	1
10	52	50	46	41	36	31	27	22	17	13	5	1	1	1
12	65	63	59	55	50	46	41	36	32	27	19	8	1	1
14	76	75	71	67	63	59	54	50	45	41	32	21	11	2
16	88	87	83	80	76	72	67	63	58	54	45	33	23	13
18	100	99	95	92	88	84	80	75	71	67	58	46	34	24
20	111	110	107	104	100	96	92	88	84	79	70	58	46	35
24	134	133	131	127	124	120	116	112	108	104	95	82	69	57
30	168	167	164	162	158	155	151	147	143	139	130	117	103	90
36	202	201	199	196	193	190	186	182	178	174	165	152	138	124
42	235	235	232	230	227	224	220	216	212	208	200	186	171	156
48	270	269	267	264	262	258	255	251	247	243	234	221	205	190

Table is based upon Class II soil type SP, trench type 4, 150 psi testing pressure, a safety factor of 1.5, an assumed minimum cover of 3', and the minimum attached length of pipe (Lr) to extend in each direction along the run of the tee is 5'. This table was derived from EBAA Iron, Inc. Restrained Length Calculation Program. For evaluation of other criteria, use this or other similar programs.

COMMON PANEL 3B

BERKELEY COUNTY WATER AND SANITATION
POTABLE WATER & SANITARY SEWER STANDARDS

Rev. 05/10

RESTRAINED JOINT TABLE FOR DEAD ENDS

Minimum length to be restrained from dead end (Feet):

PVC Pipe (in.)	Restrainment Length (ft.)	D.I. Pipe (in.)	Restrainment Length (ft.)
3	32	3	20
4	38	4	24
6	53	6	34
8	70	8	45
10	84	10	53
12	99	12	63
14	112	14	71
16	127	16	80
18	140	18	89
20	153	20	97
24	179	24	113
30	214	30	136
36	248	36	157
		42	176
		48	195

Table is based upon Class II soil types SP, trench type 4, 150 psi testing pressure, a safety factor of 1.5, and an assumed minimum cover of 3'. This table was derived from EBAA Iron, Inc. Restrained Length Calculation Program. For evaluation of other criteria, use this or other similar programs.

COMMON PANEL 3D

BERKELEY COUNTY WATER AND SANITATION
POTABLE WATER & SANITARY SEWER STANDARDS

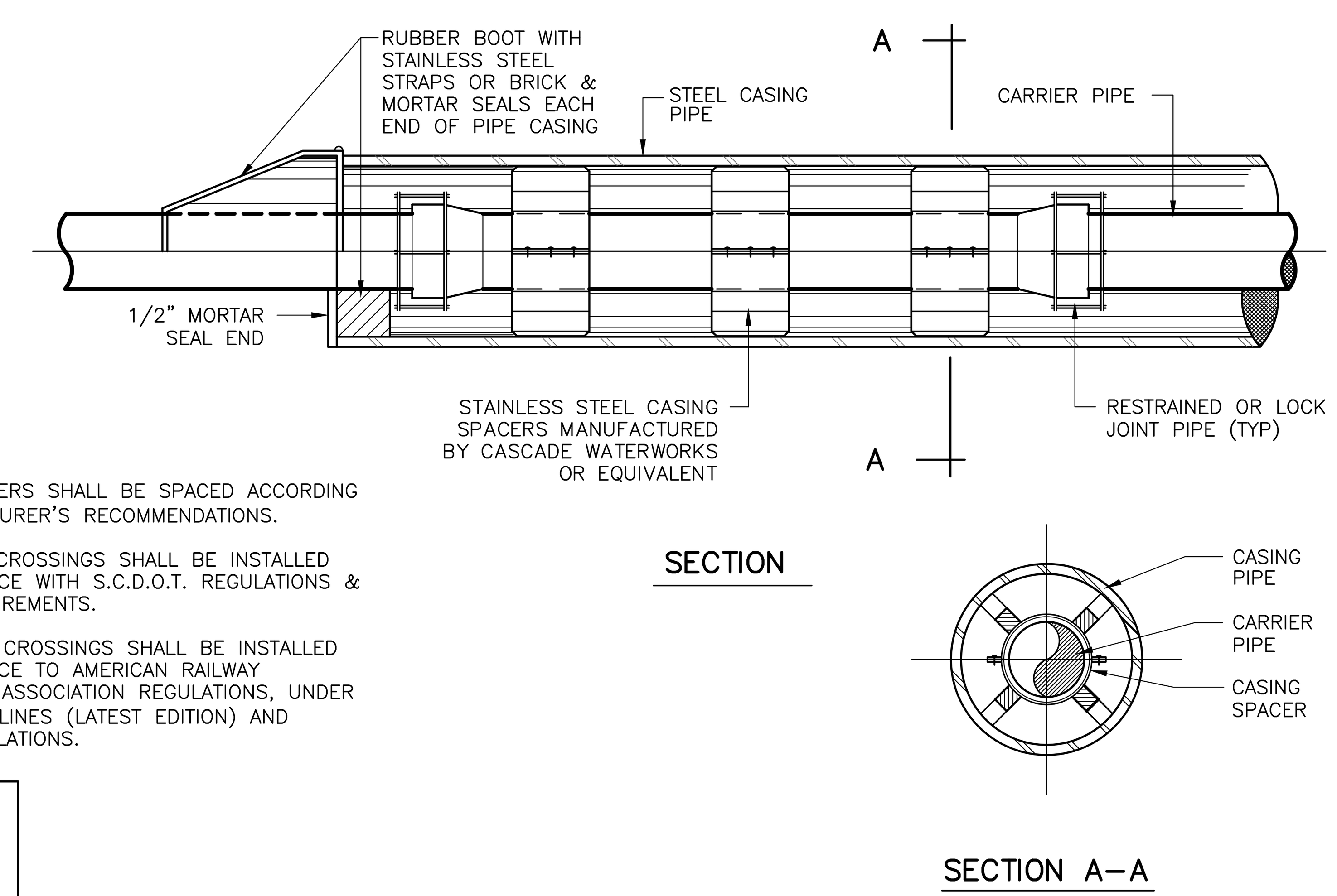
Rev. 05/10

WATER NOTES:

1. WATER INSTALLATION SHALL BE IN ACCORDANCE WITH "TEN STATES STANDARDS," S.C.D.H.E.C. AND B.C.W.S REGULATIONS.
2. CONTRACTOR SHALL SCHEDULE A PRE-CONSTRUCTION MEETING WITH B.C.W.S. AT LEAST 72 HOURS PRIOR TO BEGINNING WORK.
3. CONTRACTOR SHALL VERIFY THE LOCATION AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO BEGINNING WORK. CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES FOUND IN THE FIELD OR ON THE DRAWINGS PRIOR TO BEGINNING OR CONTINUING WORK. ANY DEVIATIONS FROM THE CONSTRUCTION PLANS SHALL NEED TO BE APPROVED IN WRITING BY B.C.W.S.
4. CONNECTION TO EXISTING WATER SYSTEM SHALL BE MADE IN THE PRESENCE OF B.C.W.S. INSPECTOR WITH AT LEAST 72 HOURS ADVANCED NOTICE.
5. ALL WATER LINES SHALL HAVE A MINIMUM COVER OF 36".
6. D.I.P. SHALL BE INSTALLED
   - AT ALL ROAD CROSSINGS UNDER PAVEMENT
   - WHEN CROSSING UNDER AN OPEN DITCH WITH LESS THAN 3' OF CLEARANCE
   - WHEN CROSSING UNDER PIPED STORM DRAINAGE WITH LESS THAN 2' OF CLEARANCE
7. FIRE HYDRANTS, WATER VALVES AND OTHER WATER SYMBOLS MAY BE SHOWN IN LARGE SCALE FOR CLARITY. WATER VALVES, VALVE BOXES AND COVERS SHALL NOT BE LOCATED WITHIN PAVED AREAS. FIRE HYDRANTS SHALL BE PLACED AS CLOSE AS POSSIBLE TO THE WATER MAIN IN ORDER TO REMAIN WITHIN THE RIGHT-OF-WAY.
8. HYDRANTS SHALL BE INSTALLED BASED ON THE BURY DEPTH OF THE WATER MAIN UNLESS OTHERWISE NOTED. HYDRANT EXTENSIONS ARE NOT ALLOWED UNLESS THE DEPTH OF THE WATER MAIN EXCEEDS 6'.
9. WATER SERVICE AND SEWER SERVICE FOR EACH LOT SHALL MAINTAIN A MINIMUM 5' OF SEPARATION.
10. DEFLECT WATER LINES IN LIEU OF FITTINGS IN ACCORDANCE WITH THE PIPE MANUFACTURER'S SPECIFICATIONS.
11. ALL FITTINGS, VALVES AND HYDRANTS SHALL BE PROVIDED WITH RESTRAINED JOINT FITTINGS PER B.C.W.S. REQUIREMENTS.
12. WATER SERVICE STUBOUTS & SERVICE TEE SHALL BE INSTALLED WITHIN THE RIGHT-OF-WAY OR GENERAL UTILITY EASEMENT (GUE) AND HAVE A MINIMUM 1 FOOT SEPARATION FROM SIDEWALKS. INSTALL WATER SERVICE STUBOUTS NO MORE THAN 18" FROM THE COMMON PROPERTY CORNER UNLESS OTHERWISE NOTED ON THE CONSTRUCTION PLANS.
13. CONTRACTOR SHALL SCHEDULE ALL REQUIRED TESTS AND INSPECTIONS WITH B.C.W.S. AT LEAST 72 HOURS IN ADVANCE. A SET OF RECORD DRAWINGS SHALL BE PROVIDED TO B.C.W.S INSPECTOR FOR FINAL INSPECTION.
14. CONTRACTOR SHALL KEEP A RED-LINED SET OF THE CONSTRUCTION DRAWINGS ON SITE AT ALL TIMES.

WATER PANEL 13

BERKELEY COUNTY WATER AND SANITATION
POTABLE WATER & SANITARY SEWER STANDARDS
REVISED: 6/15/15



NOTES:
1. CASING SPACERS SHALL BE SPACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
2. ALL HIGHWAY CROSSINGS SHALL BE INSTALLED IN ACCORDANCE WITH S.C.D.O.T. REGULATIONS & PERMIT REQUIREMENTS.
3. ALL RAILROAD CROSSINGS SHALL BE INSTALLED IN ACCORDANCE TO AMERICAN RAILWAY ENGINEERING ASSOCIATION REGULATIONS, UNDER PART 5, PIPELINES (LATEST EDITION) AND PERMIT REGULATIONS.

CASING PIPE DETAIL
NOT TO SCALE

W18
OCT. 2008
THOMAS & HUTTON ENGINEERING CO.

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DIV. I – WATER MAIN DETAILS

REVISIONS: NO. | BY | DATE

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DATE:	01/11/21
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DESIGNED:	LHB
REVIEWED:	PLB
APPROVED:	LHB
SCALE:	N/A

C3.3

STORMWATER POLLUTION PREVENTION PLAN

I. SITE DESCRIPTION

A. PROJECT DESCRIPTION

A.1.	PROJECT AREA	13.5 ACRES
A.2.	AREA DISTURBED	13.5 ACRES
A.3.	PERCENT IMPERVIOUS AREA BEFORE CONSTRUCTION	0.75 %
A.4.	RUNOFF COEFFICIENT BEFORE CONSTRUCTION	82 CN
A.5.	PERCENT IMPERVIOUS AREA AFTER CONSTRUCTION	1.9 %
A.6.	RUNOFF COEFFICIENT AFTER CONSTRUCTION	82 CN

B. DESCRIPTION OF CONSTRUCTION ACTIVITY

WORK CONSISTS OF THE INSTALLATION OF 15,200 LF OF 16-INCH WATER MAIN .

C. RUNOFF DATA

C.1. SOIL CLASSIFICATIONS: (HSG) B, C, A/D, B/D, C/D
C.2. LAND USE(S): RESIDENTIAL / AGRICULTURAL

D. RECEIVING WATERS

D.1. CLOSEST RECEIVING WATERS: TIMOTHY CREEK
D.2. ULTIMATE RECEIVING WATERS: FOUR HOLE SWAMP

E. FLOOD

E.1. FEMA FLOOD ZONE(S): X
FEMA FLOOD INSURANCE MAP(S): 45015C0350D (10/16/2013), 45035C0215E (07/18/2017), 45035C0220E (07/18/2017)

II. CONTROL MEASURES

1. EROSION AND SEDIMENT CONTROLS

PRIOR TO START OF CONSTRUCTION, ALL EXTERIOR SILT FENCE WILL BE INSTALLED AS SHOWN ON THE PLANS.

