

CALHOUN COUNTY GOVERNMENT

CALHOUN COUNTY BANKS LANE, CONGAREE COURT, HOWELL LANE, & ARCHANGEL LANE CTC DIRT ROAD PAVING 2019 PROJECT

**Project Address:
Various Locations in Calhoun County, SC
Calhoun County**



Prepared by:

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1021 Briargate Circle
Columbia, SC 29210
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March 8, 2019

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**CALHOUN COUNTY
CTC DIRT ROAD PAVING 2019 PROJECT**

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INVITATION TO BID

CALHOUN COUNTY C.T.C. Roadway Improvements for County Roads

Project Description: CALHOUN County is requesting Sealed Bids for the Roadway Improvements for the paving of approximately *0.857 miles* of existing dirt roads located in CALHOUN County, and resurfacing of approximately *0.217 miles* of an existing road located in CALHOUN County . The roads to be paved are *Banks Lane (0.159 miles)/Congaree Court (0.393 miles)*, *both bound under the same cover, located off State Road S-9-353 (Old Swamp Road)*, *construction includes the installation of proposed 2,490 linear feet 3” water line and services for property owners along Banks Lane/Congaree Court* as outlined in the attached Plans and Specifications. Another road to be paved is *Howell Lane (0.305 miles) located off State Road S-9-196 (Sweet Bay Road)* as outlined in the attached Plans and Specifications. *The road to be resurfaced is Archangel Lane (0.217 miles) located off State Road S-9-334 (Longview Road)* as outlined in the attached Plans and Specifications. The Bids must be submitted as stated on the attached CALHOUN County Sealed Bid Document. There will be a non-mandatory pre-bid conference held on March 22, 2019 at 10:00 AM at the Calhoun County Council Chambers, 102 Courthouse Drive Annex Suite 108, St. Matthews, SC 29135. Any question concerning the bid should be directed to btill@calhouncounty.sc.gov. "The Bids must be received by mail or hand delivered to the CALHOUN County Procurement Department, Attn. Mr. Boyce Till – Procurement Officer, 102 Courthouse Drive Annex Suite 112, St. Matthews, SC 29135, at the specified time on the advertisement."

Plans, Specifications, and Contract Documents: Plans, Specifications, and Contract Documents may be obtained from *Infrastructure Consulting & Engineering office at 1021 Briargate Circle Columbia, SC Monday-Friday from 8 am-5 pm for pickup. Contact Aaron Livingston at (803)-227-4064 (Office) or at Aaron.Livingston@ice-eng.com.* There will be a non-refundable \$100 per set deposit required for the Bid Documents. Overnight delivery service is available for an extra charge. Documents may also be viewed on the County website at <https://calhouncounty.sc.gov/departments/procurement>.

Owner Contact: All Contractors are instructed to direct all inquiries regarding this Bid to btill@calhouncounty.sc.gov. Requests to schedule a site visit with the Procurement Department, 102 Courthouse Drive, Courthouse Annex, Suite 112, St. Matthews, SC, 29135, (803) 655-5670, between the hours of 9:00 a.m. to 5:00 p.m. Monday through Friday.

Special Conditions: Traffic Control shall conform to SCDOT “shoulder Work with Minor Encroachment” page 17 of the South Carolina Work Zone Safety Manual.

Conditions of Work: The Contractor must have informed himself fully of the conditions relating to the construction of this project and the employment of labor thereon, to have inspected the site, and to have read and become familiar with all the bid documents, contract documents, and plans/sketches. Failure or omission to do so will not relieve a successful bidder of his obligation to furnish all material, equipment, and labor necessary to carry out the provisions of his contract. Insofar as possible, the Contractor, in carrying out his work, must employ such methods and/or means as will not cause any interruption of or interference with the work of other contractors.

Restrictions: Contractor will need to work within the easements and right of way. Coordination shall be through the County Representative's Office.

Safety Devices: Contractor shall provide all needed barricades and signs for safety and remove trash and debris from the work area daily.

Damage to Property: Contractor shall be responsible for, and immediately take action to, repair or replace any damage adjacent to existing owner property for any reason.

CALHOUN COUNTY C.T.C. Roadway Improvements for County Roads

Utilities: Any needed utilities shall be at the expense of the Contractor.

References: References shall be provided upon request to confirm that the successful bidder is capable of performing and completing this project in a timely manner under specified conditions.

Warranty Period: The warranty period for this project is one (1) year on labor and materials against defects and workmanship. This warranty period shall commence upon owner's final approval of the entire work.

Licenses & Permits: The Contractor is to obtain any licenses or permits required to perform this work at no additional expense to the Owner.

Insurance: Proof of Liability Insurance and Workmen's Compensation Insurance must be provided prior to commencing work.

Sketches: Sketches are provided for the purpose of bidding and not necessarily for detailed construction. All materials to be used are to be approved by the County Representative prior to installation. In the case of an inconsistency between the sketches and specifications or within either document, the better quality or greater quantity of work shall be provided in accordance with the interpretation of the County Representative.

Time of Completion: The time of completion is *(150) calendar days*, and availability of all items must be confirmed prior to commencing work. Liquidated damages are **five hundred (\$500.00) dollars** per calendar day. Written requests for additional time caused by unforeseen delays will be considered only if submitted in writing within ten (10) calendar days of event causing the delay. The work must commence on or before a date to be specified in a written "Notice to Proceed" from the Owner, and the project fully complete within the consecutive days thereafter, excluding major holidays.

Waiver of Lien: At the completion of the project, a Waiver of Lien (form provided by the County Representative) shall be submitted to the County Representative with the final Pay Request.

Security for Faithful Performance: For those contracts more than \$50,000.00 in value, a

Performance Bond of 100% of Bid and a Payment Bond for 100% of Bid shall be required. The Owner shall retain and hold ten (10) percent from each pay request until all work has been completed and approved by the County Representative, and a Waiver of Lien submitted stating that all vendors have been paid for materials, labor, and supplies. See advertisement for Bid Bond Information.

ENGINEER

Infrastructure Consulting & Engineering
1021 Briargate Circle
Columbia, SC 29210
Telephone: (803)-822-0333

OWNER

Calhoun County
102 Courthouse Drive
Annex Suite 112
Saint Matthews, SC
Telephone: (803)-655-5670

Instructions to Bidders

1. **Intention:** It is intended that the Instructions to Bidders, Special Conditions, General Conditions, Detail Construction Specifications and Drawings shall cover the complete work to which they relate.
2. **Definitions:** Where the following words or pronouns used in their stead occur herein, they shall have the following meaning:
 - "**Owner**" shall mean CALHOUN COUNTY, SOUTH CAROLINA, party of first part to the following agreement, or its authorized and legal representatives.
 - "**County Representative**" shall mean THE COUNTY PROCUREMENT OFFICER FOR CALHOUN COUNTY, S.C, or ENGINEER FROM THE DESIGN CONSULTANT FIRM.
 - "**Contractor**" shall mean the party of the second part to the following agreement, or the legal authorized representatives of such party.
3. **Specifications Guidelines:** The work to be done consists of furnishing all materials and equipment and performing all labor necessary for completion of the work as set forth in the Bid, as shown on the Drawings, and as specified.
4. **Materials and Work by Owner:** The Owner will furnish and perform no labor for construction of the work under this contract except what is noted in the Special Conditions under "Work by County Forces."
5. **Contractor's License and Taxes:** Bidders must satisfy the requirements of all applicable South Carolina statutes, regulations and ordinances pertaining to bidders, contractors, licenses, permits, fees and taxes, including but not limited to Sections 40-11-10, et seq, Code of Laws of South Carolina, 1976, as amended. *The General Contractor's License number must be shown in the space provided on the Bid Invitation and Bid Document.*
6. **Site Examination:** The Bidder is expected and directed to examine the location of the work and to inform himself fully as to the structural and mechanical conditions; the conformation of the ground; the soil conditions; the character, quality and quantity of the materials to be encountered; the character of equipment and facilities needed preliminary to and during the prosecution of the work; the general and local conditions; and all other matters which can in any way affect the work to be done.
7. **Sub-Surface Conditions:** A sub-surface investigation has not been made on any portion of the work, and the Owner and County Representative make no representation or express any opinion on such conditions. Excavation for the project is unclassified for rock. The contractor shall include in his bid all cost of excavation and removal and replacement of unsuitable materials. The contractor shall make his own analysis of the materials to be encountered, and include prices for removal and replacement of these materials in his unit prices for construction unless allowances for removal and replacement are provided in the Bid. It is expected that

quantities may be significantly less or greater than shown in the Bid since Bid quantities are established without any knowledge of the underground conditions, and it would be unusual for the quantities to be close to those actually encountered. The prospective bidder must form his own opinion of the character of the sub-surface materials to be encountered in excavating for construction of the various facilities and completing the work, and include all costs and charges therefore in his bid.

8. **Bids:** All Bids must be made upon the Bid Document forms hereto annexed and shall be for materials and work shown on the Drawings and/or specified. Bid forms shall not be detached from the bound documents. Bid prices must be stated for each item for which a Bid is made. Documents are to be enclosed in a sealed envelope, addressed to:

CALHOUN COUNTY GOVERNMENT
ATTN: PROCUREMENT DEPARTMENT
102 COURTHOUSE DRIVE, COURTHOUSE ANNEX SUITE 112
ST. MATTHEWS, SOUTH CAROLINA 29135

If forwarded by mail or courier, the sealed envelope containing the Bid shall be enclosed in another envelope or courier container also addressed as specified.

- (a) **Unit Price Items:** The itemized quantities given in the Bid for unit price work shall be considered by the Contractor as the quantities required to complete the work. When the actual quantities required in the construction of the work are greater than or less than the quantities shown in the items, the amount equal to the difference in quantities at the unit prices bid for amount shall be paid.
- (b) **Lump Sum Prices:** Where itemized prices are not given in the Bid, the Contractor shall consider the lump sum prices bid for the work shown on the Drawings and/or specified to be sufficient for completion of his Contract.
- (c) **Total Amount Bid:** The correct total amount bid is defined as the correct sum total of the amount bid for the items in the Bid. The correct amount bid for each unit price item is defined as the product of the quantity listed in the Bid for the item, multiplied by the unit price bid.
9. **Extra Work Items in the Bid:** The Bid may contain certain unit price items entitled "Extra Work, If Ordered by the County Representative". In each such item, the estimated quantity is based on the average amount of extra work encountered in a typical job. The stated quantities are not guaranteed, but are included in the Bid in order to determine, in advance of construction, the actual low Bidder. No work included in such items will be authorized for payment without advance authorization of the work by the County Representative.
10. **Bid Security and Bonds:** A Bid Bond shall be required in an amount equal to not less than five per cent (5%) of the amount of the bid to guarantee that the successful bidder will,

within ten (10) days from the date of the notice of awarded Contract, enter into a contract with the Owner, and execute to the Owner a Performance Bond and Payment Bond, the contract and bonds to be in the form set forth in this book. If, for any reason whatever, the Bidder withdraws from the competition after the bids have been opened, or refuses to execute the required contract and bonds, if his bid is accepted, the Owner may retain the amount of the certified check, or proceed against the bid bond. The surety on the Bid Bond and Performance and Payment Bonds shall be a surety company authorized to do business in the State where the project is located. Attorneys-in-fact certified, proper and effectively dated copy of their power of attorney. Performance and Payment Bonds shall be countersigned by an agent residing in the State, County, or City of the Owner, if required. Bonds and the surety thereon shall be subject to approval by the Attorney for the Owner.

11. **Bids Opened in Public:** Bidders are invited to be present at the opening of Bids, which will be in public.

12. **Right to Reject Bids:** The Owner reserves the right to reject any or all bids and to waive informalities. No bids will be received after the time set for opening Bids. Any Bidder may change or withdraw his bid, either personally or by telegraphic or written request, at any time prior to the scheduled closing time for receipt of bids, but no bid shall be changed or withdrawn by telegraph or mail received after the time set for opening Bids.
13. **Determination of Low Bid:** The contract will be awarded, if it is awarded, to the responsible and responsive Bidder or Bidders submitting the lowest bid. The Owner, in its sole discretion, will decide which is the lowest responsible and responsive Bidder. In determining a responsible Bidder, the following elements, among other things, may be considered: whether the Bidder involved (a) maintains a permanent place of business; (b) has adequate plant equipment to do the work properly and expeditiously; (c) has a suitable financial status to meet obligations incident to the work; and (d) has appropriate technical experience on projects of similar scope and types of work and experienced, qualified personnel. In determining a responsive Bidder, the following elements will be considered: (a) the completeness and regularity of the Bid Form; (b) Bid Form without excisions or special conditions, and, (c) a Bid Form having no alternative bids for any items unless requested in the technical specifications.
 - (a) The Bidder, if requested by the County Representative, shall list prices of at least two manufacturers of each item of major equipment if listed on the Bid Form. Use lowest price for base bid. If the "make" of any item listed in the base bid column does not meet specifications, the next lowest priced "make" listed for that item which does meet specifications will be used in determining the lowest bid price. If all of the listed "makes" of the item fail to meet specifications, as determined above, the Bidder will be so notified and he may, within 48 hours of such notification, submit a make or makes of equipment which will meet the specification for the base price originally listed in the Bid. Otherwise, the Bid will be rejected on the grounds that it is non-responsive.
 - (b) The Owner has the right to apply any or all "Deductions or Additions", if any, listed in the Bid by the County Representative, for the purpose of making an award.
14. **Return of Bid Security:** Subject to the provisions of paragraph 10, the Owner will, within ten (10) days following the Bid opening date, return the certified check of all Bidders, except the certified checks posted by the three lowest Bidders; upon final award and execution of the Contract, the remaining certified checks will be promptly returned. Bid Bonds will not be returned unless requested.
15. **Interpretation of Drawings and Specifications:** If any person contemplating submitting a bid for the project is in doubt as to the true meaning of any part of the Drawings, Specifications, or other Contract Document, or as to the scope of any part of the work, he shall submit to the County Representative a written request for an interpretation thereof. The person submitting the request will be responsible for its prompt delivery in ample time for an interpretation to be issued before bid opening date. Interpretations of the documents will be made only by Addendum, and a copy of that Addendum will be mailed or delivered to each person receiving a set of the documents. The Owner and County Representative
16. will not be responsible for other interpretations of the documents.
17. **Complete Work Required:** The Specifications, the Drawings and all supplemental documents are essential parts of the Contract, and requirements occurring in one are as binding as though occurring in all. They are intended to be complementary and to describe and provide for the complete work. In case of omissions from the Specifications as to items of equipment and materials or quantities therefore, the Drawings shall govern. In case of discrepancy in the Drawings, figured dimensions shall govern. It shall be the responsibility of the Bidder to call to the attention of the County Representative those omissions having a magnitude, which would affect the strength, adequacy, function, completeness and cost of any part of the work in ample time for amendment by Addendum prior to the Bid opening date.

18. **Drawings:** The character and location of the work, together with the essential details, are shown upon the Drawings.
19. **Working Drawings:** Working drawings shall consist of those detail drawings which may be required for prosecution of the work, but which are not included in the Contract Drawings. Six copies of all necessary working drawings shall be submitted by the Contractor to the County Representative unless additional copies are included in the submittal. Working drawings shall include shop details of manufactured equipment, products to be used, and all other drawings as may be required by the Specifications, and as may be necessary for the successful completion of the work. Review and approval by the County Representative must be obtained before work involving working drawings may be performed.
- (a) **Check by Contractor:** The Contractor shall check all working drawings for accuracy of dimensions and details, and for conformance with Contract Drawings and Specifications before submitting working drawings to the County Representative for review. The Contractor shall indicate that working drawings have been checked by affixing an appropriate stamp or notation on the face of the working drawings. Deviations from the Plans and Specifications shall be clearly and specifically called to the County Representative's attention in a written statement accompanying the drawings.
- (b) **Responsibility for Accuracy:** Review by the County Representative of the Contractor's working drawings shall not relieve the Contractor of responsibility for accuracy of dimensions and details. The Contractor shall be responsible for agreement and conformity of working drawings with the Contract Drawings and Specifications.
- (c) **Payment:** The contract price shall include the cost of furnishings all working drawings, and the Contractor shall be allowed no extra compensation for furnishing those drawings.
20. **Cooperation of Contractor:** The Contractor will be supplied with five (5) copies of the Drawings and Specifications. The Contractor shall have available on the work, at all times, one (1) copy of the Drawings and Specifications. He shall give the work the constant attention necessary to facilitate the progress thereof, and shall cooperate with the County Representative and other contractors in every way possible.
21. **Construction Stakes:** Subsidiary lines and grades shall be laid out by the Contractor from the controlling lines and bench marks established by the County Representative, or from measurements shown. All lines and grades shall be subject to checking by the County Representative, but that checking shall in no way relieve the Contractor from responsibility for their labor and assistance as the County Representative
22. may require in laying-out work, establishing bench marks, and checking and measuring the work.
23. **Authority and Duties of Inspector:** Inspectors shall be authorized to inspect all work done and all materials furnished, including preparation, fabrication, and manufacture of the materials to be used. The inspector shall not be authorized to alter or waive requirements of the Drawings and Specifications. He shall call the attention of the Contractor to failure of the work and/or materials to conform to the Drawings and Specifications. He may reject materials or suspend work until questions at issue can be referred to, and be decided by the County Representative. The presence of the inspector shall in no way lessen the responsibility of the Contractor.

24. **Inspection:** The Contractor shall furnish the County Representative with every reasonable facility for ascertaining whether or not the work performed and materials used are in accordance with the requirements and intent of the Specifications and Drawings. No work shall be done or materials used without suitable supervision or inspection by the County Representative or his representative. Failure to reject defective work and materials shall neither, in any way, prevent later rejection when those defects are discovered, or obligate the Owner to any final acceptance.
25. **Rejection of Work and Materials:** All materials furnished and work done when not in accordance with the Specifications and Drawings will be rejected, shall be immediately removed, and other work shall be done and materials furnished in accordance therewith.
If the Contractor fails to remove the work and materials within forty-eight (48) hours after having been ordered to do so, then the Owner shall have the right and authority to stop the Contractor and his work at once until the Contractor removes the work and materials.
26. **Defective Materials and Work:** The inspection of the work shall not relieve the Contractor of any of his obligations to fulfill the Contract. Defective work shall be made good by the Contractor, notwithstanding that such work and materials have been previously inspected by the County Representative and accepted or estimated for payment. Failure by the County Representative to condemn or reject improper materials and workmanship shall be considered neither as a waiver of defects, which may be discovered late, nor as preventing the Owner at any time subsequently from recovering damages for work actually defective. All work shall be guaranteed against defects in workmanship and materials for a minimum period of one year from date of Owner acceptance.
27. **Corrections:** Should any portion of the Drawings and specifications be obscure or in dispute, they shall be referred to the County Representative, and he shall decide as to the true meaning and intent. He shall also have the right to correct errors and omissions at any time when those corrections are necessary for the proper fulfillment of the Drawings and Specifications.
28. **Disagreement:** Should any disagreement or difference arise as to the estimate, quantities, or classifications, or as the meaning of the Drawings and/or Specifications, on any point concerning the character, acceptability, and nature of the several kinds of work and materials and construction thereof, the decisions of the County Representative shall be final, conclusive, and binding upon all parties to the Contract.
29. **Weather:** During unseasonable weather, all work must stop when the County Representative so directs, and all work must be suitably protected.
30. **Land and Rights-of-Way:** The Owner will furnish all land and rights-of-way necessary for the carrying out of this contract and the completion of the work herein contemplated, and will use due diligence in acquiring said land and rights-of-way as speedily as possible. It is possible that all lands and rights-of-way may not be obtained as herein contemplated before construction begins, in which event the Contractor shall begin his work upon such land and rights-of-way as the Owner may have previously acquired. The Owner will provide no right-of-way over other property. The Contractor shall take every precaution to inconvenience as little as possible the owners or tenants of adjacent property. Public Highways shall not be obstructed. Expense shall be borne by the Contractor to repair or pay for any damage or injury to either private or public property during progress of the work.
31. **Competent Labor:** The Contractor shall employ only competent and skilled personnel on the work. The Contractor shall at all times have a Superintendent, satisfactory to the County Representative, capable of acting as the Contractor's agent of the work, and who shall receive instructions from the

County Representative or his authorized representative. The Superintendent shall have full authority to execute the orders and directions of the County Representative without delay, and

to promptly supply these materials, tools, plant equipment, and labor as may be required. The Contractor shall, upon demand by the County Representative, immediately remove that Superintendent, Foreman, and Workmen whom the County Representative may consider to be incompetent or undesirable, or both.

32. **Laws, Regulations, and Permits:** The Contractor shall comply with all applicable laws, ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the work specified herein. Permits and licenses necessary for construction of the work shall be secured and paid for by the Contractor.
33. **Sales Tax:** Bidders shall include in the Bid an allowance for payment of State Sales Tax on all taxable materials specified to be furnished by the Contractor and incorporated into the work under this Contract.
34. **Sanitary Facilities:** Necessary sanitary facilities for the use of personnel on the work shall be erected and maintained by the Contractor in such manner and at such points as shall be approved by the County Representative. Facilities shall be maintained in sanitary conditions and in strict accordance with the applicable regulations. No unsanitary act shall be committed outside sanitary facilities.
35. **Storage Facilities:** Should the Contractor so desire, he may build storage facilities for housing tools, machinery and supplies, but those facilities will be permitted only at places approved by the County Representative, and their surroundings shall be maintained at all times in a sanitary and satisfactory manner. On or before completion of the work, those facilities shall be removed at the expense of the Contractor.
36. **Water, Sewer, and Electric Power Supply:** The Contractor shall make his own arrangements for water, sewer, and electric power supply for his construction operations.
37. **Access Roads:** Streets, roads and drives used by the Contractor for access to and from the job site shall be protected from damage in excess of that caused by the normal traffic of vehicles used for, or in connection with, construction work. Project-related damages shall be repaired immediately, and the area shall be left in good condition at the end of the construction period.
38. **Order of Work:** The prosecution, order and sequence of the work shall be as provided herein, or as approved by the County Representative, but that approval shall in no way affect the responsibility of the Contractor.
39. **Protective Works:** The Contractor shall furnish and install all necessary temporary signage for the protection of the work, including lights at night, barricades, and warning signs.
40. **Safety Regulations:** The performance of work under this Contract shall comply with safety regulations prescribed by the Owner, those of the National Occupational Safety and Health Act of 2011, and the requirements of the State where project is located. Each Bidder shall examine and satisfy himself as to the character and extent of these regulations.
41. **Allowable Time for Completion:** The time allowed for completion of all work as stated in the Bid and Construction Agreement shall be as specified in consecutive calendar days after notifications by written order from the County Representative to proceed with the work. Such notifications will be issued upon completion of execution of the contract documents.

42. **Liquidated Damages:** The Contractor shall pay to the Owner as liquidated damages the sum of five hundred dollars (\$500.00) for each calendar day that the Contractor shall be in default of completing the work within the time limit stated within the Bid.

END INSTRUCTION TO BIDDERS

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GENERAL CONDITIONS

1. **Contract Security:** The Contractor must furnish two Security Bonds (forms attached) each in an amount at least equal to one hundred percent (100%) of the contract price, one as a security for the faithful performance of this Contract and one for the payment of all persons performing labor and furnishing materials in connection with this Contract. The Surety on each Bond must be a surety company satisfactory to the Owner, duly authorized to do business in the State of South Carolina. The Bonds must be countersigned by an agent who is a resident of the State, County or City of the Owner, if required. The person executing the Bond on behalf of the surety must file with the Bond a general power of attorney unlimited as to amount and type Bond covered by such power of attorney, and certified to by an official of said surety.

2. **Contractor's and Subcontractor's Insurance:** The Contractor must not commence work under this Contract until he has obtained all the insurance required under this paragraph and such insurance has been approved by the Owner, nor shall the Contractor allow any subcontractor to commence work on his subcontract until all similar insurance required of the subcontractor has been so obtained and approved. All certification of insurance and policies must contain the following clause: "The insurance covered by this Certificate will not be canceled or materially altered unless at least thirty (30) days prior written notice has been given to the Owner".

(a) **Compensation Insurance:** The Contractor must procure and must maintain during the life of this Contract, including the entire period of the Contractor's Warranty, Workmen's Compensation Insurance for all of the employees engaged, or to be engaged, in work on the project under this Contract; and in any case any such work is sublet, the Contractor must require the subcontractor similarly to provide Workmen's Compensation Insurance for all of the latter's employees engaged, or to be engaged, in such work unless such employees are covered by the protection afforded by the Contractor's Workmen's Compensation Insurance. In case any class of employees engaged in hazardous work on the project under this Contract is not protected under the Workmen's Compensation Insurance Statute, the Contractor must provide Workmen's Compensation coverage for and hold harmless the Owner for the protection of such of his employees not otherwise protected.

(b) **Public Liability, Property Damage, and Automobile Liability Insurance:** The Contractor must take out, and maintain during the life of this Contract, including the entire period of the Contractor's Warranty, Comprehensive General Liability Insurance, including products and completed operations, XC and U coverage; the ISO Broadform General Liability endorsement to its equivalent thereof; Automobile Liability Insurance; and such other insurance as the Owner may direct and must protect him and any subcontractor performing work covered by this contract from claims for damage for personal injury, including accidental death, as well as from claims for property damage, which may arise from operations under this Contract, whether such operations be by the insured or by anyone directly or indirectly employed by them. The Owner must be listed as an additional Insured on all such policies and certificates of insurance. The amount of such insurance must be as follows:

(1) **Bodily Injury Insurance** in an amount of not less than \$500,000 for bodily injury, including accidental death to any one person, and subject to the same limit for each person, in an amount not less than \$1,000,000 on account of one accident.

(2) **Property Damage Insurance** in an amount not less than \$500,000 for any one damage claim, and in an aggregate amount up to \$1,000,000 during a period of twelve (12) months.

(3) **Automobile Liability Insurance:**

- a. For bodily injury, including accidental death to any one person in an amount not less than \$500,000 and subject to the same limit for each person, in an amount not less than \$1,000,000 on account of one accident.
- b. For property damage in an amount not less than \$500,000 for any one damage claim and in an aggregate amount up to \$1,000,000 during a period of twelve (12) months.
- c. **Owner's Protective Liability Insurance:** The Contractor must provide a policy issued in the name of the Owner for liability and property damage in the same amounts as required for the Contractor.
- d. **Umbrella Policy:** Umbrella coverage must be obtained if required, to provide for an increase in basic policy coverage to an amount not less than \$1,000,000.
- e. **Builder's Risk or Installation Floater Insurance (Fire and Extended Coverage):** The Contractor must insure all work against loss or damage by fire and against loss or damage covered by the standard extended coverage insurance, and the amount of the insurance at all times must be at least equal to the amount paid on account of work and materials. The policies must be in the names of the Owner and the Contractor as their interests may appear.
- f. **Proof of Coverage of Insurance:** The Contractor must furnish the Owner with certificates showing satisfactory proof of carriage of the insurance required before commencing work on this contract. Certificates of insurance for subcontractors are not required to be submitted to the Owner.
- g. **Scope of Insurance:** The insurance required under sub-contractors (b), (c) and (d) hereof must provide protection for the Contractor and his subcontractors respectively, as well as the Owner, against damage claims which may arise in any way from operations under this Contract, whether such operations be by the insured or by anyone directly or indirectly employed by him.
- h. Nothing contained in this contract or any document forming a part hereof or attached thereto, shall be construed to, change or increase the limitations on the liability of the Owner set forth in the South Carolina Tort Claim Act.