1.1. CLEARING

1.1.1. AS CLEARING IS COMPLETED, ADDITIONAL SILT FENCE WILL BE INSTALLED WHERE NECESSARY, SUCH AS POINTS WHERE FLOWS BECOME CHANNELIZED, AND OTHER POINTS WHERE EXCESSIVE RUNOFF VELOCITIES MAY OCCUR.
1.1.2. INSTALL CONSTRUCTION ENTRANCES / EXITS BEFORE BEGINNING CLEARING
1.1.3. CONSTRUCTION DELAYS IN ANY ONE AREA GREATER THAN 14 DAYS PRIOR TO START OF ROUGH GRADING WILL MANDATE STABILIZATION PROCEDURES. ACCEPTABLE METHODS OF STABILIZATION INCLUDE MULCHING AND TEMPORARY SEEDING.
1.1.4. MAINTAIN EXISTING VEGETATION WHENEVER POSSIBLE AND MINIMIZE THE AREA OF DISTURBANCE. RETAIN AND PROTECT TREES TO ENHANCE FUTURE LANDSCAPING EFFORTS AND REDUCE RAINDROP IMPACT.
1.1.5. INSTALL ALL SEDIMENT CONTROL PRACTICES PRIOR TO ANY UP-SLOPE SOIL DISTURBING ACTIVITIES.
1.1.6. PHASE CONSTRUCTION ACTIVITIES TO MINIMIZE THE AREAS DISTURBED AT ONE TIME. THIS WILL ALSO ALLOW COMPLETED AREAS TO BE STABILIZED AND RE-VEGETATED BEFORE DISTURBING ADJACENT SITES. THE NEED FOR TEMPORARY EROSION CONTROL MEASURES MAY BE AVOIDED BY COMPLETING A PHASE AND INSTALLING PERMANENT EROSION CONTROL MEASURES WHEN THE FINAL GRADE IS ATTAINED.
1.1.7. MAINTAIN AND PROTECT ALL NATURAL WATERWAYS. RETAIN AT LEAST A 35-FOOT UNDISTURBED BUFFER OF NATURAL VEGETATION ALONG ALL WATERWAYS TO FILTER OUT SEDIMENT AND OTHER POLLUTANTS. MAINTAIN A 45-FOOT UNDISTURBED BUFFER AROUND SENSITIVE WATERS.
1.1.8. INSTALL SILT FENCE (OR BIO ROLLS/ROCK SOCK PRODUCTS) ON THE DOWN-SLOPE PERIMETER OF ALL DISTURBED AREAS PRIOR TO ANY SOIL DISTURBING ACTIVITIES (INCLUDING CLEARING AND GRUBBING). SILT FENCE CAN TREAT A MAXIMUM OF 100 SQUARE FEET PER LINEAL FOOT OF FENCE. INSTALL SILT FENCE IN SHORTER REACHES ON THE CONTOUR WITH EACH END TURNED UP-SLOPE . SWALES AND SHORELAND AREAS SHOULD ALSO BE PROTECTED WITH SILT FENCE, BIO ROLLS, OR ROCK SOCKS.
1.1.9. IN AREAS OF CONCENTRATED FLOW INSTALL STRAW BALE CHECKS, ROCK CHECK DAMS, TRIANGULAR DIKES, BIO ROLL BLANKETS, OR ROCK SOCKS TO SLOW RUNOFF AND TRAP SEDIMENT.

1.1.10. USE TEMPORARY SLOPE DRAINS OR ROCK CHUTES TO MOVE WATER DOWN STEEP SLOPES.

1.1.11. CONSTRUCT SEDIMENT BASINS FOR DRAINAGE AREAS GREATER THAN 10 ACRES

1.2. ROUGH GRADING

1.2.1. ALL EXISTING CONTROLS WILL BE MAINTAINED DURING ROUGH GRADING, DELAYS OF GREATER THAN 14 DAYS PRIOR TO START OF NEXT ACTIVITY WILL MANDATE STABILIZATION PROCEDURES. ACCEPTABLE METHODS OF STABILIZATION INCLUDE MULCHING AND TEMPORARY SEEDING.
1.2.2. ALL AREAS NOT SUBJECT TO FURTHER CONSTRUCTION (DRAINAGE, SANITARY SEWER, ROADS, WATER DISTRIBUTION SYSTEMS, OR STORM WATER FACILITIES) SHALL BE GRASSED WITH A PERMANENT COVER.
1.2.3. COVER ANY STOCK PILED TOPSOIL WITH PLASTIC (OR OTHER IMPERVIOUS COVERING) OR USE A TEMPORARY SEED MIX. USE STOCKPILED TOPSOIL AS EARTHEN BERMS TO SERVE AS TEMPORARY SEDIMENT BASINS.

1.3. DRAINAGE

1.3.1. ALL EXISTING CONTROLS WILL BE MAINTAINED DURING DRAINAGE INSTALLATION.
1.3.2. CONSTRUCTION DRAINAGE WILL BE ROUTED THROUGH LAKES, WHICH WILL ACT AS SEDIMENT BASINS OR OTHER ACCEPTABLE SEDIMENT BASINS/TRAPS.
1.3.3. STORM DRAIN INLET PROTECTION AS SHOWN ON DETAIL SHEET SHALL BE INSTALLED ON ALL CURB INLETS, STORM DRAIN MANHOLES, JUNCTION BOXES, AND GRATE INLETS.
1.3.4. DELAYS OF GREATER THAN 14 DAYS PRIOR TO START OF THE NEXT CONSTRUCTION SEQUENCE WILL MANDATE STABILIZATION PROCEDURES. ACCEPTABLE METHODS OF STABILIZATION INCLUDE MULCHING AND TEMPORARY SEEDING.
1.3.5. ALL STORM LINES NOT IN STREETS OR OTHER PAVED AREAS ARE TO BE MULCHED AND SEEDED WITHIN 5 DAYS AFTER BACKFILL.

1.4. WASTE DISTRIBUTION SYSTEM INSTALLATION

1.4.1. ALL EXISTING CONTROLS WILL BE MAINTAINED DURING INSTALLATION OF THE WATER DISTRIBUTION SYSTEM.
1.4.2. DELAYS OF GREATER THAN 14 DAYS PRIOR TO START OF NEXT ACTIVITY WILL MANDATE STABILIZATION PROCEDURES. ACCEPTABLE METHODS OF STABILIZATION INCLUDE MULCHING AND TEMPORARY SEEDING.

1.5. WASTEWATER COLLECTION SYSTEM INSTALLATION

1.5.1. ALL EXISTING CONTROLS WILL BE MAINTAINED DURING INSTALLATION OF THE WASTEWATER SYSTEM.
1.5.2. DELAYS OF GREATER THAN 14 DAYS PRIOR TO START OF NEXT ACTIVITY WILL MANDATE STABILIZATION PROCEDURES. ACCEPTABLE METHODS OF STABILIZATION INCLUDE MULCHING AND TEMPORARY SEEDING.

1.6. CONSTRUCTION OF ROADS

1.6.1. ALL EXISTING CONTROLS WILL BE MAINTAINED DURING ROAD CONSTRUCTION.
1.6.2. DELAYS OF GREATER THAN 14 DAYS PRIOR TO START OF NEXT ACTIVITY WILL MANDATE STABILIZATION PROCEDURES. ACCEPTABLE METHODS OF STABILIZATION INCLUDE MULCHING AND TEMPORARY SEEDING.

1.7. GRASSING

1.7.1. ALL EXISTING CONTROLS WILL BE MAINTAINED UNTIL GRASSING IS ESTABLISHED
1.7.2. ANY AREAS THAT ERODE OR WHERE GRASS DOES NOT ESTABLISH ITSELF SHALL BE RE-GRADED AND RE-GRASSED.

2. STORM WATER MANAGEMENT

RUNOFF FROM THIS PROJECT WILL DISCHARGE INTO A STORM WATER MANAGEMENT SYSTEM. TREATMENT WILL OCCUR IN STORM WATER DETENTION PONDS.

3. OTHER CONTROLS

3.1. WASTE DISPOSAL

3.1.1. NO SOLID MATERIALS, INCLUDING BUILDING MATERIALS, SHALL BE DISCHARGED TO ANY RECEIVING WATERS.
3.1.2. OFFSITE VEHICLE TRACKING OF SEDIMENTS AND THE GENERATION OF DUST SHALL BE MINIMIZED.
3.1.3. THIS PLAN SHALL COMPLY WITH STATE AND/OR LOCAL WASTE DISPOSAL, SANITARY SEWER OR SEPTIC SYSTEM REGULATIONS.
3.1.4. DUST CONTROL ON DISTURBED AREAS - CONTROLLING SURFACE AND AIR MOVEMENT OF DUST ON CONSTRUCTION SITE AND HAUL ROUTES. THE PURPOSE OF THE MEASURE IS TO REDUCE THE PRESENCE OF AIRBORNE SUBSTANCES, WHICH MAY BE HARMFUL OR INJURIOUS TO HUMAN HEALTH, WELFARE OR SAFETY, OR TO ANIMALS OR PLANT LIFE.

III. MAINTENANCE

1. MAINTENANCE PROGRAM

1.1. THE SITE SUPERINTENDENT, OR HIS/HER REPRESENTATIVE, SHALL MAKE VISUAL INSPECTIONS OF ALL MECHANICAL CONTROLS AND NEWLY STABILIZED AREAS (I.E. SEEDED AND MULCHED AND/OR SODDED AREAS) ON A DAILY BASIS; ESPECIALLY AFTER HEAVY RAINFALL EVENT TO INSURE THAT ALL CONTROLS ARE MAINTAINED AND PROPERLY FUNCTIONING. ANY DAMAGED CONTROLS SHALL BE REPAIRED PRIOR TO THE END OF THE WORK DAY INCLUDING RE-SEEDING AND MULCHING OR RE-SODDING IF NECESSARY.

1.2. EROSION CONTROL MEASURES WILL BE MAINTAINED AT ALL TIMES. IF FULL IMPLEMENTATION OF THE APPROVED PLAN DOES NOT PROVIDE FOR EFFECTIVE EROSION CONTROL, ADDITIONAL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE IMPLEMENTED TO CONTROL OR TREAT THE SEDIMENT SOURCE. ALL DRAINAGE SWALES, POCKETS, DEPRESSION, LOW LINES, AND OUTLET DITCHES SHALL DRAIN EFFECTIVELY AT ALL TIMES. SETTLEMENT OR WASHING THAT MAY OCCUR SHALL BE REPAIRED BY THE CONTRACTOR. SEDIMENT WILL BE REMOVED FROM BEHIND THE SEDIMENT FENCE WHEN IT REACHES 1/3 THE HEIGHT OF THE FENCE. THE SEDIMENT FENCE WILL BE REPAIRED AS NECESSARY TO MAINTAIN AN EFFECTIVE BARRIER. MAINTAIN THE CONSTRUCTION EXIT IN A CONDITION TO PREVENT MUD OR SEDIMENT FROM LEAVING THE SITE. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE. IMMEDIATELY REMOVE ALL OBJECTIONABLE MATERIALS SPILLED, WASHED, OR TACKED ONTO PUBLIC ROADWAYS. RESEED AND MULCH AREA WHERE SEEDING EMERGENCE IS POOR, OR WHERE EROSION OCCURS. PROTECT FROM TRAFFIC AS MUCH AS POSSIBLE. INSPECT ALL MULCHES PERIODICALLY, AND AFTER RAINSTORMS TO CHECK FOR EROSION, DISLOCATION OR FAILURE. IF WASHOUT OCCURS, REPAIR THE SLOPE GRADE, RESEED AND REINSTALL MULCH. FOLLOW THE CONSTRUCTION SEQUENCE THROUGHOUT THE PROJECT DEVELOPMENT. WHEN CHANGES IN CONSTRUCTION ACTIVITIES ARE NEEDED, AMEND THE SEQUENCE SCHEDULE IN ADVANCE TO MAINTAIN MANAGEMENT CONTROL. IF MAJOR CHANGES ARE NECESSARY, SEND A COPY OF THE MODIFIED SCHEDULE TO THE ENGINEER, SEDIMENT AND EROSION CONTROL MEASURES WILL REMAIN IN PLACE AND BE MAINTAINED UNTIL THE DISTURBED AREAS ARE STABILIZED.

2. SILT FENCE

SILT FENCES WILL BE MONITORED DURING CONSTRUCTION. ANY SILT FENCE WHICH IS NOT FUNCTIONING PROPERLY WILL BE PROMPTLY REPAIRED. CLEAN OUT THE SILT FENCE WHEN IT REACHES 1/3 THE HEIGHT OF THE FENCE OR REPLACE WITH FUNCTIONAL SILT FENCE WITHIN 24 HOURS. USE OF HOSES AND WATER TO FLUSH THE SEDIMENT INTO THE STORM INLETS IS UNACCEPTABLE.

3. SEDIMENTATION BASINS

SEDIMENTATION BASINS WHICH ARE AT 50% USED CAPACITY OR APPROACHING SUCH CAPACITY SHALL BE RE-EXCAVATED TO ORIGINAL DIMENSIONS AND THE SILT PROPERLY DISPOSED OF.

4. SEDIMENT LOGS/ROLLS

SEDIMENT LOGS/ROLLS OR OTHER CONTROL MEASURES WHICH BEGIN TO DISINTEGRATE OR FUNCTION INEFFECTIVELY SHALL BE PROMPTLY REPLACED.

5. VEGETATION COVER

ANY VEGETATION COVER SERVING TO STABILIZE DISTURBED SOILS WHICH IS ITSELF DISTURBED SHALL IMMEDIATELY BE REPLACED.

6. CONSTRUCTION ENTRANCE

MAINTAIN ROCK CONSTRUCTION ENTRANCE AND CLEAN ADJACENT ROADS OF ANY MUD TRACKED ONTO THEM.

IV. INSPECTIONS

1. QUALIFIED PERSONNEL WILL INSPECT DISTURBED AREAS OF THE CONSTRUCTION SITE, AREAS USED FOR STORAGE OF MATERIALS THAT ARE EXPOSED TO PRECIPITATION THAT HAVE NOT BEEN FINALLY STABILIZED, STRUCTURAL CONTROL MEASURES, AND LOCATIONS WHERE VEHICLES ENTER OR EXIT THE SITE AT LEAST ONCE EVERY SEVEN CALENDAR DAYS. WHERE SITES HAVE BEEN FINALLY STABILIZED SUCH INSPECTIONS SHALL BE CONDUCTED AT LEAST ONCE EVERY MONTH DURING THE WARRANTY PERIOD.

2. DISTURBED AREAS AND AREAS USED FOR STORAGE OF MATERIALS THAT ARE EXPOSED TO PRECIPITATION SHALL BE INSPECTED FOR EVIDENCE OF, OR THE POTENTIAL FOR, POLLUTANTS ENTERING THE DRAINAGE SYSTEM. EROSION AND SEDIMENT CONTROL MEASURES IDENTIFIED IN THE PLAN SHALL BE OBSERVED TO ENSURE THAT THEY ARE OPERATING CORRECTLY. WHERE DISCHARGE LOCATIONS OR POINTS ARE ACCESSIBLE, THEY SHALL BE INSPECTED TO ASCERTAIN WHETHER EROSION CONTROL MEASURES ARE EFFECTIVE IN PREVENTING SIGNIFICANT IMPACTS TO RECEIVING WATERS. LOCATIONS WHERE VEHICLES ENTER OR EXIT THE SITE SHALL BE INSPECTED FOR EVIDENCE OF OFFSITE SEDIMENT TRACKING.

3. A WRITTEN REPORT SUMMARIZING THE SCOPE OF THE INSPECTION, NAME(S) AND QUALIFICATIONS OF PERSONNEL MAKING THE INSPECTION, THE DATE(S) OF THE INSPECTION, WEATHER INFORMATION FOR THE PERIOD SINCE THE LAST INSPECTION (OR SINCE COMMENCEMENT OF CONSTRUCTION ACTIVITY) INCLUDING A BEST ESTIMATE OF THE BEGINNING OF EACH STORM EVENT, DURATION OF EACH STORM EVENT, APPROXIMATE AMOUNT OF RAINFALL FOR EACH STORM EVENT (IN INCHES) AND WHETHER ANY DISCHARGES OCCURRED, LOCATION(S) OF DISCHARGES OF SEDIMENT OR OTHER POLLUTANTS FROM THE SITE, LOCATION(S) OF BMP'S THAT NEED MAINTENANCE, LOCATION(S) OF BMP'S THAT FAILED TO OPERATE AS DESIGNED OR PROVED INADEQUATE FOR A PARTICULAR LOCATION, LOCATION(S) WHERE ADDITIONAL BMP'S ARE NEEDED THAT DID NOT EXIST AT THE TIME OF INSPECTION AND ANY CORRECTIVE ACTION REQUIRED INCLUDING ANY CHANGES TO SWPPP NECESSARY AND IMPLEMENTATION DATES.

4. THE REPORT SHALL BE MAINTAINED AT LEAST THREE YEARS FROM THE DATE THE SITE IS FINALLY STABILIZED. THE REPORT MUST BE SIGNED AND SHALL CONTAIN A CERTIFICATION THAT THE FACILITY IS IN COMPLIANCE WITH THE STORM WATER POLLUTION PREVENTION PLAN AND THE NPDES PERMIT REFERENCED ABOVE. THE CONTRACTOR SHALL MAINTAIN THIS REPORT. THE REPORT SHALL BE SUBMITTED TO THE ENGINEER AND OWNER.

V. LONG TERM MAINTENANCE OF DRAINAGE AND STORM WATER MANAGEMENT SYSTEM

THE ROADS AND DRAINAGE SYSTEM WILL BE OWNED AND MAINTAINED BY BERKELEY COUNTY AFTER CONSTRUCTION IS COMPLETE.

VI. SC DHEC STANDARD NOTES

1. IF NECESSARY, SLOPES WHICH EXCEED EIGHT (8) VERTICAL FEET SHOULD BE STABILIZED WITH SYNTHETIC OR VEGETATIVE MATS, IN ADDITION TO GRASSING / HYDROSEEDING. IT MAY BE NECESSARY TO INSTALL TEMPORARY SLOPE DRAINS DURING CONSTRUCTION. TEMPORARY BERMS MAY BE NEEDED UNTIL THE SLOPE IS BROUGHT TO GRADE.

2. STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE IN PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITIES HAVE TEMPORARILY OR PERMANENTLY CEASED, BUT IN NO CASE MORE THAN FOURTEEN (14) DAYS AFTER WORK HAS CEASED, EXCEPT AS STATED BELOW:

2.1. WHERE STABILIZATION BY THE 14TH DAY IS PRECLUDED BY SNOW COVER OR FROZEN GROUND CONDITIONS STABILIZATION MEASURES MUST BE INITIATED AS SOON AS PRACTICABLE.
2.2. WHERE CONSTRUCTION ACTIVITY ON A PORTION OF THE SITE IS TEMPORARILY CEASED, AND EARTH-DISTURBING ACTIVITIES WILL BE RESUMED WITHIN 14 DAYS, TEMPORARY STABILIZATION MEASURES DO NOT HAVE TO BE INITIATED ON THAT PORTION OF THE SITE.

3. ALL SEDIMENT AND EROSION CONTROL DEVICES SHALL BE INSPECTED ONCE EVERY CALENDAR WEEK. IF SITE INSPECTIONS IDENTIFY BMP'S THAT ARE DAMAGED OR ARE NOT OPERATING EFFECTIVELY, MAINTENANCE MUST BE PERFORMED AS SOON AS PRACTICAL OR AS REASONABLY POSSIBLE BEFORE THE NEXT STORM EVENT WHENEVER PRACTICAL.

4. PROVIDE SILT FENCE AND/OR OTHER CONTROL DEVICES, AS MAY BE REQUIRED, TO CONTROL SOIL EROSION DURING UTILITY CONSTRUCTION. ALL DISTURBED AREAS SHALL BE CLEANED, GRADED AND STABILIZED WITH GRASSING IMMEDIATELY AFTER THE UTILITY INSTALLATION. FILL, COVER, AND TEMPORARY SEEDING AT THE END OF EACH DAY ARE RECOMMENDED. IF WATER IS ENCOUNTERED WHILE TRENCHING, THE WATER SHOULD BE FILTERED TO REMOVE ANY SEDIMENTS BEFORE BEING PUMPED INTO ANY WATERS OF THE STATE.

5. ALL EROSION CONTROL DEVICES SHALL BE PROPERLY MAINTAINED DURING ALL PHASES OF CONSTRUCTION UNTIL THE COMPLETION OF ALL CONSTRUCTION ACTIVITIES AND ALL DISTURBED AREAS HAVE BEEN STABILIZED. ADDITIONAL CONTROL DEVICES MAY BE REQUIRED DURING CONSTRUCTION IN ORDER TO CONTROL EROSION AND/OR OFFSITE SEDIMENTATION. ALL TEMPORARY CONTROL DEVICES SHALL BE REMOVED ONCE CONSTRUCTION IS COMPLETE AND THE SITE IS STABILIZED.

6. THE CONTRACTOR MUST TAKE NECESSARY ACTION TO MINIMIZE THE TRACKING OF MUD ONTO THE PAVED ROADWAY FROM CONSTRUCTION AREAS AND THE GENERATION OF DUST. THE CONTRACTOR SHALL DAILY REMOVE MUD/SOIL FROM PAVEMENT AS MAY BE REQUIRED.

7. RESIDENTIAL SUBDIVISIONS REQUIRE EROSION CONTROL FEATURES FOR INFRASTRUCTURE AS WELL AS FOR INDIVIDUAL LOT CONSTRUCTION. INDIVIDUAL PROPERTY OWNERS SHALL FOLLOW THESE PLANS DURING CONSTRUCTION OR OBTAIN APPROVAL OF AN INDIVIDUAL PLAN IN ACCORDANCE WITH S.C. REG. 72-300 AND SCR100000.

8. TEMPORARY DIVERSION BERMS AND/OR DITCHES WILL BE PROVIDED AS NEEDED DURING CONSTRUCTION TO PROTECT WORK AREAS FROM UPSLOPE RUNOFF AND/OR TO DIVERT SEDIMENT LADEN WATER TO APPROPRIATE TRAPS OR STABLE OUTLETS.

9. ALL WATERS OF THE STATE (WOS), INCLUDING WETLANDS, ARE TO BE FLAGGED OR OTHERWISE CLEARLY MARKED IN THE FIELD. A DOUBLE ROW OF SILT FENCE IS TO BE INSTALLED IN ALL AREAS WHERE A 50-FOOT BUFFER CAN NOT BE MAINTAINED BETWEEN THE DISTURBED AREA AND ALL WOS. A 10-FOOT BUFFER SHOULD BE MAINTAINED BETWEEN THE LAST ROW OF SILT FENCE AND ALL WOS

10. LITTER, CONSTRUCTION DEBRIS, OILS, FUELS, AND BUILDING PRODUCTS WITH SIGNIFICANT POTENTIAL FOR IMPACT (SUCH AS STOCKPILES OF FRESHLY TREATED LUMBER) AND CONSTRUCTION CHEMICALS THAT COULD BE EXPOSED TO STORM WATER MUST BE PREVENTED FROM BECOMING A POLLUTANT SOURCE IN STORM WATER DISCHARGES.

11. A COPY OF THE SWPPP, INSPECTION RECORDS AND RAINFALL DATA MUST BE RETAINED AT THE CONSTRUCTION SITE OR A NEARBY LOCATION EASILY ACCESSIBLE DURING NORMAL BUSINESS HOURS, FROM THE DATE OF COMMENCEMENT OF CONSTRUCTION ACTIVITIES TO THE DATE THAT FINAL STABILIZATION IS REACHED.

12. INITIATE STABILIZATION MEASURES ON ANY EXPOSED STEEP SLOPE (3H:1V OR GREATER) WHERE LAND DISTURBING ACTIVITIES HAVE PERMANENTLY OR TEMPORARILY CEASED, AND WILL NOT RESUME FOR A PERIOD OF 7 CALENDAR DAYS.

13. MINIMIZE SOIL COMPACTION IN AREAS NOT UNDER PAVEMENTS AND /OR STRUCTURES AND, UNLESS INFEASIBLE, PRESERVE TOPSOIL.

14. MINIMIZE THE DISCHARGE OF POLLUTANTS FROM EQUIPMENT AND VEHICLE WASHING, WHEEL WASH WATER AND OTHER WASH WATERS. WASH WATERS MUST BE TREATED IN A SEDIMENT BASIN OR ALTERNATIVE CONTROL THAT PROVIDES EQUAL OR BETTER TREATMENT PRIOR TO DISCHARGE.

15. MINIMIZE THE DISCHARGE OF POLLUTANTS FROM DEWATERING OF TRENCHES AND EXCAVATED AREAS. THESE DISCHARGES ARE TO BE ROUTED THROUGH APPROPRIATE BMPS (SEDIMENT BASIN, FILTER BAG, ETC.).

16. THE FOLLOWING DISCHARGES ARE PROHIBITED:

16.1. WASTEWATER FROM WASHOUT OF CONCRETE, UNLESS MANAGED BY AN APPROPRIATE CONTROL;
16.2. WASTEWATER FROM WASHOUT AND CLEANOUT OF OF STUCCO, PAINT, FORM RELEASE OILS, CURING COMPOUNDS AND OTHER CONSTRUCTION MATERIALS;
16.3. FUELS, OILS OR OTHER POLLUTANTS USED IN VEHICLE AND EQUIPMENT OPERATION AND MAINTENANCE; AND
16.4. SOAPS OR SOLVENTS USED IN VEHICLE AND EQUIPMENT WASHING.

17. AFTER CONSTRUCTION ACTIVITIES BEGIN, INSPECTIONS MUST BE CONDUCTED AT A MINIMUM OF AT LEAST ONCE EVERY CALENDAR WEEK AND MUST BE CONDUCTED UNTIL FINAL STABILIZATION IS REACHED ON ALL AREAS OF THE CONSTRUCTION SITE.

18. IF EXISTING BMPS NEED TO BE MODIFIED OR IF ADDITIONAL BMPS ARE NECESSARY TO COMPLY WITH THE REQUIREMENTS OF PERMIT SCR100000 AND/OR SC'S WATER QUALITY STANDARDS, IMPLEMENTATION MUST BE COMPLETED BEFORE THE NEXT STORM WATER EVENT WHENEVER PRACTICABLE. IF IMPLEMENTATION BEFORE THE NEXT STORM EVENT IS IMPRACTICABLE, THE SITUATION MUST BE DOCUMENTED IN THE SWPPP AND ALTERNATIVE BMPS MUST BE IMPLEMENTED AS SOON AS REASONABLY POSSIBLE.

19. A PRE-CONSTRUCTION CONFERENCE MUST BE HELD FOR EACH CONSTRUCTION SITE WITH AN APPROVED ON-SITE SWPPP PRIOR TO THE IMPLEMENTATION OF CONSTRUCTION ACTIVITIES. FOR NON-LINEAR PROJECTS THAT DISTURB 10 ACRES OR MORE, THIS CONFERENCE MUST BE HELD ON-SITE UNLESS THE DEPARTMENT HAS APPROVED OTHERWISE.

VII. EROSION, SEDIMENTATION & POLLUTION CONTROL NOTES

1. THE IMPLEMENTATION OF THESE EROSION SEDIMENT CONTROL (ESC) PLANS AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF THESE ESC FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR UNTIL ALL CONSTRUCTION IS COMPLETED AND APPROVED AND VEGETATION/LANDSCAPING IS ESTABLISHED.

2. THE ESC FACILITIES SHOWN ON THIS PLAN MUST BE CONSTRUCTED IN CONJUNCTION WITH ALL CLEARING AND GRADING ACTIVITIES, AND IN SUCH A MANNER AS TO INSURE THAT SEDIMENT AND SEDIMENT LADEN WATER DO NOT ENTER THE DRAINAGE SYSTEM, ROADWAYS, OR VIOLATE APPLICABLE WATER STANDARDS.

3. THE ESC FACILITIES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, THESE ESC FACILITIES SHALL BE UPGRADED AS NEEDED FOR UNEXPECTED STORM EVENTS AND TO ENSURE THAT SEDIMENT AND SEDIMENT LADEN WATER DO NOT LEAVE THE SITE.

4. THE ESC FACILITIES SHALL BE INSPECTED DAILY BY THE CONTRACTOR AND MAINTAINED AS NECESSARY TO ENSURE THEIR CONTINUED FUNCTIONING.

5. THE ESC FACILITIES ON INACTIVE SITES SHALL BE INSPECTED AND MAINTAINED A MINIMUM OF ONCE A MONTH OR WITHIN THE 24 HOURS FOLLOWING A MAJOR STORM EVENT.

6. AT NO TIME SHALL MORE THAN ONE FOOT OF SEDIMENT BE ALLOWED TO ACCUMULATE WITHIN A CATCH BASIN. ALL CATCH BASINS AND CONVEYANCE LINES SHALL BE CLEANED PRIOR TO PAVING AND PRIOR TO FINAL INSPECTION. THE CLEANING OPERATION SHALL NOT FLUSH SEDIMENT LADEN WATER INTO THE DOWNSTREAM SYSTEM.

7. STABILIZED CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES MAY BE REQUIRED TO INSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.