3. **Accident Prevention:** Precaution must be exercised at all times by the Contractor for the protection of all persons, including employees and property. Hazardous conditions must be guarded against or eliminated.

The Contractor shall be responsible for all injuries or damages to persons or property, and shall defend, indemnify, save and hold harmless the Owner, its officers, employees and agents, from all damages, attorneys' fees and costs by reason of injury to person or property resulting from performance of the work or in guarding the same, or from any improper materials, implements, or appliances used in its construction, or on account of any act or omission of the Contractor and sub-contractor, their agents or employees. The whole or as much of the monies due under, and by virtue, of this Contract as may be considered necessary by the Owner shall or may be retained by the Owner until all suits or claims for damages shall have been settled, and evidence to that effect furnished to the satisfaction of the Owner.

(a) In emergencies affecting the safety of persons, the work or property at the site or adjacent thereto, the Contractor without special instruction or authorization from the County Representative or Owner, must act to prevent threatened damage, injury or loss. The Contractor must make prompt written notice to the County Representative and Owner of any changes in the work or deviations from the Contract Documents caused thereby.

(b) Safety and health facilities and procedures must be in accordance with the requirements of the National Occupation Safety and Health Act of 1970, (OSHA), and subsequent amendments. The Contractor must comply with the Department of Labor's Safety and Health Regulations for construction promulgated under the National Occupational Safety and Health Act of 1970 (P.L. 91-596), and under Section 107 of the Contract Work Hours and Safety Standard Act (P.L. 91-54), and subsequent amendments. The Contractor must comply with OSHA Hazard Communication Standard, Title 29 Code of Federal Regulations 1910.1200, by compiling a master hazardous chemical list (including locations), expanding MSDS's, ensuring that containers are labeled, and providing employee training.

4. **Laws of the Place:** The Contractor must conduct the construction as defined in the Bid in accordance with the applicable national, state, county, and municipal laws, ordinances and regulations. The Contractor must keep himself fully informed of those laws, ordinances, and regulations which would, in any way, affect those engaged and employed in the project, the materials used in the project, and the conduct of the project; and informed of all orders and decrees of bodies and tribunals having jurisdiction and authority over the project. If discrepancies, or inconsistencies, or both, should be discovered in the Construction Agreement, Drawings, or Construction Specifications, or combination thereof, in relations to laws, ordinances, regulations, orders and decrees, the Contractor must forthwith report the fact, in writing, to the Owner. The Contractor must protect and indemnify the Owner, his officers, agents and employees, against claims and all liabilities arising from, or based on, the violation of those laws, ordinances, regulations, orders, and decrees, whether by the Contractor or by his employees or agents.

5. **Payment of Contractor:**

(a) Not later than 30 days after pay requests are promptly and properly submitted, the Owner will make a partial payment to the Contractor on the basis of a duly certified and approved estimate of the work performed during the preceding performance of this Contract.

The Owner will retain ten percent (10%) of the amount of each estimate until such time that all work has been completed and approved by the County Representative and a Waiver of Lien submitted stating that all vendors have been paid for materials, labor and supplies.

(b) In preparing estimates, the material not subject to deterioration delivered on the site and preparatory work done will be taken into consideration for inclusion on the partial payment request. The amount of eligible on-site material included in the partial payment shall be reduced by ten percent (10%) of the amount of the material cost as shown on the submitted material invoice.

(c) All material and work covered by partial payments made shall thereupon become the sole property of the Owner, but this provision must not be construed as relieving the Contractor from the sole responsibility for the care and protection of materials and work upon which payments have been made or the restoration of any damaged work, or as a waiver of the right of the Owner to require the fulfillment of all of the terms of the Contract.

(d) **Owner's Right to Withhold Certain Amounts and Make Application**

Thereof: The Contractor agrees that he will indemnify and save the Owner harmless from all claims growing out of the demands of subcontractors, laborers, workers, mechanics, material men, and furnishers of machinery and parts thereof, equipment, power tools, and all supplies including commissary, used in the furtherance of the performance of this contract. The Contractor must furnish satisfactory evidence that all obligations of the nature hereinabove designated have been paid, discharged, or waived. If the Contractor fails so to do, then the Owner may, after having served written notice on the said Contractor, either pay unpaid bills, of which the Owner has written notice, directly, or withhold from the Contractor's unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such claims until satisfactory evidence is furnished that all liabilities have been fully discharged, whereupon payment to the Contractor shall be resumed, in accordance with the terms of this Contract; but in no event shall the provisions of this sentence be construed to impose any obligations upon the Owner to either the Contractor or his Surety. In paying any unpaid bills of the Contractor, the Owner shall be deemed the agent of the Contractor, and the Owner shall not be liable to the Contractor for any such payments made in good faith.

6. Payment by Contractor: The Contractor shall pay

(a) For all transportation and utility services no later than 20 days following that month in which services are rendered;

(b) For all materials, tools, and other expandable equipment not less than ninety percent (90%) of the cost thereof, no later than 20 days following that month in which such materials, tools, and equipment are delivered at the site of the project; and

(c) To each of his subcontractors, no later than the 5th day following each payment to the Contractor, the respective amounts allowed the Contractor on account of the work performed by his subcontractors to the extent of such subcontractors' interest therein.

7. Subcontracting:

(a) The Contractor may utilize the services of specialty sub-contractors on those parts of the work which, under normal contracting practices, are performed by specialty subcontractors.

(b) The Contractor must not subcontract the complete work, or any major portion thereof, and must not award any work to any subcontractor without prior written approval by the Owner, which approval will not be given until the Contractor submits to the Owner, a written statement concerning the proposed award to the subcontractor, which statement must contain such information as the Owner may require.

(c) The Contractor shall be as fully responsible to the Owner for the acts and omissions of his subcontractors, and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by him.

(d) The Contractor must cause appropriate provisions to be inserted in all subcontracts relative to the work to bind sub-contractors to the Contractor by the terms of the General Conditions and other Contract Documents insofar as applicable to the work of subcontractors, and to give the Contractor the same power as regards terminating any subcontract that the Owner may exercise over the Contractor under any provisions of the Contract Documents.

(e) The Contractor must indemnify and save the Owner and the Owner's agents harmless from all claims growing out of the lawful demands of subcontractors, laborers, workmen, mechanics, material men, and furnishers of machinery and parts thereof, equipment, tools and all supplied, incurred in the furtherance of the performance of the work.

(f) Nothing contained in this Contract shall create any contractual relationship between any subcontractor and the Owner.

8. **Assignments:** The Contractor must not assign the whole or any part of this Contract, or any monies due, or to become due hereunder without written consent by the Owner. In case the Contractor assigns all, or any part of any monies, or to become due under this Contract, the instrument of assignment must contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any monies due, or to become due, to the Contractor shall be subject to prior liens of all persons, firms, and corporations for service rendered or materials supplied for the performance of the work called for in this Contract.

9. **Time for Completion and Liquidated Damages:**

(a) It is hereby understood, and mutually agreed, by and between the Contractor and the Owner, that the date of beginning, rate of progress, and the time for completion of the work to be done hereunder are ESSENTIAL CONDITIONS of this contract; and it is further mutually understood and agreed that the work embraced in this Contract shall be commenced on a date to be specified in the "Notice to Proceed" and completed within the time period specified herein above. The Contractor agrees that said work shall be prosecuted regularly, diligently, and uninterruptedly at such rate of progress as will insure full completion thereof within the time specified. It is expressly understood and agreed, by and between the Contractor and the Owner, that the time for completion of the work described herein is a reasonable time for the completion of same, taking into consideration the average climatic range and usual industrial conditions prevailing in this locality.

(b) IF THE SAID CONTRACTOR SHALL NEGLECT, FAIL OR REFUSE TO COMPLETE THE WORK WITHIN THE TIME HEREIN SPECIFIED, then the Contractor does hereby agree, as a part consideration for the awarding of this Contract, to pay to the Owner the amount specified in the Contract not as a penalty, but as liquidated damages for such breach of Contract as hereinafter set forth, for each and every calendar day that the Contractor shall be in default after the time stipulated in the Contract for completing work. The said amount is fixed and agreed upon by and between the Contractor and the Owner because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages which the Owner would in such event sustain, and said amount is agreed to be the amount of damages which the Owner would sustain.

(c) It is further agreed that time is of the essence of each and every portion of this Contract and of the specifications wherein a definite and certain length of time is fixed for the performance of any act whatsoever; and where an additional time is allowed under the contract for the completion of any work, the new time limit fixed by such extension shall be of the essence of this Contract.

(d) The Contractor shall not be charged with liquidated damages or any excess cost when the delay in completion of the work is due:

- i. To any preference, priority, or allocation order duly issued by the government.
- ii. To unforeseeable cause beyond the control and without the fault or negligence of the Contractor, including, but not restricted to, acts of God, or of the public enemy, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes and unusually severe weather.
- iii. To any delays of subcontractors occasioned by any of the causes specified in subsections (a) and (b) of this article.

Provided that within seventy-two (72) hours from the beginning of such delay, the Contractor must notify the Owner in writing of the causes of the delay. The Owner, shall then ascertain the facts and the extent of the delay and notify the Contractor within a reasonable time of its decision in the matter.

10. Construction Schedule and Periodic Estimates:

(a) Immediately after execution and delivery of the Contract, and before the first partial payment is made, the Contractor must deliver to the Owner an estimated construction progress schedule in a form satisfactory to the Owner, showing

- i. The proposed dates of commencement and completion of each of the various subdivisions of work required under the Contract Documents and
- ii. The anticipated amount of each monthly payment that will become due to the Contractor in accordance with the progress schedule.

- (b) The Contractor must also furnish on forms acceptable to the Owner:
- i. A detailed estimate giving a complete breakdown of the Contract price and
 - ii. 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 for determining the basis of partial payments and will not be considered as fixing a basis for additions to or deductions from the contract price.

11. Responsibility of Contractor: If, through acts of neglect on the part of the Contractor, any other Contractor, or any subcontractor shall suffer loss or damage on the work, the Contractor agrees to settle with such other contractor or subcontractor by agreement or arbitration if such other contractor or subcontractor will so settle. If such other contractor or subcontractor shall assert any claim against the Owner on account of any damage alleged to have been sustained, the Owner shall notify the Contractor, who must defend and indemnify and save and hold harmless the Owner against any such claim.

12. Extras: Without invalidating the Contract, the Owner may order extra work or make changes by altering, adding to or deducting from the work, the Contract sum being adjusted accordingly, and the consent of the Surety being first obtained where necessary or desirable. All work of the kind bid upon shall be paid for at the price stipulated in the Bid, and no claims for any extra work or materials shall be allowed unless the work is ordered in writing by the Owner or the County Representative, acting officially for the Owner, and the price is stated in such order.

13. Changes in Work:

(a) Should the Contractor encounter, or the Owner discover, during the progress of the work, subsurface or latent conditions at the site materially differing from those shown on the Drawings or indicated in the Specifications, or unknown conditions of an unusual nature differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Drawings and Specifications, the attention of the Owner shall be called immediately to such conditions before they are disturbed. The Owner must thereupon promptly investigate the conditions, and if it finds that they do so materially differ, the Contract shall be modified, with the written approval by the Owner, to provide for any increase or decrease of costs or difference in time resulting from such conditions. No changes in work shall be made without prior written approval by the Owner.

(b) The Contractor must proceed with the performance of any changes in the work so ordered in the field by the County Representative and/or Owner unless the Contractor believes said change entitles him to a change in Contract price and/or time, in which event the Contractor must give the County Representative written notice thereof within seven days after receipt of the field order and must not execute the field change pending the execution of a change order unless the change is for accident prevention as cited herein.

(c) The Contractor must furnish to the Owner, when required, an itemized breakdown of the quantities and prices used in computing the value of any change that might be ordered. In figuring these changes, instructions for measurement of quantities set forth in the Specifications must be followed.

(d) Charges or credits for the work covered by the approved change shall be determined by the Owner using one or more or a combination of the following methods:

- i. Unit bid prices stipulated in the Bid or as subsequently approved, which unit prices shall include allowances for overhead and profit.
- ii. An agreed lump sum.
- iii. The actual cost, by keeping a correct account including all vouchers, for:
 1. Labor, including foremen;
 2. Materials entering permanently into the work;
 3. Ownership or rental cost of power tools and construction equipment actually used;
 4. Power and consumable supplies for operation of power equipment actually used;
 5. Prorate charges for insurance covering public liability, Workmen's Compensation, Old Age and Unemployment, and also Social Security.

To the costs in (c) above shall be added a negotiated fixed fee for overhead and profit, not to exceed fifteen percent (15%) of the above items, except that actual cost only will be allowed for Social Security and Unemployment Insurance. Among the items considered as overhead are costs for insurance other than above, bonds, superintendence, timekeeping, clerical work, watchman, use of small tools, general office expense and miscellaneous. The allowance for combined overhead and profit thus calculated shall be the only such allowance included in the total cost of the work performed by the Contractor or his subcontractor. If the work was performed by sub-contract, the Contractor may add a negotiated fixed fee for overhead and profit not to exceed five percent (5%) of the subcontract cost.

If the Owner determines that the Contractor, pursuant to his obligations under paragraph 6 and 7 of the Instruction to Bidders and Special Provisions, should have discovered the conditions prior to the awarding of the bid for the project, it may require the Contractor to complete the project for the contract price and the condition shall be deemed to be materially different as provided herein.