8. BEFORE COMMENCING ANY LAND DISTURBING ACTIVITY, THE EXISTING STORM WATER INLET(S) THAT RECEIVING RUNOFF FROM THE PROPOSED WORK AREA SHALL BE PROTECTED. THE TEMPORARY INLET PROTECTION MUST REMAIN IN PLACE UNTIL THE CONSTRUCTION ACTIVITY IS COMPLETED, THE STREET HAS BEEN SWEPT AND ANY EXPOSED SOILS ARE STABILIZED. THE CONTRACTOR IS ALSO RESPONSIBLE FOR REMOVING ANY TEMPORARY INLET PROTECTION INSTALLED; AFTER ALL DISTURBED AREAS ARE STABILIZED. TEMPORARY PROTECTION OF THE INLETS MAY BE ACCOMPLISHED BY ONE OR MORE OF THE FOLLOWING:

8.1. USE OF GRAVEL BAGS TO FILTER THE SEDIMENT FROM ANY RUNOFF. TO MAKE A GRAVEL BAG, USE A BAG MADE OF GEOTEXTILE FABRIC (NOT BURLAP) AND FILL WITH EITHER 3/4 INCH ROCK OR 1/4 INCH PEA GRAVEL.
8.2. USE OF SEDIMENT LOGS TO FILTER THE SEDIMENT FROM ANY RUNOFF (AVAILABLE THROUGH LOCAL EROSION CONTROL SUPPLIERS).
8.3. USE OF ABOVE OR UNDER-GRATE FILTER BAGS OR DEVICES TO FILTER THE SEDIMENT FROM ANY RUNOFF (AVAILABLE THROUGH EROSION CONTROL SUPPLIERS).

9. WATER MAY NOT BE DISCHARGED IN A MANNER THAT CAUSES EROSION, SEDIMENTATION, OR FLOODING ON THE SITE, ON DOWNSTREAM PROPERTIES, IN THE RECEIVING CHANNELS, OR IN ANY STORM WATER INLET. WHEN SITE DEWATERING, WATER PUMPED FROM THE SITE, INCLUDING TRENCHES, SHALL BE TREATED BY ONE OF THE FOLLOWING:

9.1. TEMPORARY SEDIMENTATION BASINS
9.2. SEDIMENT FILTERING BAGS

10. THE CONTRACTOR SHALL VERIFY THE SIZE AND LOCATION OF ALL EXISTING UTILITIES. EXISTING UTILITIES ARE ALL UTILITIES THAT EXIST ON THE PROJECT IN AN ORIGINAL, RELOCATED OR NEWLY INSTALLED POSITION. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR THE COST OF REPAIRS TO DAMAGED UNDERGROUND OR OVERHEAD FACILITIES, EVEN IF THE UTILITY IS NOT SHOWN ON THE SITE DEVELOPMENT PLANS. THE CONTRACTOR SHALL CONTACT THE LOCAL UTILITIES PROTECTION CENTER TO COORDINATE THE MARKING OF EXISTING UTILITY LINES A MINIMUM OF 96 HOURS PRIOR TO COMMENCEMENT OF ANY WORK.

11. THE CONTRACTOR SHALL FLUSH ALL INLETS AND PIPE AT THE COMPLETION OF CONSTRUCTION TO REMOVE SILT AND DEBRIS. THE CLEANING AND FLUSHING OF INLETS AND PIPE (EXISTING AND PROPOSED) SHALL BE CONSIDERED PART OF THE COST FOR THE PROJECT.

12. EGRESS FROM THE SITE SHALL BE CONTROLLED SUCH THAT VEHICLES LEAVING THE SITE MUST TRAVERSE CONSTRUCTION EXITS TO REMOVE MUD FROM TIRES.

13. SCHEDULE CONSTRUCTION ACTIVITIES TO MINIMIZE THE EXPOSED AREA AND DURATION OF EXPOSURE. IN SCHEDULING, TAKE INTO ACCOUNT THE SEASON AND THE WEATHER FORECAST.

14. EROSION CONTROL MEASURES ARE THE MINIMUM REQUIRED. THE CONTRACTOR SHALL PROVIDE ADDITIONAL CONTROL MEASURES AS DICTATED BY ACTUAL FIELD CONDITIONS AT THE TIME OF CONSTRUCTION IN ORDER TO PREVENT EROSION AND CONTROL SEDIMENT. EROSION AND SEDIMENT CONTROL MEASURES WILL REMAIN IN PLACE AND BE MAINTAINED UNTIL THE ENTIRE PROJECT IS TERMINATED OR SUSPENDED FOR AND INDEFINITE LENGTH OF TIME, ALL DISTURBED AREAS SHALL BE PLANTED WITH PERMANENT VEGETATION.

15. THE DATA, TOGETHER WITH ALL OTHER INFORMATION SHOWN ON THESE PLANS, OR IN ANY WAY INDICATED THEREBY, WHETHER BY DRAWINGS OR NOTES, OR IN ANY OTHER MANNER, IS BASED UPON FIELD INVESTIGATIONS AND IS BELIEVED TO BE INDICATIVE OF ACTUAL CONDITIONS. HOWEVER, THE SAME IS SHOWN AS INFORMATION ONLY, IS NOT GUARANTEED AND DOES NOT BIND THOMAS & HUTTON, OR THE OWNER IN ANY WAY.

16. CONTRACTOR SHALL MAINTAIN SITE ON A DAILY BASIS TO PROVIDE FOR POSITIVE DRAINAGE. CONTRACTOR, AT HIS COST, SHALL GRADE SITE AND PROVIDE NECESSARY TEMPORARY DRAINAGE SWALES TO INSURE STORM WATER DOES NOT POND ON SITE.

17. SITE DRAINAGE SHALL BE ESTABLISHED TO PREVENT ANY PONDED WATER CONDITIONS WITHIN THE CONSTRUCTION AREA AND TO FACILITATE STORM WATER DISCHARGE.

18. THE ESCAPE OF SEDIMENT FROM THE SITE SHALL BE PREVENTED BY THE INSTALLATION OF EROSION AND SEDIMENT CONTROL MEASURES AND PRACTICES PRIOR TO, OR CONCURRENT WITH, LAND DISTURBING ACTIVITIES.

19. LIME RATES AND ANALYSIS:
19.1. AGRICULTURAL LIME SHALL BE APPLIED AT THE RATE SHOWN IN THE SEEDING SECTION UNLESS SOIL TESTS INDICATE OTHERWISE. GRADED AREAS REQUIRE LIME APPLICATION. IF LIME IS APPLIED WITHIN SIX MONTHS OF PLANTING PERMANENT PERENNIAL VEGETATION, ADDITIONAL LIME IS NOT REQUIRED. AGRICULTURAL LIME APPLICATION SHALL BE WITHIN THE SPECIFICATIONS OF THE SOUTH CAROLINA DEPARTMENT OF AGRICULTURE.

20. MULCHING:

MULCHING IS REQUIRED FOR ALL PERMANENT VEGETATION APPLICATIONS. MULCH APPLIED TO SEEDED AREAS SHALL ACHIEVE 75% SOIL COVER. SELECT THE MULCHING MATERIAL FROM THE FOLLOWING AND APPLY AS INDICATED:

20.1. DRY STRAW OR DRY HAY OF GOOD QUALITY AND FREE OF WEED SEEDS CAN BE USED. DRY STRAW SHALL BE APPLIED AT THE RATE OF TWO TONS PER ACRE. DRY HAY SHALL BE APPLIED AT THE RATE OF 2 1/2 TONS PER ACRE.
20.2. WOOD CELLULOSE MULCH OR WOOD PULP FIBER SHALL BE USED WITH HYDRAULIC SEEDING. IT SHALL BE APPLIED AT A RATE OF 500 POUNDS PER ACRE. DRY STRAW OR DRY HAY SHALL BE APPLIED (AT THE RATE INDICATED ABOVE) AFTER HYDRAULIC SEEDING.
20.3. ONE THOUSAND POUNDS OF WOOD CELLULOSE OR WOOD PULP FIBER, WHICH INCLUDES A TACKIFIER, SHALL BE USED WITH HYDRAULIC SEEDING ON SLOPES 3/4:1 OR STEEPER.
20.4. SERICEA LESPEDEZA HAY CONTAINING MATURE SEED SHALL BE APPLIED AT A RATE OF 3 TONS PER ACRE.
20.5. PINE STRAW OR PINE BARK SHALL BE APPLIED AT A THICKNESS OF 3 INCHES FOR BEDDING PURPOSES. OTHER SUITABLE MATERIALS IN SUFFICIENT QUANTITY MAY BE USED WHERE ORNAMENTALS OR OTHER GROUND COVERS ARE PLANTED. THIS IS NOT APPROPRIATE FOR SEEDED AREAS.
20.6. WHEN USING TEMPORARY EROSION CONTROL BLANKETS OR BLACK SOD, MULCH IS NOT REQUIRED.
20.7. ON SLOPES GREATER THAN 10 FEET IN LENGTH AND 4:1 OR STEEPER, USE THE FOLLOWING EROSION CONTROL BLANKETS THAT HAVE BEEN PROPERLY ANCHORED TO THE SLOPE ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS:

- 2:1 SLOPES OR STEEPER: - STRAW/COCONUT BLANKET OR HIGH VELOCITY WOOD BLANKET
- 3:1 SLOPES OR STEEPER: - WOOD OR STRAW BLANKET WITH NET ON BOTH SIDES
- 4:1 SLOPES OR FLATTER: - WOOD OR STRAW MULCH BLANKET WITH NET ON ONE SIDE

VIII. HOUSEKEEPING

THESE PERFORMANCE STANDARDS APPLY TO ALL SITES.

1. PETROLEUM PRODUCTS: INCLUDING OIL, GASOLINE, LUBRICANTS AND ASPHALTIC SUBSTANCES.

1.1. HAVE EQUIPMENT TO CONTAIN AND CLEAN UP PETROLEUM SPILLS IN FUEL STORAGE AREAS OR ON MAINTENANCE AND FUELING VEHICLES
1.2. STORE IN COVERED AREAS PROTECTED WITH DIKES

2. SPILLS: PREVENTION AND RESPONSE.

2.1. STORE AND HANDLE MATERIALS TO PREVENT SPILLS
2.2. TIGHTLY SEALED CONTAINERS, NEAT AND SECURE STACKING, ETC.
2.3. REDUCE STORM WATER CONTACT IF SPILL OCCURS
2.3.1. CLEANUP PROCEDURES SHOULD BE CLEARLY POSTED.
2.3.2. CLEANUP MATERIALS SHOULD BE READILY AVAILABLE
2.3.3. STOP THE SOURCE
2.3.4. CONTAIN THE SPILL

3. NON-STORM WATER DISCHARGES

THE FOLLOWING NON-STORMWATER DISCHARGES MUST BE PROTECTED FROM CAUSING POLLUTION OR EROSION:

3.1. DISCHARGES FROM FIRE-FIGHTING ACTIVITIES
3.2. FIRE HYDRANT FLUSHINGS
3.3. WATERS USED TO WASH VEHICLES WHERE DETERGENTS ARE NOT USED
3.4. WATER USED TO CONTROL DUST
3.5. POTABLE WATER INCLUDING UNCONTAMINATED WATER LINE FLUSHINGS
3.6. ROUTINE EXTERNAL BUILDING WASH DOWN THAT DOES NOT USE DETERGENTS
3.7. PAVEMENT WASH WATERS WHERE SPILLS OR LEAKS OF TOXIC OR HAZARDOUS MATERIALS HAVE NOT OCCURRED (UNLESS ALL SPILLED MATERIAL HAS BEEN REMOVED) AND WHERE DETERGENTS ARE NOT USED
3.8. UNCONTAMINATED AIR CONDITIONING OR COMPRESSOR CONDENSATE
3.9. UNCONTAMINATED GROUND WATER OR SPRING WATER
3.10. FOUNDATION OR FOOTING DRAINS WHERE FLOWS ARE NOT CONTAMINATED WITH PROCESS MATERIALS SUCH AS SOLVENTS
3.11. UNCONTAMINATED EXCAVATION DEWATERING
3.12. LANDSCAPE IRRIGATION
3.13. DECHLORINATED SWIMMING POOL DISCHARGES.

4. CONSTRUCTION WASTES: DEMOLITION RUBBLE, PACKAGING MATERIALS, SCRAP BUILDING SUPPLIES, ETC.

4.1. SELECT A DESIGNATED WASTE COLLECTION AREA
4.2. PROVIDE LIDS FOR WASTE CONTAINERS
4.3. WHEN POSSIBLE LOCATE CONTAINERS IN COVERED AREA
4.4. MAINTAIN CONSISTENT REMOVAL SCHEDULE FOR WASTE

5. PESTICIDES: REDUCE THE AMOUNT OF PESTICIDES AVAILABLE FOR CONTACT WITH STORM WATER.

5.1. STORE IN A DRY COVERED AREA
5.2. INSTALL CURBS OR DIKES AROUND STORAGE AREA TO PROTECT AGAINST SPILLS
5.3. STRICTLY FOLLOW RECOMMENDED APPLICATION RATES

6. FERTILIZERS AND DETERGENTS: REDUCE THE AMOUNT OF FERTILIZERS AND DETERGENTS AVAILABLE FOR CONTACT WITH STORM WATER.

6.1. LIMIT APPLICATION OF FERTILIZERS TO THE MINIMUM NEEDED
6.2. APPLY MORE FREQUENTLY BUT AT LOWER APPLICATION RATES
6.3. LIMIT USE OF DETERGENTS ON-SITE
6.4. DO NOT DISCHARGE WASH WATER INTO STORM WATER SYSTEM
6.5. MAINTAIN STRUCTURAL AND VEGETATIVE BMP'S
6.6. APPLY ACCORDING TO SOIL TEST RECOMMENDATIONS PRIOR TO SEEDING.