14. Claims for Extra Cost: No claim for extra work or cost shall be allowed, unless the same was done pursuant to a written order by the County Representative, as aforesaid, and the claim presented with the first estimate after the changed or extra work is done. When work is performed under the terms of

Subsection 13(c) of these General Conditions, the Contractor must furnish satisfactory bills, payrolls and vouchers covering all items of cost and when requested by the Owner, give the Owner access to accounts relating thereto.

15. Materials, Services and Facilities:

(a) It is understood that, except as otherwise specifically stated in the Contract Documents, the Contractor must provide and pay for all materials, labor, tools, equipment, water, lights, power, transportation, superintendence, temporary construction of every nature, and all other services and facilities of every nature whatsoever necessary to execute, complete, and deliver the work within the specified time.

(b) Materials and equipment must be stored in a manner to insure the preservation of their quality and fitness for the work.

(c) Any work necessary to be performed after regular working hours, on Sundays or legal holidays, shall be performed without additional expense to the Owner.

16. Patents:

(a) The contractor shall defend, indemnify, hold and save the Owner and its officers, agents, servants, and employees harmless from liability of any nature or kind, including attorney's fees cost and expense, for or on account of any patented or unpatented inventions, process, article, or appliance manufactured or used in the performance of the Contract, including its use by the Owner, unless otherwise specifically stipulated in the Contract Documents.

(b) If the Contractor uses any design, device or materials covered by letter, patents or copyrights, he must provide for such use by suitable agreement with the Owner of such patented or copyrighted design, device or material. It is mutually agreed and understood that, without exception, the Contract prices shall include all royalties or costs arising from the use of such design, device or materials, in any way involved in the work. The Contractor and/or his sureties shall defend, indemnify and save and hold harmless the Owner of the project from any and all claims for infringement by reason of the use of such patented or copyrighted design, device or material or any trademark or copy-right in the connection with work performed under this Contract, and shall indemnify the Owner for any attorneys' fees, cost, expense or damage which it may be obliged to pay by reason of such infringement at any time during the prosecution of the work or after completion of the work.

17. Inspection and Testing of Material: Unless otherwise specifically provided for in the Specifications, the inspection and testing of material and finished articles to be incorporated in the work at the site shall be made by bureaus, laboratories or agencies arranged for by the Contractor and as approved by the County Representative. The Contractor shall furnish all such extra quantities of materials and items as may be required for testing, and shall deliver same to the laboratory. The cost of furnishing and delivering samples to the laboratory shall be paid for by the Contractor.

Where the Detailed Specifications call for certified copies or mill or shop tests to establish conformance of certain materials with the Specifications, it shall be the responsibility of the Contractor to assure the delivery of such certifications to the Owner.

No materials or finished articles shall be incorporated into the work until such materials and finished articles have passed the required tests. The Contractor must promptly segregate and remove rejected material and finished articles from the work site.

The testing and approval of materials by the laboratory or laboratories approved by the County Representative shall not relieve the Contractor of any of his obligations to fulfill his Contract and guarantee of workmanship and materials as called for in Paragraph 21 entitled "General Warranty for one year After Completion of Contract", herein. The Contractor may, at his option and at his expense, cause such other tests to be conducted as he may deem necessary to assure suitability, strength and durability of any material or finished articles.

18. Right of the Owner to Terminate Contract: In the event that any of the provisions of this Contract are violated by the Contractor or by any of his subcontractors, the Owner may serve written notice upon the Contractor and his Surety of his intention to terminate the Contract, such notices to contain the reasons of such intention to terminate the Contract; and unless within ten (10) days after the serving of such notice upon the Contractor, such violation or delay shall cease and satisfactory arrangement of correction be made, the Contract shall, upon the expiration of said ten (10) days, terminate.

In the event of any such termination, the Owner shall immediately serve notice thereof upon the Surety and the Contractor, and the Surety shall have the right to take over and perform the Contract; provided, however, that if the Surety does not commence performance thereof within five (5) days from the date of the mailing to such Surety of notice of termination, the Owner may take over the work, prosecute the same to completion by contract or by force account at the expense of the Contractor, and the Contractor and his Surety shall be liable to the Owner for any excess cost occasioned the Owner thereby, and in such event, the Owner may take possession of and utilize in completing the work, such materials, appliances, and plant as may be on the work site and necessary therefore.

19. Notices and Service Thereof:

(a) Any notice to the Contractor from the Owner, relative to any part of this Contract, shall be in writing and considered delivered and the service thereof completed, when said notice is posted by certified mail, to the said Contractor at his last given address, or delivered in person to said Contractor or his authorized representative on the work, or is deposited in the regular United States mail in a sealed, postage prepaid envelope, and the receipt thereof is acknowledged by the Contractor.

(b) Unless otherwise specified in writing to the Contractor, all papers required to be delivered to the Owner shall be delivered to the County Representative. Any notice to or demand upon the Owner shall be considered sufficiently given if it is delivered to the office of said County Representative or deposited in the United States mail in a sealed postage prepaid envelope properly addressed to the County Representative, or to such other address as the Owner may subsequently specify in writing to the Contractor for such purposes, and it is received by the County Representative.

20. Quantities of Estimate: The estimated quantities of work to be done and materials to be furnished under this Contract shown in any of the documents, including the Bid, are given for use in comparing bids, and to indicate approximately the total amount of the contract. Except as herein otherwise specifically limited, the right is especially reserved by the Owner to increase or diminish them as may be deemed reasonably necessary or desirable by the Owner to complete the work contemplated by this Contract.

21. General Warranty After Completion of Contract: For a period of at least one year after completion of the Contract and final acceptance of the work by the Owner, the contractor warrants the fitness and soundness of all work done and materials and equipment put in place under the Contract. Neither the final certificate of payment nor any provision in the Contract Documents, nor partial or entire occupancy of the premises by the Owner, shall constitute an acceptance of work not done in accordance with the Contract Documents, or relieve the Contractor of liability for this warranty or for any other warranties or responsibility for faulty materials, equipment or workmanship. The Contractor must remedy any defects in the work and pay for damage resulting there from discovered with a period of one year from the date of final acceptance of work unless a longer period is specified. The Owner will give notice of observed defects with reasonable promptness. This provision in no way affects the Contractor's responsibility to the Owner for latent defects.

22. Contractor's Obligations: The Contractor shall and will, in good workmanlike manner, do and perform all work and furnish all supplies and materials, machinery, equipment, facilities and means, except as herein otherwise expressly specified, necessary or proper and complete all work required by the Contract within the time herein specified, in accordance with the provisions of this Contract and said Specifications, the Plans and Drawings of the work covered by this Contract, and any and all supplemental plans and drawings of the work, and in accordance with the directions of the County Representative as given from time to time during the progress of the work. The Contractor shall furnish, erect, maintain and remove such construction plant and such temporary works as may be required. He alone shall be responsible for the safety, efficiency and adequacy of his plan, appliance and methods, and for any damage which may result from their failure or their improper construction, maintenance or operation.

The Contractor shall observe, comply with, and be subject to all terms, conditions, requirements, and limitations of the Contract Specifications, and shall do, carry on, and complete the entire work to the satisfaction of the County Representative and the Owner.

23. County Representative 's Authority: The County Representative shall give all orders and directions contemplated under this Contract and Specifications relative to the execution of the work. The County Representative shall determine the amount, quality, acceptability and fitness of several kinds of work and materials which are to be paid for under the Contract and shall decide all questions which may arise in relation to said work and the construction thereof. The County Representative 's estimates and decisions shall be final and conclusive, except as herein otherwise expressly provided. In case any question shall arise between the parties hereto relative to said Contract or Specifications, the determination or decision of the County Representative shall be a condition precedent to the right of the Contractor to receive any money or payment for work under this Contract affected in any manner or to any extent by such question.

The County Representative shall decide the meaning and intent of any portion of the Specifications and or any Plans or Drawings where the same may be found obscure or be in dispute.

Any difference or conflicts, in regard to their work, which may arise between the Contractor and other contractors performing work for the Owner, shall be adjusted and determined by the County Representative.

The County Representative and Owner will not be responsible for the construction means, controls, techniques, sequences, procedures, or construction safety.

24. Owner's Prerogative: The Owner shall have the right to enter the site for the purpose of doing work and/or having work done which is not covered by the Contract Documents. This provision shall not relieve the Contractor of his obligations cited in Item 22 herein, excepting work done by the agents or employees of the Owner. Prior to completion and acceptance of the work set forth in the Contract, the Owner with the concurrence of County Representative and Contractor, may use any completed or substantially completed portion of the work, by such use shall not constitute an acceptance of that portion.

25. "Or Equal" Clause: With the exception of major items of mechanical and electrical equipment, whenever a material or article required is specified or shown on the Drawings by using the name of the proprietary product or of a particular manufacturer or vendor, any material or article which will meet the design criteria and is equal in function and durability, as determined by the County Representative prior to the bid, will be considered acceptable.

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

27. Reports, Records and Data: The Contractor and each of his subcontractors must submit to the Owner such schedules, payroll, reports, estimates, records and other data as the Owner may request, or as may be required herein, concerning the work performed or to be performed under this Contract.

28. Acceptance of Work and Final Payment: Before final acceptance of the work and payment to the Contractor of the percentage retained by the Owner, the following requirements must be complied with:

(a) **Final Inspection:** Upon written notice from the Contractor that his work is completed, the County Representative will make a final inspection of the work, and must notify the Contractor of all instances where his work fails to comply with the Contract Drawings and/or Specifications, as well as any defects he may discover. The Contractor must immediately make such alterations necessary to make the work comply with the Contract Drawings and Specifications to the satisfaction of the County Representative.

(b) **Cleaning Up:** Before the work is considered as complete, all rubbish and unused material due to or connected with the construction must be removed and the premises left in a condition satisfactory to the Owner. Streets, curbs, cross-walks, fences, and other public and private property or rights-of-way disturbed or damaged must be restored to their former condition. Final acceptance will be withheld until such work is finished.

(c) **Liens:** Final acceptance of the work will not be granted, and the retained percentage will not be due or payable until the Contractor has furnished the Owner proper and satisfactory evidence under oath that all claims for labor and material employed or used in the construction of the work under this contract have been settled, and that no legal claims will be filed against the Owner for such labor or materials.

(d) **Final Estimate:** Upon completion of all cleaning up, alterations and repairs required by the final inspection or operation test, the satisfactory completion of the operating test, and upon submitting proper and satisfactory evidence to the Owner that all claims have been settled, the County Representative will issue a certificate of final acceptance of the work. The Contractor shall then prepare his final estimate. After review of the final estimate by the County Representative, and approval by the Owner, the final payment shall then become due.

29. **Minimizing Silting and Bank Erosion During Construction:** During construction protective measures must be taken and maintained to minimize bank erosion, and the silting of creeks and rivers adjacent to work being performed during construction. This must be done as according to the Erosion Control Section of the Specifications and the Stormwater Pollution Plan.

30. **Restoration of Disturbed Areas:** All areas disturbed by or during construction must be restored to their existing or better condition. This provision is not to be interpreted to require replacement of trees and undergrowth in undeveloped sections of rights-of-way.

31. **Chemicals Used During Construction:** All chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactor or of other classification, must show approval of either EPA or USDA. Use of all such chemicals and disposal or residue must be in strict conformity with manufacturer's instructions.

32. **Acceptance of Final Estimate:** The acceptance by the Contractor of the final payment shall operate as a release to the Owner from all claims and liabilities to the Contractor for all work done or materials furnished, or for any act of the Owner or its agents affecting the work.

33. **Inspection by Agencies:** The representatives of all local, state and federal regulatory agencies legally authorized to have access shall have access to the work wherever it is, in preparation or progress, and the Contractor must provide proper facilities for such access and inspection.

34. **Litigation:** In the event of litigation in which the Owner is or becomes a party, the Contractor agrees and consents that the litigation shall be filed in or transferred to the Court of Common Pleas of CALHOUN County, South Carolina or the CALHOUN Division of the United States District Court for the District of South Carolina and that the laws of the State of South Carolina shall apply to and govern such litigation. The Contractor further agrees to cooperate with the Owner in obtaining the transfer of such litigation to those courts by promptly signing all documents necessary thereto.

35. Unauthorized Aliens and Public Employment:

(a) By signing its bid, offer, or proposal, Contractor certifies that it will comply with the applicable requirements of Title 8, Chapter 14 of South Carolina Code of Laws and agrees to provide to the Owner upon request any documentation required to establish either:

- i.** That Title 8, Chapter 14 is inapplicable both to Contractor and its subcontractors or sub-subcontractors; or
- ii.** That Contractor and its subcontractors or sub-subcontractors are in compliance with Title 8, Chapter 14.

(b) 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."

(c) Contractor agrees to include in any contract with its subcontractors language requiring its subcontractors

- i.** To comply with the applicable requirements of Title 8, Chapter 14, and
- iii.** To include in their contracts with their sub-subcontractors language requiring their sub-subcontractors to comply with the applicable requirements of Title 8, Chapter 14.

END GENERAL CONDITIONS

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BID DOCUMENT
CTC DIRT ROAD PAVING 2019 PROJECT

TO THE COUNTY AND COUNTY COUNCIL
OF CALHOUN COUNTY, SOUTH
CAROLINA

Submitted _____, 2019

The undersigned, as Bidder, hereby declares:

1. That the only person or persons interested in the bid as principal or principals is (or are) named herein and that no person other than mentioned herein has any interest in this Bid or in the Contract to be entered into;
2. That this bid is made without connection with any other person, company or parties making a bid; and
3. That in all respects, this bid is made fairly and in good faith, without collusion or fraud.

The Bidder further declares:

4. That he has examined the site of the work and has informed himself fully in regard to all conditions pertaining to the place where the work is to be done; and
5. That he has examined the Drawings and Specifications for the work and contractual documents relative thereto and has read all Special Provisions and General Conditions furnished prior to the opening of bids; and
6. That he has satisfied himself relative to all work to be performed.