IX. GRASSING NOTES

1. SOD:

ALL SOD SHALL BE NURSERY GROWN AS CLASSIFIED IN THE ASPS GSS. MACHINE CUT SOD AT A UNIFORM THICKENS OF 3/4" WITHIN A TOLERANCE OF 1/4", EXCLUDING TOP GROWTH AND THATCH. EACH INDIVIDUAL SOD PIECE SHALL BE STRONG ENOUGH TO SUPPORT ITS OWN WEIGHT WHEN LIFTED BY THE ENDS. BROKEN PODS, IRREGULARLY SHAPED PIECES, AND TORN OR UNEVEN ENDS WILL BE REJECTED. WOOD PEGS AND / OR WIRE STAPLES SHALL REPLACE SOD WITH AN EQUAL SOD COMPOSITION AS THAT WHICH IS EXISTING. IF NO SOD TYPE EXIST. THEN THE FOLLOWING SOD COMPOSITION SHALL BE USED.

2. SODDING SCHEDULE:

LAY SOD FROM MAY 1 TO SEPTEMBER 15 FOR SPRING PLANTING AND FROM SEPTEMBER 15 TO NOVEMBER 1 FOR FALL PLANTING.

3. SEED:

ALL SEED SHALL CONFORM TO ALL STATE LAWS AND TO ALL REQUIREMENTS AND REGULATIONS OF THE SOUTH CAROLINA DEPARTMENT OF AGRICULTURE. THE SEVERAL VARIETIES OF SEED SHALL BE INDIVIDUALLY PACKAGED OR BAGGED, AND TAGGED TO SHOW NAME OF SEED, NET WEIGHT, ORIGIN, GERMINATION, LOT NUMBER, AND OTHER INFORMATION REQUIRED BY THE DEPARTMENT OF AGRICULTURE.

3.1. PENNISETUM GLAUCIUM (BROWNTOP MILLET): TESTING 98 PERCENT PURITY AND 85 PERCENT GERMINATION.
3.2. BERMUDA COMMON: TESTING 98 PERCENT PURITY AND 85 PERCENT GERMINATION.
3.3. DOMESTIC ITALIAN RYE: TESTING 98 PERCENT PURITY AND 90 PERCENT GERMINATION.

4. MISCELLANEOUS:

4.1. PERMANENT SEEDING SHALL COVER ALL DISTURBED AREA NOT TO BE COVERED BY LANDSCAPE PLANTING BEDS, STRUCTURE, OR PAVEMENT.
4.2. SEED ALL DISTURBED AREAS WITHIN SEVEN DAYS OF FINAL GRADING AND TEMPORARY SEED/MULCH ALL AREAS THAT WILL BE LEFT INACTIVE FOR MORE THAN FOURTEEN (14) DAYS.
4.3. ALL PERMANENT GRASS PLANTINGS SHALL BE MULCHED
4.4. CENTIPEDE SOD CAN BE USED AS PERMANENT COVER ANYTIME EXCEPT JUNE THRU OCTOBER
4.5. IF GRASSING OCCURS DURING A MONTH REQUIRING TEMPORARY COVER, THE CONTRACTOR SHALL APPLY PERMANENT COVER (IN ADDITION TO THE TEMPORARY COVER) AT THE APPROPRIATE TIME AT NO NO ADDITIONAL COST. THE CONTRACTOR MUST ACHIEVE A STRAND OF PERMANENT GRASS WITH AT LEAST 95% COVER. BARE SPOTS CAN NOT BE MORE THAN 1 INCH SQUARE IN ANY 10 SF.

X. PERMANENT STABILIZATION

NEWLY SEEDED OR SODDED AREAS MUST BE PROTECTED FROM VEHICLE TRAFFIC,EXCESSIVE PEDESTRIAN TRAFFIC, AND CONCENTRATED RUNOFF UNTIL THE VEGETATION IS WELL ESTABLISHED. IF NECESSARY, AREAS MUST BE RE-WORKED AND RE-STABILIZED IF GERMINATION IS SPARSE, PLANT COVERAGE IS SPOTTY ,OR TOPSOIL EROSION IS EVIDENT. ONE OR MORE OF THE FOLLOWING MAY APPLY TO THE SITE.

4.1. SEEDED AREAS

FOR SEEDED AREAS, PERMANENT STABILIZATION MEANS A 90% COVER OF THE DISTURBED AREA WITH MATURE, HEALTHY PLANTS WITH NO EVIDENCE OF WASHING OR RILLING OF THE TOPSOIL.

4.2. SODDED AREAS

FOR SODDED AREAS, PERMANENT STABILIZATION MEANS THE COMPLETE BINDING OF THE SOD ROOTS INTO THE APPROVED MULCH MATERIAL.

4.3. PERMANENT MULCH

FOR MULCHED AREAS, PERMANENT MULCHING MEANS TOTAL COVERAGE OF THE EXPOSED AREA WITH AN APPROVED MULCH MATERIAL.

4.4. RIPRAP

FOR AREAS STABILIZED WITH RIPRAP, PERMANENT STABILIZATION MEANS THAT SLOPES STABILIZED WITH RIPRAP HAVE AN APPROPRIATE BACKING OF AN APPROVED GEOTEXTILE TO PREVENT SOIL MOVEMENT FROM BEHIND THE RIPRAP.

4.5. DITCHES, CHANNELS, AND SWALES

FOR OPEN CHANNELS, PERMANENT STABILIZATION MEANS THE CHANNEL IS STABILIZED WITH MATURE VEGETATION AT LEAST THREE INCHES IN HEIGHT, WITH WELL-GRADED RIPRAP LINING, OR WITH ANOTHER NON-EROSIVE LINING CAPABLE OF WITHSTANDING THE ANTICIPATED FLOW VELOCITIES AND FLOW DEPTHS WITHOUT RELIANCE ON CHECK DAMS TO SLOW FLOW. THERE MUST BE NO EVIDENCE OF SLUMPING OF THE LINING, UNDERCUTTING OF THE BANKS, OR DOWN CUTTING OF THE CHANNEL.

XI. FERTILIZER REQUIREMENTS

1. TEMPORARY SEEDING FERTILIZER

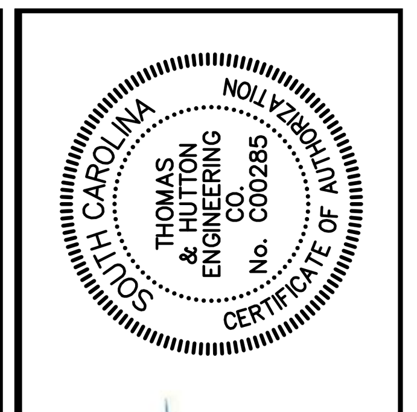
APPLY A MINIMUM OF 500 LBS PER ACRE OF A COMPLETE 10-10-10 FERTILIZER (11.5 POUNDS PER 1000 SQUARE FEET) OR EQUIVALENT DURING TEMPORARY SEEDING OF GRASSES UNLESS A SOIL TEST INDICATES A DIFFERENT REQUIREMENT. INCORPORATE FERTILIZER AND LIME (IF USED) INTO THE TOP 4-6 INCHES OF THE SOIL BY DISKING OR OTHER MEANS WHERE CONDITIONS ALLOW. LIME IS NOT REQUIRED FOR TEMPORARY SEEDING UNLESS A SOIL TEST SHOWS THAT THE SOIL PH IS BELOW 5.0. IT IS DESIRABLE TO APPLY LIME DURING THE TEMPORARY SEEDING OPERATION TO BENEFIT THE LONG-TERM PERMANENT SEEDING. APPLY A MINIMUM OF 1.5 TONS OF LIME / ACRE (70LBS. / 1000 SQ. FT.).

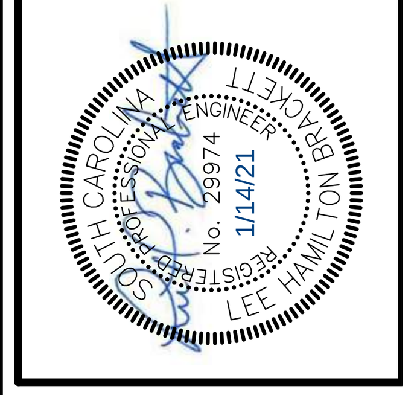
2. PERMANENT SEEDING FERTILIZER

APPLY A MINIMUM OF 1000 LBS PER ACRE OF A COMPLETE 10-10-10 FERTILIZER (23 POUNDS PER 1000 SQUARE FEET) OR EQUIVALENT DURING PERMANENT SEEDING OF GRADES UNLESS A SOIL TEST INDICATES A DIFFERENT REQUIREMENT. INCORPORATE FERTILIZER AND LIME (IF USED) INTO THE TOP 4-6 INCHES OF THE SOIL BY DISKING OR OTHER MEANS WHERE CONDITIONS ALLOW. DO NOT MIX THE LIME AND THE FERTILIZER PRIOR TO THE FIELD APPLICATION. UNLESS A SPECIFIC SOIL TEST INDICATES OTHERWISE, APPLY 1 & 1/2 TONS OF GROUND COARSE TEXTURED AGRICULTURAL LIMESTONE PER ACRE (70 LBS. / 1000 SQ.FT.).

XII. SWPP PREPARER CERTIFICATION

I HAVE PLACED MY SIGNATURE AND SEAL ON THE DESIGN DOCUMENTS SUBMITTED SIGNIFYING THAT I ACCEPT RESPONSIBILITY FOR THE DESIGN OF THE SYSTEM. FURTHER, I CERTIFY TO THE BEST OF MY KNOWLEDGE AND BELIEF THAT THE DESIGN IS CONSISTENT WITH THE REQUIREMENTS OF TITLE 48, CHAPTER 14 OF THE CODE OF LAWS OF SC, 1976 AS AMENDED, PURSUANT TO REGULATION 72-300 ET SEQ. (IF APPLICABLE), AND IN ACCORDANCE WITH THE TERMS AND CONDITIONS OF SCR100000.





NO.	REVISIONS	BY	DATE

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BERKELEY COUNTY
BERKELEY COUNTY, SC
BERKELEY–DORCHESTER REACH INTERCONNECT
DIV. I — EROSION CONTROL NOTES

JOB NO:	J–26926.0000
DATE:	01/11/21
DRAWN:	JTB
DESIGNED:	LHB
REVIEWED:	PLB
APPROVED:	LHB
SCALE:	N/A

EC1.0

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STORMWATER POLLUTION PREVENTION PLAN

TEMPORARY SEEDING - COASTAL

SPECIES	LBS/AC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
SANDY, DROUGHTY SITES													
BROWNTOP MILLET	40												
RYE, GRAIN	56												
RYEGRASS	50												
WELL DRAINED, CLAYEY/LOAMEY SITES													
BROWNTOP MILLET	40												
JAPANESE MILLET	40												
RYE, GRAIN	56												
OATS	75												
RYEGRASS	50												

PERMANENT SEEDING - COASTAL

SPECIES	LBS/AC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
SANDY, DROUGHTY SITES													
BROWNTOP MILLET	10												
BAHIAGRASS	40												
BROWNTOP MILLET	10												
BAHIAGRASS	30												
SERICEA LESPEDEZA	40												
BROWNTOP MILLET	10												
ATLANTIC COASTAL	15												
PANICGRASS	PLS												
BROWNTOP MILLET	10												
SWITCHGRASS	8												
(ALAMO)	PLS												
LITTLE BLUESTEM	4												
SERICEA LESPEDEZA	20												
BROWNTOP MILLET	10												
WEEPING LOVEGRASS	8												
WELL DRAINED, CLAYEY/LOAMEY SITES													
BROWNTOP MILLET	10												
BAHIAGRASS	40												
RYE, GRAIN	10												
BAHIAGRASS	40												
CLOVER, CRIMSON (ANNUAL)	5												
BROWNTOP MILLET	10												
BAHIAGRASS	30												
SERICEA LESPEDEZA	40												
BROWNTOP MILLET	10												
BERMUDA, COMMON	10												
SERICEA LESPEDEZA	40												
BROWNTOP MILLET	10												
BERMUDA, COMMON	12												
KOBE LESPEDEZA (ANNUAL)	10												
BROWNTOP MILLET	10												
BAHIAGRASS	20												
BERMUDA, COMMON	6												
SERICEA LESPEDEZA	40												
BROWNTOP MILLET	10												
SWITCHGRASS	8												
LITTLE BLUESTEM	PLS												
INDIANGRASS	3												

EROSION CONTROL LEGEND

DESCRIPTION	PLAN SYMBOL
SILT FENCE	
CLEARING LIMITS	CL — CL
DIVERSION DIKE	DD
DIVERSION BERM	DB
TEMPORARY DIVERSION	TD
PERMANENT DIVERSION	PD
SUBSURFACE DRAIN	SSD
VEGETATED CHANNEL	
RIP RAP LINED CHANNEL	
ECB OR TRM LINED CHANNEL	
PAVED CHANNEL	PC
TREE PROTECTION	
SURFACE ROUGHENING	OR LG
TOP SOILING	
TEMPORARY SEEDING	TS
PERMANENT SEEDING	PS
MULCHING	M

EROSION CONTROL LEGEND

DESCRIPTION	PLAN SYMBOL
EROSION CONTROL BLANKET OR TURF REINFORCEMENT MAT	
FLEXIBLE GROWTH MATRIX	FGM
BONDED FIBER MATRIX	BFM
SODDING	SO
SLOPED SODDING	
STAKED SOD	
STAKED SOD AROUND INLET	OR
RIPRAP	
OUTLET PROTECTION – RIP RAP	
OUTLET PROTECTION – ECB OR TRM	
DUST CONTROL	DC
POLYACRYLAMIDE (PAM)	PAM
SEDIMENT BASIN	
SEDIMENT BASIN WITH SKIMMER	
SEDIMENT TRAP	
ROCK SEDIMENT DIKE	
SEDIMENT TUBE	

EROSION CONTROL LEGEND

DESCRIPTION	PLAN SYMBOL
ROCK CHECK DAM	OR
POROUS BAFFLES	
STABILIZED CONSTRUCTION ENTRANCE	
CONCRETE WASHOUT	
STORM DRAIN INLET PROTECTION – TYPE A FILTER FABRIC	A
STORM DRAIN INLET PROTECTION – TYPE A SEDIMENT TUBE	A
STORM DRAIN INLET PROTECTION – TYPE B HARDWARE FABRIC AND STONE	B
STORM DRAIN INLET PROTECTION – TYPE C BLOCK AND GRAVEL	C
STORM DRAIN INLET PROTECTION – TYPE D RIGID INLET FILTER	D
STORM DRAIN INLET PROTECTION – TYPE E SURFACE COURSE CURB INLET FILTER	E
STORM DRAIN INLET PROTECTION – TYPE F INLET TUBE	F
STORM DRAIN INLET PROTECTION – TYPE G IMPERVIOUS AREA	G
STORM DRAIN INLET PROTECTION – CATCH BASIN INSERT	I
PIPE SLOPE DRAINS	
TEMPORARY STREAM CROSSING	T
LEVEL SPREADER	

LIST OF ACRONYMS FOR SEDIMENT AND EROSION CONTROL

AASHTO	AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
AMD	ACRYLAMIDE POLYMER
BFM	BONDED FIBER MATRIX
BMP(S)	BEST MANAGEMENT PRACTICE(S)
CFS	CUBIC FEET PER SECOND
CMP	CORRUGATED METAL PIPE
DHEC	DEPARTMENT OF HEATH AND ENVIRONMENTAL CONTROL
ECB	EROSION CONTROL BLANKET
EPA	UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
EPSC	EROSION PREVENTION AND SEDIMENTATION CONTROL
FDA	UNITED STATES FOOD AND DRUG ADMINISTRATION
FGM	FLEXIBLE GROWTH MATRIX
HDPE	HIGH DENSITY POLYETHYLENE
MS4	MUNICIPAL SEPARATE STORM SEWER SYSTEM
MSDS	MATERIAL SAFETY DATA SHEETS
NPDES	NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
PAM	POLYACRYLAMIDE OR POLYMER
RCP	REINFORCED CONCRETE PIPE
SCS	SOIL CONSERVATION SERVICE
SWPPP	STORMWATER POLLUTION PREVENTION PROGRAM
TRM	TURF REINFORCEMENT MAT
VFS	VEGETATED FILTER STRIP

CONSTRUCTION SEQUENCE

	CONSTRUCTION ACTIVITY	SCHEDULE CONSIDERATION
1	OBTAIN COPIES OF ALL PLAN APPROVALS AND OTHER APPLICABLE PERMITS.	CONTRACTOR TO HAVE ONSITE AT ALL TIMES DURING CONSTRUCTION.
2	FLAG THE WORK LIMITS.	
3	HOLD PRE CONSTRUCTION CONFERENCE AT LEAST ONE WEEK PRIOR TO STARTING CONSTRUCTION.	
4	INSTALL CONSTRUCTION ACCESS , SILT FENCE, AND LAY DOWN AREAS.	STABILIZE BARE AREAS IMMEDIATELY AND INSTALL CONSTRUCTION EXITS / ENTRANCES.
5	INSTALL WATER DISTRIBUTION SYSTEM.	APPLY TEMPORARY OR PERMANENT STABILIZATION MEASURES IMMEDIATELY ON ALL DISTURBED AREAS WHERE WORK IS DELAYED OR COMPLETE.
6	SURFACE STABILIZATION-TEMPORARY AND PERMANENT SEEDING, MULCHING, SODDING, RIP RAP.	APPLY TEMPORARY OR PERMANENT STABILIZATION MEASURES IMMEDIATELY ON ALL DISTURBED AREAS WHERE WORK IS DELAYED OR COMPLETE.
7	LANDSCAPING AND FINAL STABILIZATION - TOPSOILING, TREES AND SHRUBS, PERMANENT SEEDING, MULCHING, SODDING, RIP RAP.	LAST CONSTRUCTION PHASE--STABILIZE ALL OPEN AREAS, INCLUDING BORROW AND SPOIL AREAS. REMOVE AND STABILIZE ALL TEMPORARY CONTROL MEASURES.

SOUTH CAROLINA — NOLTE/VIALE — THOMAS & HUTTON ENGINEERING — No. C00285 — CERTIFICATE OF AUTHORIZATION

SOUTH CAROLINA — PROFESSIONAL ENGINEER — No. 29974 — 1/14/21 — THOMAS & HUTTON ENGINEERING

DATE	BY	REVISIONS	NO.

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BERKELEY COUNTY
BERKELEY COUNTY, SC

BERKELEY–DORCHESTER REACH INTERCONNECT

DIV. I – EROSION CONTROL CHARTS

JOB NO:	J-26926.0000
DATE:	01/11/21
DRAWN:	JTB
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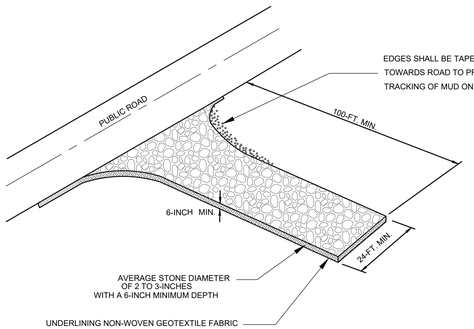
SCALE:	N/A

EC1.1

STORMWATER POLLUTION PREVENTION PLAN



INSTALL A CULVERT PIPE ACROSS THE ENTRANCE WHEN NEEDED TO PROVIDE POSITIVE DRAINAGE.

DIVERT ALL SURFACE RUNOFF AND DRAINAGE FROM THE STONE PAD TO A SEDIMENT TRAP OR BASIN OR OTHER SEDIMENT TRAPPING STRUCTURE.

WHEN AND WHERE TO USE IT:

STABILIZED CONSTRUCTION ENTRANCES SHOULD BE USED AT ALL POINTS WHERE TRAFFIC WILL BE LEAVING A CONSTRUCTION SITE AND MOVING DIRECTLY ONTO A PUBLIC ROAD.

IMPORTANT CONSIDERATIONS:

IF WASHING IS USED, PROVISIONS MUST BE MADE TO INTERCEPT THE WASH WATER AND TRAP THE SEDIMENT BEFORE IT IS CARRIED OFFSITE. WASHDOWN FACILITIES SHALL BE REQUIRED AS DIRECTED BY SCDHEC AS NEEDED. WASHDOWN AREAS IN GENERAL MUST BE ESTABLISHED WITH CRUSHED GRAVEL AND DRAIN INTO A SEDIMENT TRAP OR SEDIMENT BASIN.

CONSTRUCTION ENTRANCES SHOULD BE USED IN CONJUNCTION WITH THE STABILIZATION OF CONSTRUCTION ROADS TO REDUCE THE AMOUNT OF MUD PICKED UP BY VEHICLES.

INSTALLATION:

REMOVE ALL VEGETATION AND ANY OBJECTIONABLE MATERIAL FROM THE FOUNDATION AREA.

DIVERT ALL SURFACE RUNOFF AND DRAINAGE FROM STONES TO A SEDIMENT TRAP OR BASIN.

INSTALL A NON-WOVEN GEOTEXTILE FABRIC PRIOR TO PLACING ANY STONE.

INSTALL A CULVERT PIPE ACROSS THE ENTRANCE WHEN NEEDED TO PROVIDE POSITIVE DRAINAGE.

THE ENTRANCE SHALL CONSIST OF 1-INCH TO 3-INCH D50 STONE PLACED AT A MINIMUM DEPTH OF 6-INCHES.

MINIMUM DIMENSIONS OF THE ENTRANCE SHALL BE 24-FEET WIDE BY 100-FEET LONG, AND MAY BE MODIFIED AS NECESSARY TO ACCOMMODATE SITE CONSTRAINTS.

THE EDGES OF THE ENTRANCE SHALL BE TAPERED OUT TOWARDS THE ROAD TO PREVENT TRACKING OF MUD AT THE EDGE OF THE ENTRANCE.

INSPECTION AND MAINTENANCE:

CHECK FOR MUD AND SEDIMENT BUILDUP AND PAD INTEGRITY. MAKE DAILY INSPECTIONS DURING PERIODS OF WET WEATHER. MAINTENANCE IS REQUIRED MORE FREQUENTLY IN WET WEATHER CONDITIONS. RESHAPE THE STONE PAD AS NEEDED FOR DRAINAGE AND RUNOFF CONTROL.

WASH OR REPLACE STONES AS NEEDED. THE STONE IN THE ENTRANCE SHOULD BE WASHED OR REPLACED WHENEVER THE ENTRANCE FAILS TO REDUCE MUD BEING CARRIED OFF-SITE BY VEHICLES.

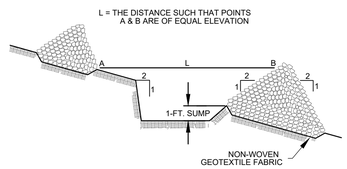
FREQUENT WASHING WILL EXTEND THE USEFUL LIFE OF STONE.

IMMEDIATELY REMOVE MUD AND SEDIMENT TRACKED OR WASHED ONTO PUBLIC ROADS BY BRUSHING OR SWEEPING. FLUSHING SHOULD ONLY BE USED WHEN THE WATER CAN BE DISCHARGED TO A SEDIMENT TRAP OR BASIN.

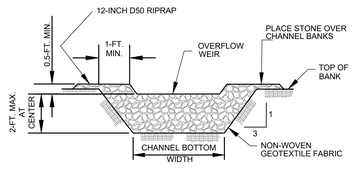
REPAIR ANY BROKEN PAVEMENT IMMEDIATELY.

STABILIZED CONSTRUCTION ENTRANCE

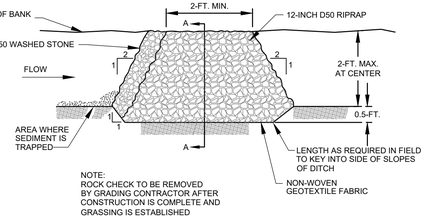
NOT TO SCALE



SPACING BETWEEN DITCH CHECK



CROSS SECTION A-A THRU STONE DITCH CHECK



NOTE:
ROCK CHECK TO BE REMOVED BY GRADING CONTRACTOR AFTER CONSTRUCTION IS COMPLETE AND GRASSING IS ESTABLISHED

TYPICAL DITCH CHECK SECTION

WHEN AND WHERE TO USE IT:

A ROCK DITCH CHECK SHOULD BE INSTALLED IN STEEPLY SLOPED SWALES, OR IN SWALES WHERE ADEQUATE VEGETATION CANNOT BE ESTABLISHED. ROCK DITCH CHECKS SHOULD BE USED ONLY IN SMALL OPEN CHANNELS. ROCK DITCH CHECKS SHOULD NOT BE PLACED IN WATERS OF THE COMMONWEALTH OR USGS BLUE-LINE STREAMS.

INSTALLATION:

A NON-WOVEN GEOTEXTILE FABRIC SHALL BE INSTALLED OVER THE SOIL SURFACE WHERE THE ROCK DITCH CHECK IS TO BE PLACED.

THE BODY OF THE ROCK DITCH CHECK SHALL BE COMPOSED OF 12-INCH D50 RIPRAP.

THE UPSTREAM FACE OF THE ROCK DITCH CHECK MAY BE COMPOSED OF 1-INCH D50 WASHED STONE.

ROCK DITCH CHECKS SHOULD NOT EXCEED A HEIGHT OF 2-FEET AT THE CENTERLINE OF THE CHANNEL.

ROCK DITCH CHECKS SHOULD HAVE A MINIMUM TOP FLOW LENGTH OF 2-FEET.

STONE SHOULD BE PLACED OVER THE CHANNEL BANKS TO PREVENT WATER FROM CUTTING AROUND THE DITCH CHECK.

THE ROCK MUST BE PLACED BY HAND OR MECHANICAL PLACEMENT (NO DUMPING OF ROCK TO FORM DAM) TO ACHIEVE COMPLETE COVERAGE OF THE DITCH OR SWALE AND TO ENSURE THAT THE CENTER OF THE CHECK IS LOWER THAN THE EDGES.

THE MAXIMUM SPACING BETWEEN THE DAMS SHOULD BE SUCH THAT THE TOE OF THE UPSTREAM CHECK IS AT THE SAME ELEVATION AS THE TOP OF THE DOWNSTREAM CHECK.

INSPECTION AND MAINTENANCE:

INSPECT FOR SEDIMENT AND DEBRIS ACCUMULATION. INSPECT DITCH CHECK EDGES FOR EROSION AND REPAIR PROMPTLY AS REQUIRED.

SEDIMENT SHOULD BE REMOVED WHEN IT REACHES 1/3 THE ORIGINAL CHECK HEIGHT.

IN THE CASE OF GRASS-LINED DITCHES AND SWALES, ROCK DITCH CHECKS SHOULD BE REMOVED WHEN THE GRASS HAS MATURED SUFFICIENTLY TO PROTECT THE DITCH OR SWALE UNLESS THE SLOPE OF THE SWALE IS GREATER THAN 4%.

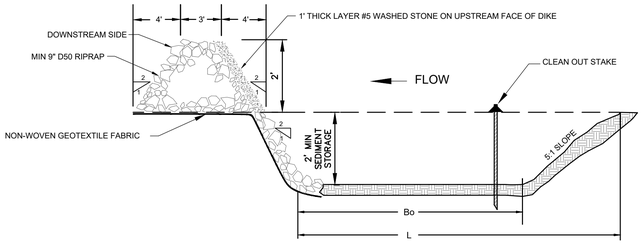
AFTER CONSTRUCTION IS COMPLETE, ALL STONE SHOULD BE REMOVED BY THE GRADING CONTRACTOR IF VEGETATION WILL BE USED FOR PERMANENT EROSION CONTROL MEASURES.

THE AREA BENEATH THE ROCK DITCH CHECKS SHOULD BE SEEDED AND MULCHED IMMEDIATELY AFTER ROCK CHECK DAM REMOVAL.