The Bidder proposes and agrees, if this Bid is accepted, to:

- A. Contract with CALHOUN County, South Carolina, a body politic and corporate and a political subdivision of the state of South Carolina (hereinafter called The Owner), in the form of contract specified,
- B. To furnish all necessary materials, equipment, machinery, tools, apparatus, means of transportation and labor necessary and to complete the construction of the work in full and complete accordance with the shown, noted, described, and reasonably intended requirements of the Drawings, Specifications and Contract Documents to the full and entire satisfaction of The Owner, with a definite understanding that no money will be allowed for extra work except as set forth in the attached General Conditions and Contract Documents, for the following prices:

BID DOCUMENT
CTC DIRT ROAD PAVING 2019 PROJECT

BANKS LANE/CONGAREE COURT BID ITEMS

Item	Description	Units	Unit Cost (\$)	Cost (\$)
1	Mobilization	1 LS	_____	_____
2	Construction Stakes, Lines, & Grades	1 EA	_____	_____
3	Traffic Control	1 LS	_____	_____
4	Clearing & Grubbing Within Roadway	1 LS	_____	_____
5	Removal & Disposal of Existing Pavement	258 SY	_____	_____
6	Unclassified Excavation	932 CY	_____	_____
7	Borrow Excavation	5,655 CY	_____	_____
8	Fine Grading	9,439 SY	_____	_____
9	Graded Aggregate Base Course 6" Uniform	9,006 SY	_____	_____
10	Prime Coat	2,432 GAL	_____	_____
11	Liquid Asphalt Binder PG64-22	46 TON	_____	_____
12	Hot Mix Asphalt Surface Course Type C	761 TON	_____	_____
13	Permanent Construction Signs (Ground Mounted)	48 SF	_____	_____
14	Permanent Yellow Pavement Markers Bi-Dir. - 4" X 4"	3 EA	_____	_____
15	24" White Solid Lines (Stop/Diag Lines)- Perm. Pvmt. Marking	30 LF	_____	_____
16	4" Yellow Solid Lines (Pvt. Edge Lines) Thermo. 90 MIL.	100 LF	_____	_____
17	Flat Sheet, Type III, fixed Sz. & Msg. Sign	11.25 SF	_____	_____
18	U-Section Post for Sign Supports – 3P	14 LF	_____	_____
19	18" Smooth Wall Pipe	1,752 LF	_____	_____
20	24" Smooth Wall Pipe	104 LF	_____	_____
21	Catch Basin – Type 9	14 EA	_____	_____
22	Manhole	7 EA	_____	_____
23	Rip Rap Class B	90 TON	_____	_____
24	Geotextile for Erosion Control Under Rip Rap (Class 2) Type B	106 SY	_____	_____

BID DOCUMENT
CTC DIRT ROAD PAVING 2019 PROJECT

Item	Description	Units	Unit Cost (\$)	Cost (\$)
25	MT2 Leading End Treatment TL-2	3 EA	_____	_____
26	MB Trailing End Treatment	5 EA	_____	_____
27	MGS3 Guardrail	875 LF	_____	_____
28	MGS3 GR Compressed Shoulder	113 LF	_____	_____
29	Permanent Cover	1.344 ACRE	_____	_____
30	Temporary Cover	0.672 ACRE	_____	_____
31	Turf Reinforcement Matting (TRM) Type 1	0.293 MSY	_____	_____
32	Temporary Erosion Control Blanket (ECB)	2.435 MSY	_____	_____
33	Inlet Structure Filter – Type F (Weighted)	168 LF	_____	_____
34	Inlet Structure Filter – Type F (Non-Weighted)	168 LF	_____	_____
35	Sediment Tubes for Ditch Checks	216 LF	_____	_____
36	Silt Fence	2,615 LF	_____	_____
37	Replace/Repair Silt Fence	265 LF	_____	_____
38	Removal of Silt Retained by Silt Fence	655 LF	_____	_____
39	3" SDR 21 PVC Pipe	2,490 LF	_____	_____
40	1" HDPE Tubing	294 LF	_____	_____
41	3" Tee	1 EA	_____	_____
42	3" 90 Degree Bend/Fitting	2 EA	_____	_____
43	3" 45 Degree Bend/Fitting	3 EA	_____	_____
44	3" 22.5 Degree Bend/Fitting	7 EA	_____	_____
45	3" 11.25 Degree Bend/Fitting	3 EA	_____	_____
46	3" Mechanical Joint Restraints	21 EA	_____	_____
47	3" Bell Joint Restraints	36 EA	_____	_____
48	3" Gate Valves	3 EA	_____	_____
49	3" Yard Hydrant	1 EA	_____	_____
50	1" Stainless Steel Tapping Saddle	8 EA	_____	_____

BID DOCUMENT
CTC DIRT ROAD PAVING 2019 PROJECT

**Total Amount
of Bid Banks
Lane/
Congaree
Court (\$)**

BID DOCUMENT
CTC DIRT ROAD PAVING 2019 PROJECT

HOWELL LANE BID ITEMS

Item	Description	Units	Unit Cost (\$)	Cost (\$)
1	Mobilization	1 LS	_____	_____
2	Construction Stakes, Lines, & Grades	1 EA	_____	_____
3	Traffic Control	1 LS	_____	_____
5	Removal & Disposal of Existing Pavement	48 SY	_____	_____
6	Unclassified Excavation	383 CY	_____	_____
7	Borrow Excavation	474 CY	_____	_____
8	Fine Grading	5,620 SY	_____	_____
9	Graded Aggregate Base Course 6" Uniform	5,500 SY	_____	_____
10	Prime Coat	1,486 GAL	_____	_____
11	Liquid Asphalt Binder PG64-22	28 TON	_____	_____
12	Hot Mix Asphalt Surface Course Type C	469 TON	_____	_____
13	Permanent Construction Signs (Ground Mounted)	48 SF	_____	_____
14	Permanent Yellow Pavement Markers Bi-Dir. - 4" X 4"	3 EA	_____	_____
15	24" White Solid Lines (Stop/Diag Lines)- Perm. Pvmt. Marking	20 LF	_____	_____
16	4" Yellow Solid Lines (Pvt. Edge Lines) Thermo. 90 MIL.	200 LF	_____	_____
17	Flat Sheet, Type III, fixed Sz. & Msg. Sign	17.5 SF	_____	_____
18	U-Section Post for Sign Supports – 3P	28 LF	_____	_____
19	18" Smooth Wall Pipe	272 LF	_____	_____
20	24" Smooth Wall Pipe	192 LF	_____	_____
21	30" Smooth Wall Pipe	36 LF	_____	_____
22	Catch Basin – Type 9	6 EA	_____	_____
23	Manhole	1 EA	_____	_____
24	Rip Rap Class B	52 TON	_____	_____
25	Geotextile for Erosion Control Under Rip Rap (Class 2) Type B	62 SY	_____	_____

BID DOCUMENT
CTC DIRT ROAD PAVING 2019 PROJECT

Item	Description	Units	Unit Cost (\$)	Cost (\$)
26	Permanent Cover	0.438 ACRE	_____	_____
27	Temporary Cover	0.219 ACRE	_____	_____
28	Turf Reinforcement Matting (TRM) Type 1	0.700 MSY	_____	_____
29	Inlet Structure Filter – Type F (Weighted)	80 LF	_____	_____
30	Inlet Structure Filter – Type F (Non-Weighted)	80 LF	_____	_____
31	Sediment Tubes for Ditch Checks	320 LF	_____	_____
32	Silt Fence	550 LF	_____	_____
33	Replace/Repair Silt Fence	55 LF	_____	_____
34	Removal of Silt Retained by Silt Fence	140 LF	_____	_____
				Total Amount of Bid Howell Lane (\$)

BID DOCUMENT
CTC DIRT ROAD PAVING 2019 PROJECT

ARCHANGEL LANE BID ITEMS

Item	Description	Units	Unit Cost (\$)	Cost (\$)
1	Mobilization	1 LS	_____	_____
2	Construction Stakes, Lines, & Grades	1 EA	_____	_____
3	Traffic Control	1 LS	_____	_____
4	Borrow Excavation	211 CY	_____	_____
5	Liquid Asphalt Binder PG64-22	21 TON	_____	_____
6	Full Depth Asph. Pav. Patching 6" Unif.	926 SY	_____	_____
7	Hot Mix Asphalt Surface Course Type C	340 TON	_____	_____
8	Permanent Construction Signs (Ground Mounted)	48 SF	_____	_____
9	Permanent Cover	0.731 ACRE	_____	_____
10	Temporary Cover	0.366 ACRE	_____	_____
11	Silt Fence	2,276 LF	_____	_____
12	Replace/Repair Silt Fence	1,000 LF	_____	_____
13	Removal of Silt Retained by Silt Fence	500 LF	_____	_____
				Total Amount of Bid Archangel Lane (\$)

STATE OF SOUTH CAROLINA)
) **CONSTRUCTION AGREEMENT**
COUNTY OF CALHOUN)

THIS AGREEMENT is made and entered into on the _____ day of _____ 2019, by and between CALHOUN COUNTY, SOUTH CAROLINA, a body politic and corporate and a political subdivision of the State of South Carolina, (hereinafter called the “OWNER”) and (Insert FULL LEGAL NAME of Contractor), a (if incorporated, insert STATE where incorporated) corporation (hereinafter called the “CONTRACTOR”).

WITNESSETH:

That the CONTRACTOR, for the consideration hereinafter fully set out, hereby agrees with the OWNER as follows:

1. That the CONTRACTOR will furnish all equipment, tools, materials, skill, and labor of every description necessary to carry out and to complete in a good, firm, substantial, and workmanlike manner, the Work specified, in strict conformity with the Documents entitled:

**CTC DIRT ROAD PAVING 2019 PROJECT
for CALHOUN COUNTY**

on file in the office of the OWNER, and the Specifications hereinafter set forth, which Drawings and Specifications, together with the foregoing Bid, Advertisement for Bids, Instructions to Bidder, Special Provisions, General Conditions, and all addenda hereto annexed, shall form essential parts of this CONSTRUCTION AGREEMENT, as if fully contained herein. The Work covered by this CONSTRUCTION AGREEMENT includes all Work as Specified and listed in the attached Bid, under the following items, to wit:

**CTC DIRT ROAD PAVING 2019 PROJECT
for CALHOUN COUNTY**

2. That the CONTRACTOR shall commence Work to be performed under this CONSTRUCTION AGREEMENT on a date to be specified in a written order of the OWNER’s County Representative and shall fully complete all Work hereunder by **(150) consecutive, calendar days** except as otherwise provided in these documents for extensions of the above time limit.

Time is of the essence of this CONSTRUCTION AGREEMENT, and the CONTRACTOR shall pay to the OWNER, not as a penalty, but as Liquidated Damages, the sum of **Five Hundred and 00/100 Dollars (\$500.00)** for each consecutive, calendar day that the CONTRACTOR shall be in default of completing the Work within the time limit named herein. Because of the difficulty of fixing damages suffered by the OWNER on account of such default, damages are herein agreed upon as stated.

3. The OWNER hereby agrees to pay the CONTRACTOR for the faithful performance of this CONSTRUCTION AGREEMENT, subject to additions and deductions as provided in the Drawings and Specifications, together with the Bid, Advertisements for Bids, Instructions to the Bidders, Special Provisions, General Conditions, and all Addenda hereto annexed, in lawful money of the United States, the sum of:

Dollars

(\$ _____) Dollars and Cents

which sum shall also pay for all loss or damages arising out of the nature of the Work aforesaid, or from the action of the elements, or from unforeseen obstructions or difficulties encountered in the prosecuting of the Work, and for all expenses incurred by or in consequence of the Work, its suspension or discontinuance, and for well and faithfully completing the Work and the whole thereof, as herein provided, and for replacing defective Work, material, or equipment provided for a period of one (1) year after completion of all Work.

4. No later than 30 days after pay requests are promptly and properly submitted, as the Work progresses, the OWNER shall make partial payments to the CONTRACTOR on the value of labor and materials incorporated into the Work and of materials on hand at the Site of the Work, except cement and other materials subject to deterioration, during the preceding calendar month, less payments already made and less deductions for any unaccepted or defective Work, in accordance with terms set forth in the Specifications.

5. Upon submission by the CONTRACTOR of evidence satisfactory to the OWNER that all payrolls, material bills, and other costs of any kind incurred by the CONTRACTOR in connection with the construction of the Work have been paid in full, final payment on account of this CONSTRUCTION AGREEMENT shall be made within thirty (30) days after the completion by the CONTRACTOR of all Work covered by this CONSTRUCTION AGREEMENT and the acceptance of such Work by the OWNER.

REMAINDER OF PAGE INTENTIONALLY LEFT BLANK

IN WITNESS WHEREOF, the parties hereto have caused this CONSTRUCTION AGREEMENT to be executed by their duly authorized officers as of the date first above written in four (4) counterparts, each of which shall, without proof or accounting for the other counterparts, be deemed an original agreement. It is the intention of the parties that this Construction Agreement is a sealed instrument regardless of whether or not any seal is actually attached hereto.

Signed, Sealed, and Delivered in the Presence of: **CALHOUN COUNTY, SOUTH CAROLINA**

Witnesses:

By: _____
Boyce Till
Calhoun County Procurement Officer

ATTEST:

COUNTY CLERK (Official Seal) (SEAL)

CONTRACTOR

Signed, Sealed and Delivered in the Presence of:

(Print or Type Name of CONTRACTOR)

Witnesses:

(As to the CONTRACTOR)

By: _____

(Print or Type Name)

(Print or Type Name)

Its: _____

(As to the CONTRACTOR)

(Print or Type Name)

ATTEST:
* _____ (SEAL)

(Print or Type Name)

Its: _____
(Official Seal)

APPROVED AS TO FORM AND CONTENT

Attorney for the OWNER

*** NOTE: SIGNING INSTRUCTIONS - THESE INSTRUCTIONS MUST BE FOLLOWED.**
If CONTRACTOR is a Corporation, the CONSTRUCTION AGREEMENT must be signed by the President or Vice-President, Attested by the Secretary, and the Corporate Seal affixed.
If CONTRACTOR is a Partnership, the CONSTRUCTION AGREEMENT must be signed in the Partnership's Name by one of the Partners, with indication that (s)he is a General Partner. Signatures must be legible with the printed or typed name under each appropriate signature.

PERFORMANCE BOND

STATE OF SOUTH CAROLINA)
)
COUNTY OF CALHOUN)

KNOW ALL MEN BY THESE PRESENTS, that we _____
(hereinafter called the CONTRACTOR), of _____

as principal, and CALHOUN County Government a corporation duly qualified and authorized under the laws of the State of South Carolina to act as surety bonds (hereinafter called the SURETY), do hereby acknowledge ourselves indebted and firmly bound and held unto CALHOUN County, South Carolina, a body politic, and Corporate, and a Political Subdivision of the State of South Carolina (hereinafter called the OWNER) for the use and benefit of those entitled hereto, in the sum of:

Dollars and 00/100 Dollars
(\$) Dollars and Cents

for the payment of which well and truly to be made in lawful money of the United States, we do hereby bind ourselves, successors, assigns, heirs, and personal representatives.

BUT THE CONDITIONS OF THE FOREGOING OBLIGATION OR BOND ARE THIS:

WHEREAS, the CONTRACTOR has entered into a written Agreement or Contract with the OWNER, a copy of said contract being attached hereto and is by reference made a part hereof, the same as if set forth fully herein for constructing:

**CTC DIRT ROAD PAVING 2019 PROJECT
for CALHOUN COUNTY**

and it is the desire of the OWNER that the said CONTRACTOR shall assure all undertakings under said Agreement or Contract.

NOW THEREFORE, if the said CONTRACTOR shall fully and faithfully perform all the undertakings and obligations under the said Agreement or Contract hereinbefore referred to and shall fully indemnify and save harmless the said OWNER from all costs and damages whatsoever which it may suffer by reason of any failure on the part of said CONTRACTOR so to do, and shall fully reimburse and repay the said OWNER any and all outlays and expense which it may incur in making good any such default, and shall guarantee all materials and workmanship against defects for a period of one (1) year after the final settlement of the said Agreement or Contract, then this obligation or Bond shall be null and void, otherwise, to remain in full force and effect.

For value received, it is hereby stipulated and agreed that no changes, alteration, extension of time, or addition to the terms of the said Agreement or Contract or in the Work to be performed thereunder or the Specifications accompanying the same, shall in any wise affect the obligation under said obligation or Bond, and notice is hereby waived of any such changes, extension of time, alteration or addition to the terms of the Agreement or Contract, or to the Work or the Specifications.

IN WITNESS WHEREOF, the said CONTRACTOR has hereunder affixed his signature and said SURETY has hereunto caused to be affixed its corporate signature, and seal, by its attorney-in-fact, on this the _____ day of _____, 2019, executed in four (4) counterparts, each of which shall, without proof or accounting for the other counterparts, be deemed an original.

Signed, Sealed, and Delivered in the Presence of:

(CONTRACTOR)

1. _____
(As to CONTRACTOR)

By: _____ L.S.

(Print or Type Name)

(Print or Type Name)

2. _____
(As to CONTRACTOR)

Title: _____ L.S.

(Print or Type Name)

ATTEST:
By: _____

(Print or Type Name)

1. _____
(As to SURETY)

ATTEST:
By: _____

_____ L.S.

(Print or Type Name)

(Print or Type Name)

Its: _____
(OFFICIAL SEAL)

2. _____
(As to SURETY)

(SURETY)
By: _____ L.S.

(Print or Type Name)

(Print or Type Name)

TITLE: _____

APPROVED AS TO FORM BEFORE EXECUTION:

(Attorney for the OWNER)

*** NOTE: If the Principal is a Corporation, the Bond shall be signed by the President or a Vice-President, attested by the Secretary and the Corporate Seal Affixed. If the Principal is a partnership, the Bond shall be signed in the Partnership Name by one of the Partners, with the indication that he is a General Partner. Signatures must be legible and typed in under the appropriate line. THESE INSTRUCTIONS MUST BE FOLLOWED.**

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

IN WITNESS WHEREOF, the said CONTRACTOR has hereunder affixed his signature and said SURETY has hereunto caused to be affixed its corporate signature, and seal, by its attorney-in-fact, on this the _____ day of _____, 2019, executed in four (4) counterparts, each of which shall, without proof or accounting for the other counterparts, be deemed an original.

Signed, Sealed, and Delivered in the Presence of:

(CONTRACTOR)

1. _____
(As to CONTRACTOR)

(Print or Type Name)

By: _____ L.S.

(Print or Type Name)

2. _____
(As to CONTRACTOR)

(Print or Type Name)

Title: _____ L.S.
ATTEST:
By: _____

(Print or Type Name)

1. _____
(As to SURETY)

(Print or Type Name)

ATTEST:
By: _____

(Print or Type Name)

2. _____
(As to SURETY)

(Print or Type Name)

Its: _____
(OFFICIAL SEAL)

(SURETY)

By: _____ L.S.

(Print or Type Name)
TITLE: _____

APPROVED AS TO FORM BEFORE EXECUTION

(Attorney for the OWNER)

*** NOTE: If the Principal is a Corporation, the Bond shall be signed by the President or a Vice-President, attested by the Secretary and the Corporate Seal Affixed. If the Principal is a partnership, the Bond shall be signed in the Partnership Name by one of the Partners, with the indication that he is a General Partner. Signatures must be legible and typed in under the appropriate line. THESE INSTRUCTIONS MUST BE FOLLOWED.**

PRECONSTRUCTION CONFERENCE

(Rev. July 2013)

1.1 DESCRIPTION

To help clarify construction contract administration procedures, the County (Owner) will conduct a Preconstruction Conference prior to start of the work. Contractor(s) will designate personnel for attendance.

1.2 SUBMITTALS

- A. To the maximum extent practicable, advise the County Representative at least 4 hours in advance of the Conference as to items to be added to the agenda.
- B. The County Representative will compile minutes of the Conference, and will furnish copies of the minutes to the Contractor. The Contractor may make and distribute such other copies as he wishes.

1.3 PRECONSTRUCTION CONFERENCE

- A. The Conference will be held after the Owner has issued the “Notice of Award”, but prior to actual start of the work.
- B. Attendance:
 - 1. Provide attendance by authorized representatives of the Contractor and major subcontractors. For those persons designated by the Contractor, his subcontractors, and suppliers to attend the Preconstruction Conference, provide required authority to commit the entities they represent to solutions agreed upon in the Conference.
 - 2. The County Representative will advise other interested parties, including but not limited to, utilities and SCDOT, and request their attendance.
- C. Minimum agenda: Data will be distributed and discussed on:
 - 1. Organizational arrangement of Contractor’s forces and personnel, and those of subcontractors, materials suppliers and the County Representative;
 - 2. Establish channels and procedures for communication;
 - 3. Construction schedule, including sequence of critical work;
 - 4. Contract documents, including distribution of required copies of drawings and revisions;
 - 5. Processing of Shop Drawings and other data submitted to the County Representative for review;
 - 6. Processing of field decisions and Change Orders;
 - 7. Rules and regulations governing performance of the Work; and
 - 8. Procedures for safety, security, quality control, traffic control, etc.

Also during the Conference, the project start date will be determined. After the end of the Conference, a “Notice to Proceed” will be issued to the Contractor.



Home (/) > Water/Sewer (<http://www.jmeagle.com/pvc/watersewer>) > Irrigation/
Agriculture (<http://www.jmeagle.com/pvc/irrigation-agriculture>) > IPS Pressure Rated /
Ring-Tite

IPS Pressure Rated / Ring-Tite

Application:

JM Eagle's IPS Pressure is pipe suitable for use in rural water, and agricultural and turf irrigation pipelines, as well as gravity sewer, force main and water reclamation projects

Benefits:

Due to its long laying lengths of 20 feet, IPS Pressure PVC water pipe reduces the cost of multiple joints and allows for more ground to be covered during installation. JM Eagle IPS Pressure pipe:

- Maintains performance against tuberculation, corrosion and external galvanic soil conditions without lining wrapping, coating or cathodic protection.

IPS Pressure Ring-Tite

PRESSURE-RATED PVC PIPE



DELIVERING GOOD WATER TO YOU

SUBMITTAL AND DATA SHEET

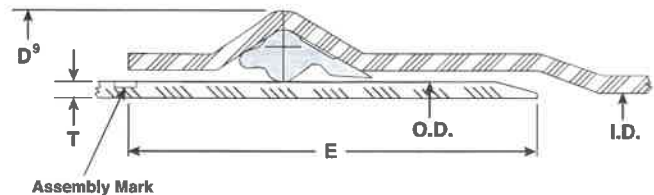
PIPE SIZE (IN)	AVERAGE O.D. (IN)	NOM. I.D. (IN)	MIN. T. (IN)	AVG. E (IN)	APPROX. D' (IN)	APPROX. WGT (LBS/FT)
PRESSURE CLASS 250 psi (SDR 17)*						
PIPE STIFFNESS: 437 psi						
1½	1.900	1.641	0.112	3.575	2.39	0.58
2	2.375	2.078	0.140	3.825	2.94	0.66
2½	2.875	2.517	0.169	4.075	3.55	—
3	3.500	3.063	0.206	4.325	4.32	1.42
4	4.500	3.938	0.265	4.625	5.56	2.36
6	6.625	5.803	0.390	5.325	8.19	5.11
8	8.625	7.553	0.508	6.025	10.66	8.69
10	10.750	9.410	0.632	6.825	13.28	13.55
12	12.750	11.160	0.750	8.225	15.75	19.20
PRESSURE CLASS 200 psi (SDR 21)*						
PIPE STIFFNESS: 334 psi						
1½	1.900	1.709	0.090	3.575	2.26	0.44
2	2.375	2.135	0.113	3.825	2.83	0.54
2½	2.875	2.585	0.137	4.075	3.42	0.79
3**	3.500	3.146	0.167	4.325	4.17	1.17
4**	4.500	4.046	0.214	4.625	5.36	1.93
6**	6.625	5.955	0.316	5.325	7.89	4.23
8**	8.625	7.754	0.410	6.025	10.27	7.18
10	10.750	9.667	0.511	6.825	12.79	11.20
12	12.750	11.465	0.606	8.225	15.17	15.82
PRESSURE CLASS 150 psi (SDR 26)*						
PIPE STIFFNESS: 118 psi						
1½	1.900	1.745	0.073	3.575	2.19	0.28
2	2.375	2.182	0.091	3.825	2.74	0.44
2½	2.875	2.642	0.110	4.075	3.32	0.64
3	3.500	3.214	0.135	4.325	4.04	0.95
4	4.500	4.133	0.173	4.625	5.19	1.58
5	5.563	5.109	0.214	4.750	6.42	2.40
6	6.625	6.084	0.255	5.325	7.65	3.44
8	8.625	7.921	0.332	6.025	9.95	5.85
10	10.750	9.874	0.413	6.825	12.40	9.12
12	12.750	11.711	0.490	8.225	14.71	12.89
PRESSURE CLASS 125 psi (SDR 32.5)*						
PIPE STIFFNESS: 67 psi						
1½	1.900	1.773	0.060	3.575	2.14	—
2	2.375	2.220	0.073	3.825	2.67	—
2½	2.875	2.688	0.088	4.075	3.23	—
3	3.500	3.271	0.108	4.325	3.93	0.77
4	4.500	4.207	0.138	4.625	5.05	1.28
5	5.563	5.200	0.171	4.750	6.25	2.00
6	6.625	6.193	0.204	5.325	7.44	2.79
8	8.625	8.063	0.265	6.025	9.69	4.70
10	10.750	10.048	0.331	6.825	12.07	7.35
12	12.750	11.919	0.392	8.225	14.32	10.36

PIPE SIZE (IN)	AVERAGE O.D. (IN)	NOM. I.D. (IN)	MIN. T. (IN)	AVG. E (IN)	APPROX. D' (IN)	APPROX. WGT (LBS/FT)
PRESSURE CLASS 100 psi (SDR 41)*						
PIPE STIFFNESS: 88 psi						
3	3.500	3.320	0.085	4.325	3.84	—
4	4.500	4.267	0.110	4.625	4.94	1.03
5	5.563	5.27	0.136	4.750	6.10	1.60
6	6.625	6.282	0.162	5.325	7.27	2.23
8	8.625	8.180	0.210	6.025	9.47	3.75
10	10.750	10.195	0.262	6.825	11.80	5.86
12	12.750	12.091	0.311	8.225	13.99	8.28
PRESSURE CLASS 80 psi (SDR 64)*						
PIPE STIFFNESS: 7 psi						
6	6.625	6.40	0.104	5.325	7.20	1.60
8	8.625	8.33	0.135	6.025	9.30	2.40
10	10.750	10.39	0.168	6.825	11.50	3.80
12	12.750	12.32	0.199	8.225	13.80	5.30

Product Standard: ASTM D2241
Pipe Compound: ASTM D1784 Cell Class 12454
Gasket: ASTM F477
Integral Bell Joint: ASTM D3139
Certifications: ANSI/NSF 61, ANSI/NSF 14*, Uniform Plumbing Code*
Nominal Laying Length: 20/22 feet
 (Laying length tolerances are in accordance with ASTM standards)
Installation: JM Eagle™ IPS Pressure Installation Guide

Manning Coefficient (n) = 0.009
 Hazen-Williams Coefficient (c) = 150

*Supply may vary based on plant location. Please call regarding availability.
 **This item is also available with an Eagle Loc Joint. Please call for more details.