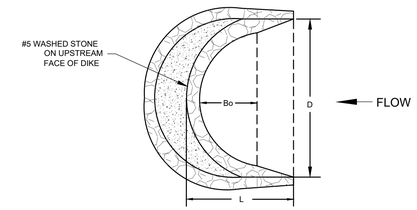
ROCK DITCH CHECK

OR

NOT TO SCALE



SECTION



D	L	Bo	PEAK FLOW (CFS)	TOTAL STORAGE VOL. (CU. FT.)	SEDIMENT STORAGE VOLUME (CU. FT.)
15'	17.5'	3.5'	24.1	838	250
20'	20.0'	6.0'	32.1	1263	406
25'	22.5'	8.5'	40.1	1766	601
30'	25.0'	11.0'	48.2	2348	836

TYPICAL ROCK DIKE PLAN DIMENSIONS

WHEN AND WHERE TO USE IT:

ROCK SEDIMENT DIKES ARE MOST EFFECTIVE IN AREAS WHERE SEDIMENT CONTROL IS NEEDED WITH MINIMAL DISTURBANCE. THEY CAN BE USED AS SEDIMENT CONTROL STRUCTURES FOR THE OUTFALLS OF DIVERSION SWALES, DIVERSION DIKES, IN LOW AREAS OR OTHER AREAS WHERE CONCENTRATED SEDIMENT LADEN FLOW IS EXPECTED. ROCK SEDIMENT DIKES SHOULD NOT BE PLACED IN WATERS OF THE STATE OR ANY OTHER STREAMS THAT HAVE A BASE FLOW. MAXIMUM 2 - ACRE DRAINAGE AREA TO DIKE.

INSTALLATION:

A NON-WOVEN GEOTEXTILE FABRIC SHALL BE INSTALLED OVER THE SOIL SURFACE WHERE THE ROCK SEDIMENT DIKE IS TO BE PLACED.

THE BODY OF THE ROCK SEDIMENT DIKE SHALL BE COMPOSED OF MINIMUM 9-INCH D50 RIPRAP.

THE UPSTREAM FACE OF THE ROCK SEDIMENT DIKE SHALL BE COMPOSED OF A 1-FOOT THICK LAYER OF 3/4-INCH TO 1-INCH D50 WASHED STONE PLACED AT A SLOPE OF 2H:1V.

ROCK SEDIMENT DIKES SHALL HAVE A MINIMUM TOP FLOW LENGTH OF 3-FEET (2-FOOT FLOW LENGTH THROUGH THE RIPRAP AND 1-FOOT FLOW LENGTH THROUGH THE WASHED STONE).

THE ROCK MUST BE PLACED BY HAND OR MECHANICAL PLACEMENT (NO DUMPING OF ROCK TO FORM THE SEDIMENT DIKE) TO ACHIEVE THE PROPER

DIMENSIONS.
A SEDIMENT SUMP SHALL BE LOCATED ON THE UPSTREAM SIDE OF THE STRUCTURE TO PROVIDE SEDIMENT STORAGE. THE UPSTREAM SIDE OF THE SEDIMENT SUMP SHALL HAVE A SLOPE OF 5H:1V TO INHIBIT EROSION OF THE SEDIMENT STORAGE AREA. THE MINIMUM DEPTH OF THE SEDIMENT SUMP SHALL BE 2-FEET. MARK THE SEDIMENT CLEANOUT LEVEL OF THE SEDIMENT DIKE WITH A STAKE IN THE FIELD.

SEED AND MULCH ALL DISTURBED AREAS.

INSPECTION AND MAINTENANCE:

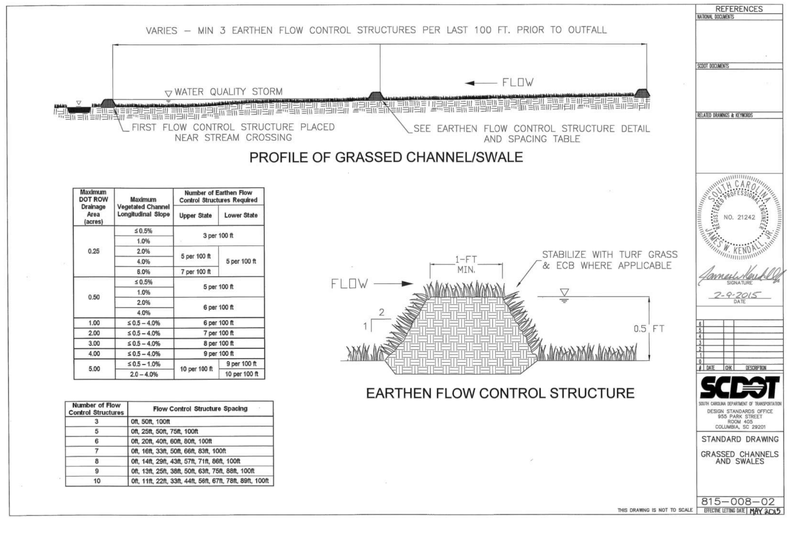
CONTRACTOR SHALL PROVIDE CONTINUAL MONITORING, REGULAR MAINTENANCE AND REGULAR SEDIMENT REMOVAL.

REMOVE SEDIMENT WHEN IT REACHES 50% OF THE SEDIMENT STORAGE VOLUME OR WHEN REACHES THE TOP OF CLEANOUT STAKE. REMOVED SEDIMENT FROM THE SUMP SHOULD BE REMOVED FROM, OR STABILIZED ON SITE.

ALL ROCK SEDIMENT DIKES SHOULD BE REMOVED WITHIN 30 DAYS AFTER FINAL SITE STABILIZATION IS ACHIEVED OR AFTER THEY ARE NO LONGER NEEDED. DISTURBED AREAS RESULTING FROM THE REMOVAL OF ROCK SEDIMENT DIKES SHOULD BE PERMANENTLY STABILIZED.

ROCK SEDIMENT DIKES

NOT TO SCALE



SOUTH CAROLINA
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NO.	REVISIONS	BY	DATE

BERKELEY COUNTY
BERKELEY COUNTY, SC

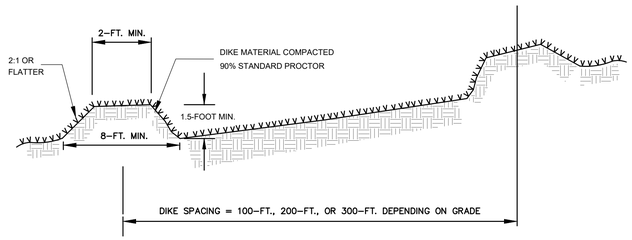
BERKELEY–DORCHESTER REACH INTERCONNECT

DIV. I – EROSION CONTROL DETAILS

JOB NO:	J-26926.0000
DATE:	01/11/21
DRAWN:	JTB
DESIGNED:	LHB
REVIEWED:	PLB
APPROVED:	LHB
SCALE:	N/A

EC1.2

STORMWATER POLLUTION PREVENTION PLAN



SECTION

INSTALLATION:

SLOPES SHALL BE STABILIZED IMMEDIATELY USING VEGETATION, SOD, AND EROSION CONTROL BLANKETS OR TURF REINFORCEMENT MATS TO PREVENT EROSION.

THE UPSLOPE SIDE OF THE DIKE SHOULD PROVIDE POSITIVE DRAINAGE SO NO EROSION OCCURS AT THE OUTLET. PROVIDE ENERGY DISSIPATION MEASURES AS NECESSARY. SEDIMENT-LADEN RUNOFF MUST BE RELEASED THROUGH A SEDIMENT TRAPPING FACILITY.

SEDIMENT-LADEN RUNOFF SHALL BE DIRECTED TO A SEDIMENT TRAPPING FACILITY.

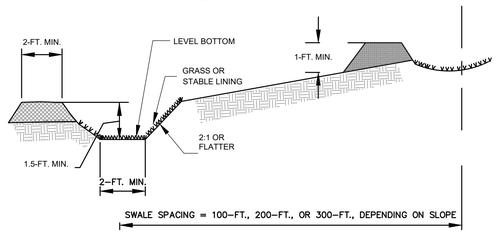
MINIMIZE CONSTRUCTION TRAFFIC OVER DIVERSION DIKES AND BERMS.

INSPECTION AND MAINTENANCE:

DAMAGE CAUSED BY CONSTRUCTION TRAFFIC OR OTHER ACTIVITY MUST BE REPAIRED BEFORE THE END OF EACH WORKING DAY.

⇒DD⇒ DIVERSION DIKE OR BERM

NOT TO SCALE



SECTION

INSTALLATION:

THE BOTTOM WIDTH SHOULD BE A MINIMUM OF 2-FEET, AND THE BOTTOM SHOULD BE LEVEL.

THE DEPTH SHOULD BE A MINIMUM OF 1.5-FEET AND THE SIDE SLOPES SHOULD BE 2H:1V OR FLATTER.

THE MAXIMUM GRADE SHALL BE 5%, WITH POSITIVE DRAINAGE TO A SUITABLE OUTLET.

SLOPES SHALL BE STABILIZED IMMEDIATELY USING VEGETATION, SOD, AND EROSION CONTROL BLANKETS OR TURF REINFORCEMENT MATS TO PREVENT EROSION.

THE UPSLOPE SIDE OF THE SWALE SHOULD PROVIDE POSITIVE DRAINAGE SO NO EROSION OCCURS AT THE OUTLET. PROVIDE ENERGY DISSIPATION MEASURES AS NECESSARY.

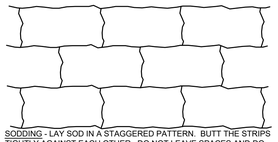
SEDIMENT-LADEN RUNOFF SHALL BE DIRECTED TO A SEDIMENT TRAPPING FACILITY.

INSPECTION AND MAINTENANCE:

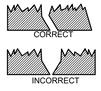
DAMAGE CAUSED BY CONSTRUCTION TRAFFIC OR OTHER ACTIVITY MUST BE REPAIRED BEFORE THE END OF EACH WORKING DAY.

⇒TD⇒ TEMPORARY DIVERSION DITCH OR SWALE

NOT TO SCALE

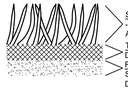


SODDING - LAY SOD IN A STAGGERED PATTERN. BUTT THE STRIPS TIGHTLY AGAINST EACH OTHER. DO NOT LEAVE SPACES AND DO NOT OVERLAP. A SHARPENED MASONS TROWEL IS A HANDY TOOL FOR TUCKING DOWN THE ENDS AND TRIMMING PIECES.



BUTTING - ANGLED ENDS CAUSED BY THE AUTOMATIC SOD CUTTER MUST BE MATCHED CORRECTLY

ROLL SOD IMMEDIATELY TO ACHIEVE FIRM CONTACT WITH THE SOIL. WATER TO A DEPTH OF 4" AS NEEDED. WATER WELL AS SOON AS THE SOD IS LAID. MOW WHEN THE SOD IS ESTABLISHED - IN 2 - 3 WEEKS. SET THE MOWER HIGH (2"-3").



SHOOTS OR GRASS BLADES - GRASS SHOULD BE GREEN AND HEALTHY

THATCH - GRASS CLIPPINGS AND DEAD LEAVES, UP TO 1/2" THICK

ROOT ZONE - SOIL AND ROOTS SHOULD BE 1/2" TO 3/4" THICK, WITH DENSE ROOT MAT FOR STRENGTH

SOD

SODDING

NOT TO SCALE

SPECIFICATIONS:

IF FEASIBLE, SOD SHOULD NOT BE LAID IN EXCESSIVELY WET OR DRY WEATHER.

DURING PERIODS OF HIGH TEMPERATURE, OR IF THE SOIL IS DRY, THE SOIL SHOULD BE LIGHTLY IRRIGATED IMMEDIATELY PRIOR TO LAYING THE SOD.

THE FIRST ROW OF SOD SHOULD BE LAID IN A STRAIGHT LINE WITH SUBSEQUENT ROWS PLACED PARALLEL TO AND BUTTING TIGHTLY AGAINST EACH OTHER. JOINTS SHOULD BE STAGGERED TO PROMOTE MORE UNIFORM GROWTH AND STRENGTH AND TO REDUCE THE CHANCE OF WASHOUTS UNDERNEATH THE SOD. CARE SHOULD BE EXERCISED TO INSURE THAT SOD IS NOT STRETCHED OR OVERLAPPED AND THAT ALL JOINTS ARE BUTTED TIGHT IN ORDER TO PREVENT VOIDS WHICH WOULD CAUSE DRYING OF THE ROOTS. SMALL GAPS OR VOIDS REMAINING AFTER THE SOIL IS LAID SHOULD BE FILLED WITH TOPSOIL.

PLACEMENT SHOULD BEGIN AT THE LOWER END OF SLOPES AND CHANNELS. ON SLOPES 3:1 OR GREATER, OR WHEREVER EROSION MAY BE A PROBLEM, SOD SHOULD BE SECURED BY PEGGING OR OTHER APPROVED METHODS. SOD SHOULD BE INSTALLED WITH THE LENGTH PERPENDICULAR TO THE SLOPE (ON THE CONTOUR).

AS SODDING IS COMPLETED, SOD SHOULD BE ROLLED OR TAMPED TO PROVIDE FIRM CONTACT BETWEEN ROOTS AND SOIL.

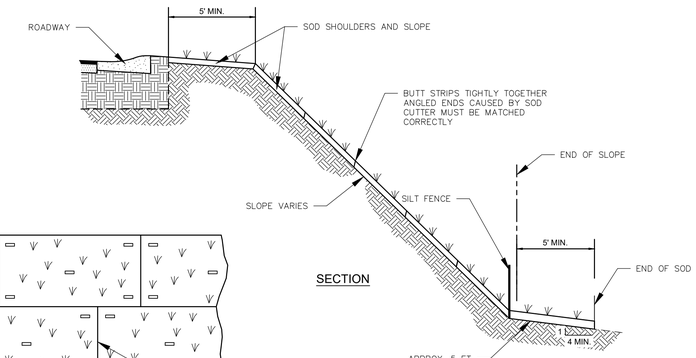
AFTER ROLLING, SOD SHOULD BE IRRIGATED TO A DEPTH SUFFICIENT THAT THE UNDERSIDE OF THE SOD PAD AND THE SOIL 4" BELOW THE SOD IS THOROUGHLY WET.