I.D.: Inside Diameter
O.D.: Outside Diameter
T: Wall Thickness
D⁹: Bell Outside Diameter
E: Distance between Assembly Mark and the end of the spigot.



This information may have been updated. Please visit www.jmeagle.com for all updated information and warranty details.

CUSTOMER SERVICE: 1.800.621.4404

THIS PRODUCT IS MADE IN AMERICA

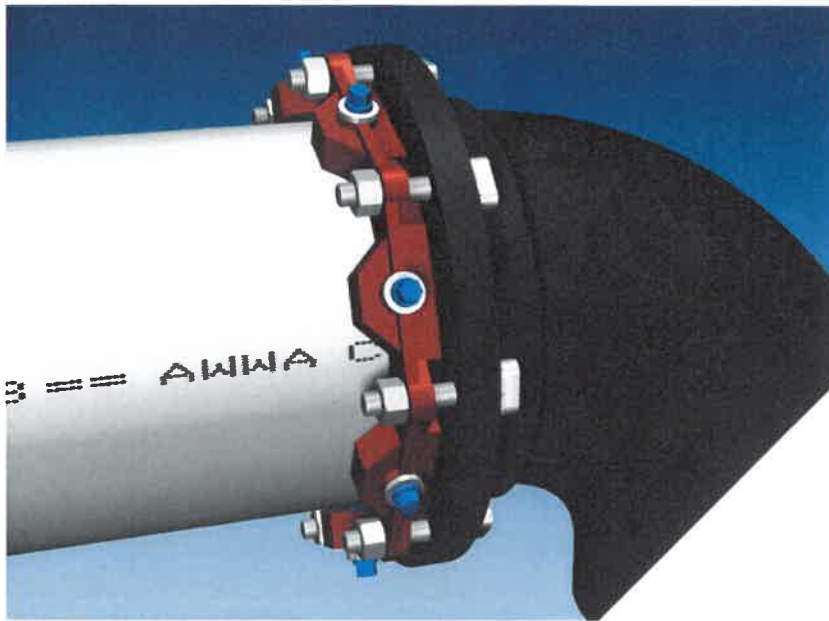
PRINTED JUNE 2018 REV13

SG-2



Series 2000PV

Mechanical Joint Restraint for PVC Pipe



Series 2012PV on 12inch C900 PVC pipe at a ductile iron fitting.

Features and Applications:

- For restraining plain end PVC pipe at mechanical joint fittings and appurtenances
- Sizes 3 inch through 36 inch
Sizes 42 inch through 54 inch accommodated by Series 2200
- MEGA-BOND® Restraint Coating System
For more information on MEGA-BOND, refer to www.ebaa.com
- Constructed of ASTM A536 Ductile Iron
- The mechanical joint follower gland is incorporated into the restraint
- Accommodates full deflection of the mechanical joint on which it is used
- Heavy duty thick wall design
- Support Products Available:
 - Split mechanical Joint style available for 3 inch through 12 inch EBAA Series 2000SV
 - Solid restraint ring harness available for C900-16 PVC pipe bells EBAA Series 2800
 - Split restraint ring harness available for C900-16 PVC pipe bells and PVC fittings EBAA Series 1500, 1600 and 2500
- All 2000PV and related restraint products can be furnished as packaged accessories complete with appropriate restraint, gasket, lubrication and bolting hardware

Nominal Pipe Size	Series Number	Shipping Weight
3	2003PV	7.0
4	2004PV	8.8
6	2006PV	12.1
8	2008PV	16.3
10	2010PV	26.0
12	2012PV	31.4
14	2014PV	47.6
16	2016PV	52.8
18	2018PV	61.8
20	2020PV	70.9
24	2024PV	92.9
30	2030PV	128.5
36	2036PV	161.3
42	2242*	652.0
48	2248*	711.1
54	2254*	1,085.6

*Restraint for pipe size 42 inch and greater, please refer to Series 2200 Brochure found at www.ebaa.com.

U.S. Patent No.
4627775 4896903 5071175

For use on water or wastewater pipelines subject to hydrostatic pressure and tested in accordance with either AWWA C600 or ASTM D2774.

Series 6500

Bell Restraint Harness for IPS O.D. (Class) PVC Pipe
Split Serrated Restraint Rings on Both Sides of the Bell
U.S. Patent No. 4,568,112

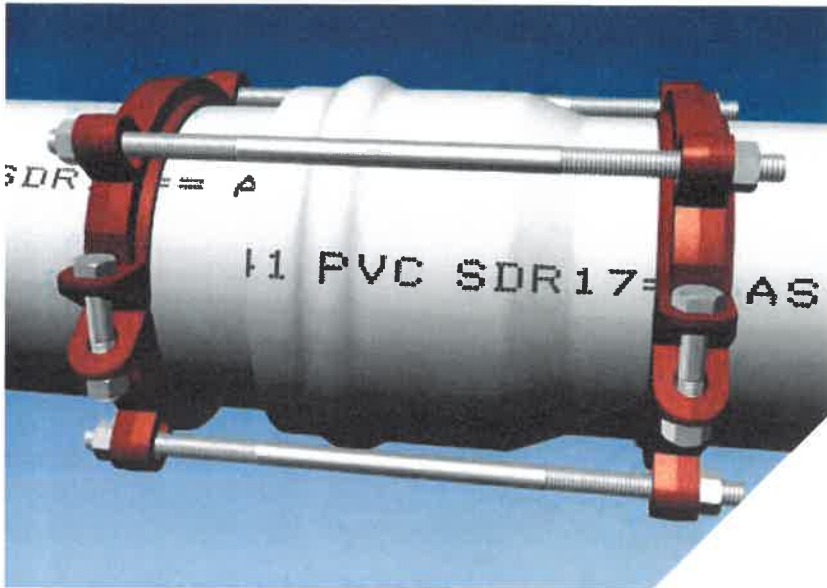


Image depicts Series 6510 on 10 inch IPS PVC Pipe.

Features and Applications:

- For use on IPS O.D. (Class) ASTM D2241 PVC Pipe Systems
- Minimum 2 to 1 Safety Factor
- **MEGA-BOND®** Restraint Coating System
For more on MEGA-BOND refer to www.ebaa.com
- Split design for ease of installation
- Constructed of ASTM A536 Ductile Iron

For use on water or wastewater pipelines subject to hydrostatic pressure and tested in accordance with either AWWA C600, C605, or ASTM D2774.

Pressure Ratings (PSI)

Nominal Pipe Size	Series Number	Approximate Shipping Weight	Pressure Ratings (PSI)		
			SDR17	SDR21	SDR26
2	6502	5.40	250	200	160
2½	650250	5.80	250	200	160
3	6503	6.20	250	200	160
4	6504	27.40	250	200	160
6	6506	29.04	250	200	160
8	6508	43.29	250	200	160
10	6510	70.00	200	200	160
12	6512	83.60	200	200	160

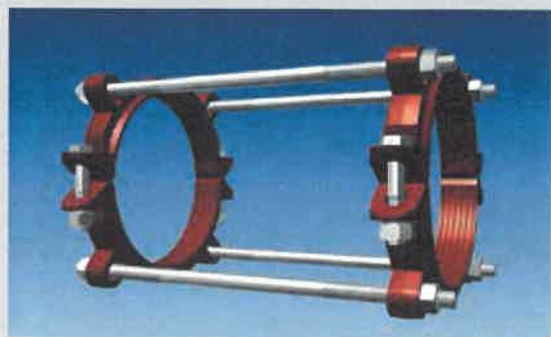
NOTE: For applications or pressures not shown, please contact EBAA for assistance. This rating applies to pipe of PVC material per ASTM D2241.

For Restraint of IPS PVC Fittings, see our **Series 7500**

Sample Specification

Restraint for ASTM D2241 pipe bells shall consist of the following: The restraint shall be manufactured of ductile iron conforming to ASTM A536. A split serrated ring shall be utilized behind the pipe bell. A split serrated ring shall be used to grip the pipe, and a sufficient number of bolts shall be used to connect the bell ring to the gripping ring. The restraint devices shall be coated using MEGA-BOND®. (For complete specifications on MEGA-BOND visit www.ebaa.com). The restraint shall be the Series 6500, as manufactured by EBAA Iron, Inc., or approved equal.

Packaged Items



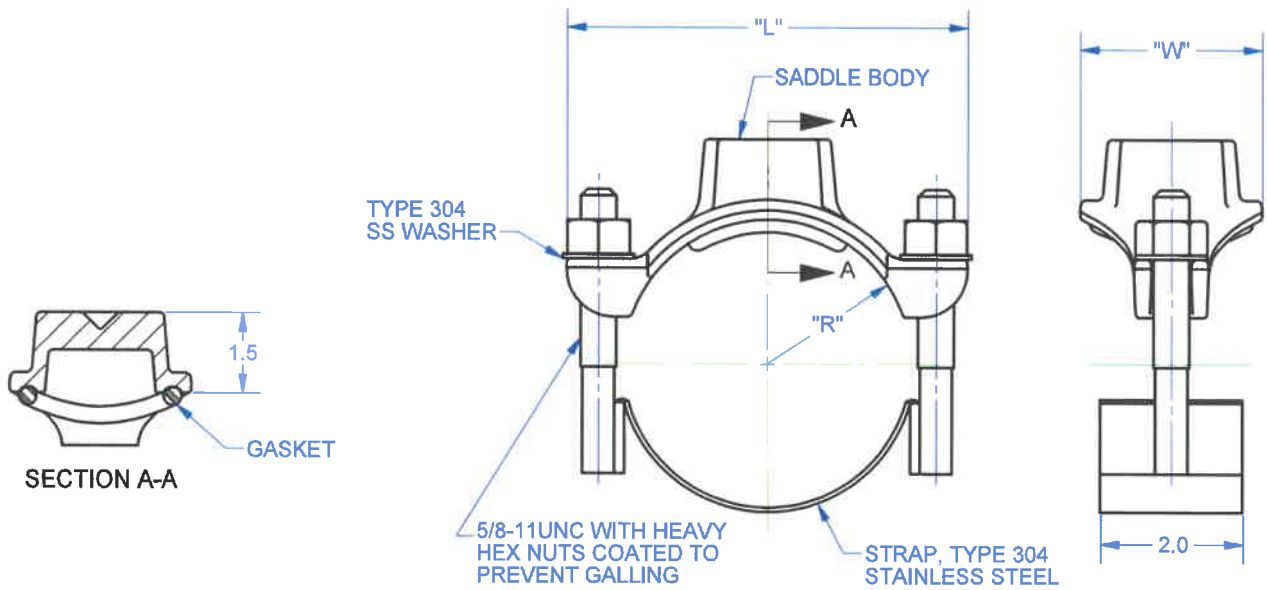
CAD-021113

General Table

NOMINAL SIZE	O.D. PIPE RANGE	LENGTH (L)	RADIUS (R)	WIDTH (W)
1-1/2"	1.90 - 2.13	4.69	1.07	2.63
2"	2.38 - 2.50	4.50	1.25	
3"	3.45 - 4.05	5.56	2.21	

REVISIONS

REV.	DESCRIPTION	DATE	APPROVED
0	INITIAL RELEASE IN PDM, ADDED STRAP WIDTH	6/4/13	PNN
1	DELETED 4" - 12"	6/8/2015	DHE



NOTES:

1. ALL MATERIAL DUCTILE IRON PER ASTM A536 GRADE 65-45-12, UNLESS NOTED OTHERWISE.
2. COATING: SHOP COAT (101S) OR NYLON COATING (101NS) 10-12 MILS THICK.
3. THREAD: "IP" (NPT) OR "CC" (PER AWWA C800) AVAILABLE.

PROPRIETARY NOTICE	UNLESS OTHERWISE SPECIFIED	SIGNATURES	DATE	ROMAC INDUSTRIES INC.				
THIS DRAWING CONTAINS CONFIDENTIAL PROPRIETARY INFORMATION AND IS THE PROPERTY OF ROMAC IND., INC. IT IS TO BE USED ONLY FOR THE PURPOSE FOR WHICH IT WAS SUBMITTED AND SHALL NOT HAVE ITS INFORMATION DISCLOSED OR REPRODUCED IN WHOLE OR IN PART FOR ANY PURPOSE WITHOUT PRIOR WRITTEN PERMISSION OF ROMAC IND., INC.	DIMENSIONS ARE IN INCHES TOLERANCES ARE ON: 1 PL DECIMALS ± 0.060 2 PL DECIMALS ± 0.030 3 PL DECIMALS ± 0.010 ANGLES ± 1° FRACTIONS ± 1/64	DRAWN Peter Nielsen	05/28/2013		TITLE			
		APPROVED Peter Nielsen	6/11/2015		101S&N SADDLE - 1-1/2" - 3"			
				DWG. NO. CAD-021113	SIZE A	REV. NO. R0	SCALE 1:2	SHEET 1 OF 1

MODEL NAME: 101S - CUSTOMER DRAWING
CONFIGURATION NAME: Default

MODEL CAD #: CAD-006787

LEGACY DRAWING #: 61507-A
DRAWING FILE NAME: 101S-101NS 1.5-3 CUST DWG

AUTHOR: Peter Nielsen

Ford Stainless Steel Saddles Style FS300

For 1/2" through 2" Taps

Ford Stainless Steel Saddles are designed for use where corrosive conditions exist. Designed for all pipe types, the stainless steel construction allows the saddle to conform, reducing stress on the pipe.

Specifications

Stainless Steel Bolts, Nuts and Washers-
18-8 type 304 stainless steel bolts. Heavy hex nuts are coated to prevent galling.

Stainless Taps - 18-8 type 304 stainless steel TIG welded to band. Available with AWWA and FIP threads in 1/2" through 2". Metric taps available.