ESTABLISHMENT AND MAINTENANCE OF SOD:

DURING THE FIRST 3 - 4 WEEKS WATERING SHOULD BE PERFORMED AS OFTEN AS NECESSARY TO MAINTAIN MOIST SOIL TO A DEPTH OF AT LEAST 2 INCHES.

THE FIRST MOWING SHOULD NOT BE ATTEMPTED UNTIL THE SOD IS FIRMLY ROOTED, USUALLY 2 - 3 WEEK. THE MOWER SHOULD BE SET HIGH (2 -3 INCHES) FOR THE FIRST MOWING. NO MORE THAN 1/3 OF THE SHOOT (GRASS LEAF) SHOULD BE REMOVED IN ANY MOWING.

FERTILIZER SHOULD BE APPLIED, AS NECESSARY, TO OBTAIN AND MAINTAIN THE DESIRED GROWTH AND DENSITY. LIME SHOULD BE ADDED, AS NEEDED, TO MAINTAIN PROPER pH. SOIL SHOULD BE TESTED EVERY 1 - 2 YEARS TO DETERMINE FERTILIZER AND LIME REQUIREMENTS.



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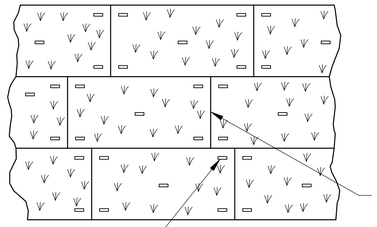


USE PEGS OR STAPLES TO FASTEN SOD FIRMLY AT THE ENDS OF STRIPS AND IN THE CENTER AND EVERY 3–4 FEET IF THE STRIPS ARE LONG. PEGS SHALL BE 6"–10" IN LENGTH.

LAY SOD IN A STAGGERED PATTERN. DO NOT LEAVE SPACES AND DO NOT OVERLAP. TUCK DOWN ENDS AND TRIM PIECES W/ A SHARPENED MASONS TROWEL.

PLAN

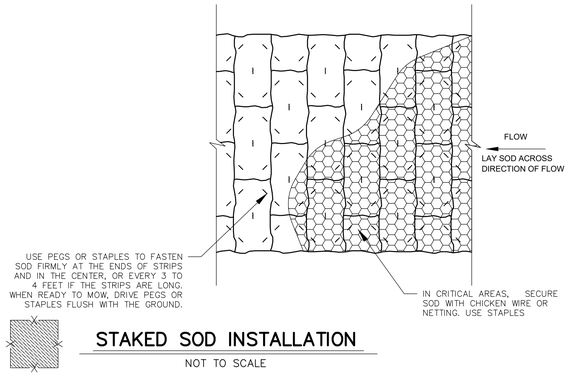
INSTALLATION AND MAINTENANCE OF SOD SHALL BE IN ACCORDANCE WITH "EROSION AND SEDIMENT CONTROL PRACTICES FOR DEVELOPING AREAS" BY THE SOUTH CAROLINA RESOURCES CONSERVATION COMMISSION.

THE FIRST ROW OF SOD SHOULD BE LAID IN A STRAIGHT LINE WITH SUBSEQUENT ROWS PLACED PARALLEL TO AND BUTTING TIGHTLY AGAINST EACH OTHER. JOINTS SHOULD BE STAGGERED TO PROMOTE MORE UNIFORM GROWTH AND STRENGTH AND TO REDUCE THE CHANCE OF WASHOUTS UNDERNEATH THE SOD. CARE SHOULD BE EXERCISED TO INSURE THAT SOD IS NOT STRETCHED OR OVERLAPPED AND THAT ALL JOINTS ARE BUTTED TIGHT IN ORDER TO PREVENT VOIDS WHICH WOULD CAUSE DRYING OF THE ROOTS. SMALL GAPS OR VOIDS REMAINING AFTER THE SOIL IS LAID SHOULD BE FILLED WITH TOPSOIL.

PROVIDE STRONGLY ROOTED ST AUGUSTINE SOD, NOT LESS THAN 2 YEARS OLD AND FREE OF WEEDS AND UNDESIRABLE NATIVE GRASSES. PROVIDE ONLY SOD CERTIFIED BY THE CROP PEST COMMISSION CAPABLE OF GROWTH WHEN PLANTED (VIABLE NOT DORMANT), AND IN STRIPS OF NOT MORE THAN 18 INCHES WIDE AND 72 INCHES LONG.

SLOPED SODDING DETAIL

NOT TO SCALE



STAKED SOD INSTALLATION

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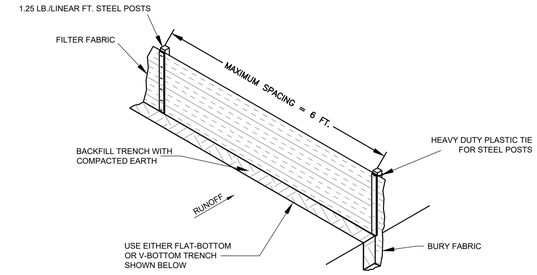
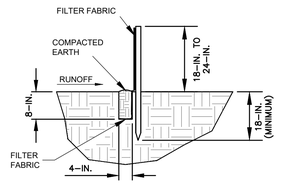
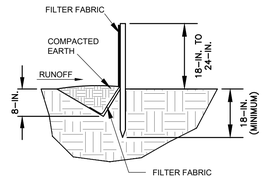


SILT FENCE INSTALLATION



FLAT-BOTTOM TRENCH DETAIL



V-SHAPED TRENCH DETAIL

WHEN AND WHERE TO USE IT:
SILT FENCE IS APPLICABLE IN AREAS:

WHERE THE MAXIMUM SHEET OR OVERLAND FLOW PATH LENGTH TO THE FENCE IS 100-FEET.
WHERE THE MAXIMUM SLOPE STEEPNESS (NORMAL [PERPENDICULAR] TO FENCE LINE) IS 2H:1V.
THAT DO NOT RECEIVE CONCENTRATED FLOWS GREATER THAN 0.5 CFS.

DO NOT PLACE SILT FENCE ACROSS CHANNELS OR USE IT AS A VELOCITY CONTROL BMP.

MATERIALS:

STEEL POSTS
USE 48-INCH LONG STEEL POSTS THAT MEET THE FOLLOWING MINIMUM PHYSICAL REQUIREMENTS:
COMPOSED OF HIGH STRENGTH STEEL WITH MINIMUM YIELD STRENGTH OF 50,000 PSI.
HAVE A STANDARD "T" SECTION WITH A NOMINAL FACE WIDTH OF 1.38-INCHES AND NOMINAL "T" LENGTH OF 1.48-INCHES.
WEIGH 1.25 POUNDS PER FOOT (± 8%).
HAVE A SOIL STABILIZATION PLATE WITH A MINIMUM CROSS SECTION AREA OF 17-SQUARE INCHES ATTACHED TO THE STEEL POSTS.
PAINTED WITH A WATER BASED BAKED ENAMEL PAINT.

USE STEEL POSTS WITH A MINIMUM LENGTH OF 4-FEET, WEIGHING 1.25 POUNDS PER LINEAR FOOT (± 8%) WITH PROJECTIONS TO AID IN FASTENING THE FABRIC. EXCEPT WHEN HEAVY CLAY SOILS ARE PRESENT ON SITE, STEEL POSTS WILL HAVE A METAL SOIL STABILIZATION PLATE WELDED NEAR THE BOTTOM SUCH THAT WHEN THE POST IS DRIVEN TO THE PROPER DEPTH, THE PLATE WILL BE BELOW THE GROUND LEVEL FOR ADDED STABILITY.
THE SOIL PLATES SHOULD HAVE THE FOLLOWING CHARACTERISTICS:
BE COMPOSED OF MINIMUM 15 GAUGE STEEL.
HAVE A MINIMUM CROSS SECTION AREA OF 17-SQUARE INCHES.

GEOTEXTILE FILTER FABRIC:
FILTER FABRIC IS:
COMPOSED OF FIBERS CONSISTING OF LONG CHAIN SYNTHETIC POLYMERS COMPOSED OF AT LEAST 85% BY WEIGHT OF POLYOLEFINS, POLYESTERS, OR POLYAMIDES.
FORMED INTO A NETWORK SUCH THAT THE FILAMENTS OR YARNS RETAIN DIMENSIONAL STABILITY RELATIVE TO EACH OTHER.
FREE OF ANY TREATMENT OR COATING WHICH MIGHT ADVERSELY ALTER ITS PHYSICAL PROPERTIES AFTER INSTALLATION.
FREE OF DEFECTS OR FLAWS THAT SIGNIFICANTLY AFFECT ITS PHYSICAL AND/OR FILTERING PROPERTIES.
CUT TO A MINIMUM WIDTH OF 36 INCHES.

USE ONLY FABRIC APPEARING ON SCDOT APPROVAL SHEET #34 MEETING THE REQUIREMENTS OF THE MOST CURRENT EDITION OF THE SCDOT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.

INSTALLATION:
EXCAVATE A TRENCH APPROXIMATELY 6-INCHES WIDE AND 6-INCHES DEEP WHEN PLACING FABRIC BY HAND. PLACE 12-INCHES OF GEOTEXTILE FABRIC INTO THE 6-INCH DEEP TRENCH, EXTENDING THE REMAINING 6-INCHES TOWARDS THE UPSLOPE SIDE OF THE TRENCH. BACKFILL THE TRENCH WITH SOIL OR GRAVEL AND COMPACT. BURY 12-INCHES OF FABRIC INTO THE GROUND WHEN PNEUMATICALLY INSTALLING SILT FENCE WITH A SLICING METHOD. PURCHASE FABRIC IN CONTINUOUS ROLLS AND CUT TO THE LENGTH OF THE BARRIER TO AVOID JOINTS. WHEN JOINTS ARE NECESSARY, WRAPPED THE FABRIC TOGETHER AT A SUPPORT POST WITH BOTH ENDS FASTENED TO THE POST, WITH A 6-INCH MINIMUM OVERLAP. INSTALL POSTS TO A MINIMUM DEPTH OF 24-INCHES. INSTALL POSTS A MINIMUM OF 1- TO 2- INCHES ABOVE THE FABRIC, WITH NO MORE THAN 3-FEET OF THE POST ABOVE THE GROUND. SPACE POSTS TO MAXIMUM 6-FEET CENTERS. ATTACH FABRIC TO WOOD POSTS USING STAPLES MADE OF HEAVY-DUTY WIRE AT LEAST 1-1/2-INCH LONG, SPACED A MAXIMUM OF 6-INCHES APART. STAPLE A 2-INCH WIDE LATHE OVER THE FILTER FABRIC TO SECURELY FASTEN IT TO THE UPSLOPE SIDE OF WOODEN POSTS. ATTACH FABRIC TO THE STEEL POSTS USING HEAVY-DUTY PLASTIC TIES THAT ARE EVENLY SPACED AND PLACED IN A MANNER TO PREVENT SAGGING OR TEARING OF THE FABRIC. IN CALL CASES, TIES SHOULD BE AFFIXED IN NO LESS THAN 4 PLACES. INSTALL THE FABRIC A MINIMUM OF 24-INCHES ABOVE THE GROUND. WHEN NECESSARY, THE HEIGHT OF THE FENCE ABOVE GROUND MAY BE GREATER THAN 24-INCHES. IN TIDAL AREAS, EXTRA SILT FENCE HEIGHT MAY BE REQUIRED. THE POST HEIGHT WILL BE TWICE THE EXPOSED POST HEIGHT. POST SPACING WILL REMAIN THE SAME AND EXTRA HEIGHT FABRIC WILL BE 4-, 5-, OR 6-FEET TALL. LOCATE SILT FENCE CHECKS EVERY 100 FEET MAXIMUM AND AT LOW POINTS. INSTALL THE FENCE PERPENDICULAR TO THE DIRECTION OF FLOW AND PLACE THE FENCE THE PROPER DISTANCE FROM THE TOE OF STEEP SLOPES TO PROVIDE SEDIMENT STORAGE AND ACCESS FOR MAINTENANCE AND CLEANOUT.

INSPECTION AND MAINTENANCE:
CHECK FOR SEDIMENT BUILDUP AND FENCE INTEGRITY. CHECK WHERE RUNOFF HAS ERODED A CHANNEL BENEATH THE FENCE, OR WHERE THE FENCE HAS SAGGED OR COLLAPSED BY FENCE OVERTOPPING. IF THE FENCE FABRIC TEARS, BEGINS TO DECOMPOSE, OR IN ANY WAY BECOMES INEFFECTIVE, REPLACE THE SECTION OF FENCE IMMEDIATELY. REMOVE SEDIMENT ACCUMULATED ALONG THE FENCE WHEN IT REACHES 1/3 THE HEIGHT OF THE FENCE, ESPECIALLY IF HEAVY RAINS ARE EXPECTED. REMOVE TRAPPED SEDIMENT FROM THE SITE OR STABILIZE IT ON SITE. REMOVE SILT FENCE WITHIN 30 DAYS AFTER FINAL STABILIZATION IS ACHIEVED OR

AFTER TEMPORARY BEST MANAGEMENT PRACTICES (BMPS) ARE NO LONGER NEEDED. PERMANENTLY STABILIZE DISTURBED AREAS RESULTING FROM FENCE REMOVAL.

SILT FENCE

NOT TO SCALE

SOUTH CAROLINA — NOLLY CRAIG HUTTON — THOMAS & HUTTON ENGINEERING — No. C00285 — CERTIFICATE OF AUTHORIZATION

SOUTH CAROLINA — LICENSED PROFESSIONAL ENGINEER — No. 29974 — 1/14/21 — LUCAS BRADLEY HAMILTON

NO.	REVISIONS	BY	DATE

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BERKELEY COUNTY
BERKELEY COUNTY, SC

BERKELEY–DORCHESTER REACH INTERCONNECT

DIV. I – EROSION CONTROL DETAILS

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DESIGNED:	LHB
REVIEWED:	PLB
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SCALE:	N/A

EC1.3