Coined Body - Band is coined for gasket retention (some exceptions apply). Contact factory for further information.

Stainless Steel Lifter Bar-
18-8 type 304 stainless steel

Stainless Band - 18-8 type 304 stainless steel. Stainless steel saddles are fully passivated to ensure corrosion resistance.

Working Pressure Rating -
Rated for 250 psi (not to exceed the pressure rating of the pipe).

Gasket - NBR (Buna-N) per ASTM D2000. EDPM available.

NSF 61 Approved

Size 12" and under are approved for use on HDPE pipe. If Belleville washers are desired, use prefixes FSP313, FSP323, FSP333 and FSP343.

OUTLET THREAD TAP CODE

CC (AWWA) Thread		FIP Thread	
Thread	Code	Thread	Code
-	-	1/2" IP	IP1
3/4" CC	CC3	3/4" IP	IP3
1" CC	CC4	1" IP	IP4
1-1/4" CC	CC5	1-1/4" IP	IP5
1-1/2" CC	CC6	1-1/2" IP	IP6
2" CC	CC7	2" IP	IP7

Rev. 5-18 Shaded area indicates changes

- Catalog number
 - A-2361-20 Mechanical joint ends (with accessories unassembled)
 - A-2361-23 Mechanical joint ends (less accessories)
 - A-2361-25 Mechanical joint ends (with transition gaskets accessories unassembled)
- Sizes – 3", 4", 6", 8", 10", 12"
- Non-rising stem (NRS)
- Meets or exceeds all applicable requirements of ANSI/AWWA C515*** Standard, UL 262 Listed, FM 1120/1130 Approved, and certified to ANSI/NSF 61 & 372
- Standard mechanical joint ends comply with ANSI/AWWA C111
- Nominal 10 mils Mueller Pro-Gard® Fusion Bonded Epoxy coated interior and exterior surfaces Epoxy coating meets or exceeds all applicable requirements of ANSI/AWWA C550 Standard
- Iron wedge, symmetrical and fully encapsulated with molded rubber; no exposed iron
- Triple O-ring seal (2 above the thrust collar and 1 below)
- 2" square wrench nut - open left or open right
- 350 psig (2400 kPa/24 barg) maximum working pressure; 700 psig (4800 kPa/48 barg) static test pressure
- UL Listed, FM Approved: 350 psig (2400 kPa/24 barg)
- Designed for potable water applications



A-2361-20 shown

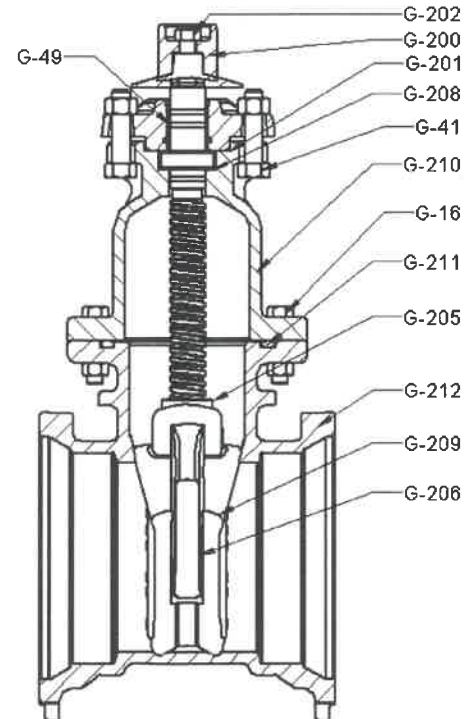
Options

See page 10.54 for more information on Resilient Wedge Gate Valve options

- Position indicators
- Low zinc, silicon bronze ASTM B98-C66100/H02 stem
- Stainless steel stem: Type 304, Type 316
- Handwheel
- EPDM Disc and o-rings

Resilient wedge gate valve parts

Catalog Part Number	Description	Material	Material Standard
G-16	Bonnet Bolts & Nuts	316 Stainless Steel	ASTM F593 (bolt) ASTM F594 (nut)
G-41	Stuffing Box Bolts & Nuts	316 Stainless Steel	ASTM F593 (bolt) ASTM F594 (nut)
G-49	Stem O-rings (3)	Nitrile	ASTM D2000
G-200	Wrench Nut Cap Screw	316 Stainless Steel	ASTM F593
G-201	Stuffing Box O-ring	Nitrile	ASTM D2000
G-202	Wrench Nut	Ductile Iron	ASTMA536 ▼
G-203	Stem	Bronze	ASTM B138
G-204	Hand Wheel (not shown)	Cast Iron +	ASTMA126 CL.B
G-205	Stem Nut	Bronze	ASTM B584
G-206	Guide Cap Bearings	Acetal	-
G-207	Stuffing Box with dirt seal	Ductile Iron Nitrile	ASTMA536 ▼ ASTM D2000
G-208	Anti-friction Washers (2)	Acetal	-
G-209	Wedge, Rubber Encapsulation	Ductile Iron* SBR	ASTMA536 ▼ ASTM D2000
G-210	Bonnet	Ductile Iron	ASTMA536 ▼
G-211	Bonnet O-ring +++	Nitrile	ASTM D2000
G-212	Body	Ductile Iron	ASTMA536 ▼



+++ 3" valves use a bonnet gasket

*Fully encapsulated in molded rubber with no iron exposed;

▼ Material strength ASTM A536 65-45 minimum

+ Manufacturer's option to change material to ductile iron ASTM A536

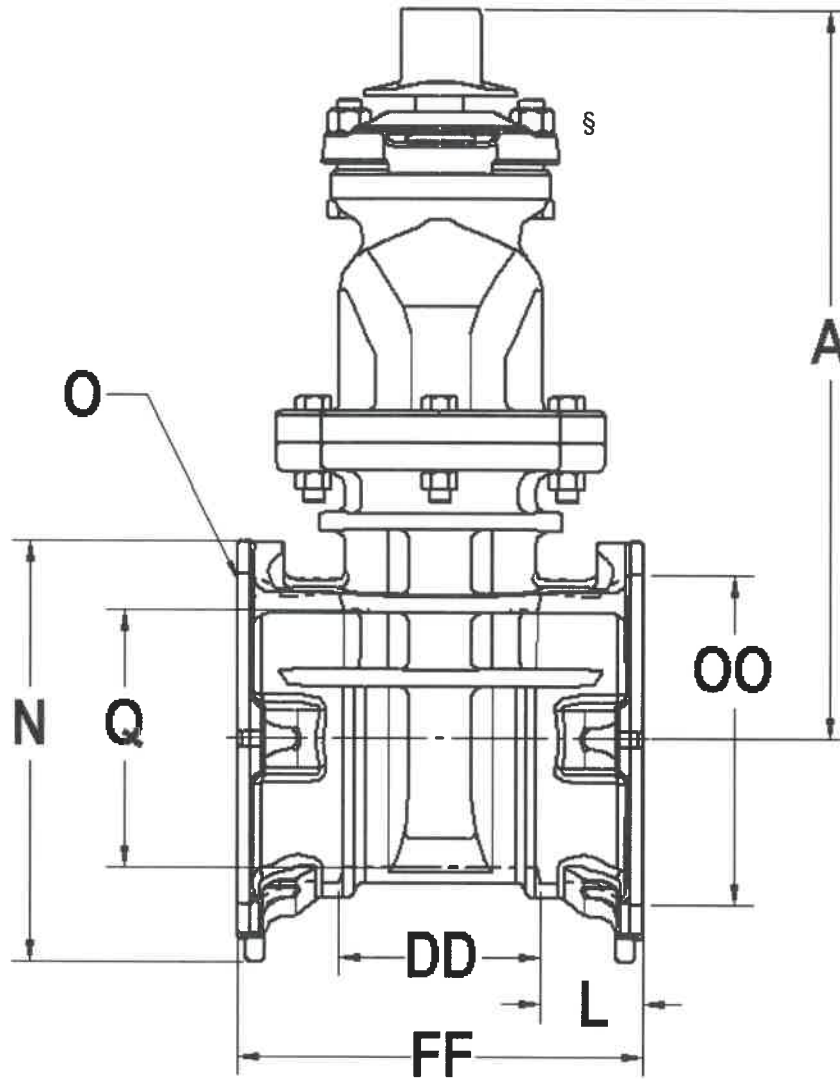
*** 3" valves meet or exceed all applicable requirements of ANSI/AWWA C509 Standard

3" - 12" A-2361 RESILIENT WEDGE GATE VALVES - M.J. x M.J.



10.5

Shaded area indicates change Rev. 2-17



Dimensions

Dimension	Nominal Size					
	3"	4"	6"	8"	10"	12"
A	12.38	14.19	18.00	21.50	25.50	28.62
FF	9.62	9.50	10.00	10.50	11.50	12.00
L	2.50	2.50	2.50	2.50	2.50	2.50
N	7.50	8.40	10.41	12.68	15.24	18.024
O (number and size of holes)	4--.88	4--.88	6--.88	6--.88	8--.88	8--.88
DD	4.62	4.50	5.00	5.50	6.50	7.00
Q	3.30	4.30	6.30	8.30	10.30	12.30
OO (bolt circle diameter)	6.19	7.50	9.50	11.75	14.00	16.25
Turns to open	11	14	20.5	26.5	33.0	38.5
Weight*	83	70	112	162	238	303

*All dimensions are in inches. All weights include accessories are in pounds and are approximate.

9.26



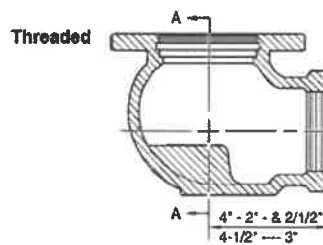
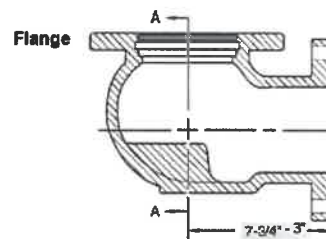
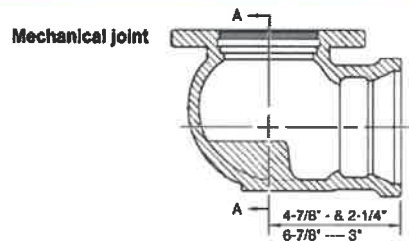
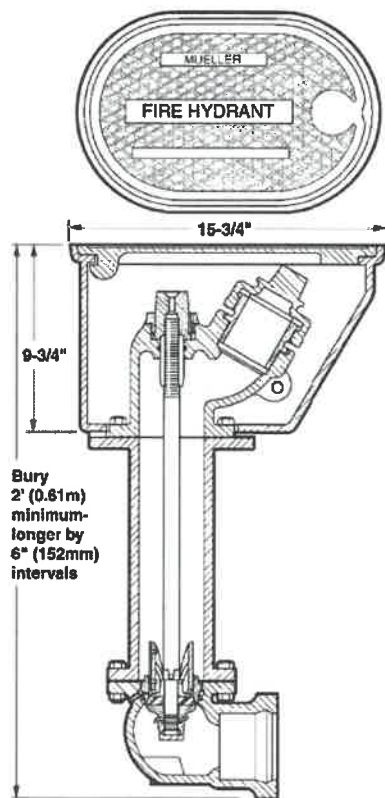
MUELLER® 2-1/8" FLUSH TYPE FIRE HYDRANT

Rev. 4-14 Shaded area indicates changes

- ▣ **Catalog numbers -**
A-412 2-1/8" main valve opening one way (one 2-1/2" hose nozzle) non-locking lid
- ▣ Meets all applicable parts of ANSI/AWWA C502 Standard
- ▣ Flush type dry barrel design
- ▣ Compression type main valve closes with pressure
- ▣ Cast iron flush box with non-locking lid
- ▣ Operating nut available in wide variety of shapes and sizes
- ▣ Field replaceable hose nozzles
- ▣ Hose nozzles have large radius, full flow openings for low friction loss
- ▣ Contoured shoe is designed for full flow
- ▣ Dual bronze drain valves provide effective barrel drainage
- ▣ 150 psig (1000 kPa/10 barg) maximum working pressure, 300 psig (2100 kPa/21 barg) test pressure



Dimensions



SEE PAGE 9.28 FOR ORDERING INSTRUCTIONS

TABLE of CONTENTS

WATERLINE RELOCATION

BANKS LANE – CONGAREE COURT CALHOUN COUNTY, SOUTH CAROLINA

Section	Title
I	WATER SYSTEM STANDARDS
II	CLEARING AND GRUBBING
III	EARTHWORK-EXCAVATION
IV	TRENCH EXCAVATION and BACKFILL
V	SITE GRADING
VI	PIPELINE MATERIALS
	a) POLYVINYL PIPE (PVC)
	b) DUCTILE IRON PIPE (DIP)
	c) POLYETHYLENE PIPE (HDPE)
VII	VALVES
VIII	FITTINGS and APPURTENACES
IX	FIRE HYDRANTS, POST HYDRANTS and YARD HYDRANTS
X	POTABLE SERVICE CONNECTIONS
XI	WATERLINE INSTALLATION
XII	PIPELINE TESTING and DISINFECTION

I. WATER SYSTEM STANDARDS and GUIDELINES

SCOPE

Water pipelines and appurtenances shall be provided as shown on the plans and as specified herein. Clearing, grubbing, trench excavation and backfill, pipe material, fire hydrants, valves, cutting and replacing pavement, and removing and replacing sidewalk shall be as specified in other chapters. All applicable provisions shall be binding upon work covered in this section.

WATER SYSTEM DESIGN GUIDELINES:

These guidelines are based on Federal, State, and local health requirements and Ten State Standard design criteria. Design Criteria not indicated herein shall comply with “Ten State Standards” where applicable. All installations shall meet quality standards of the South Carolina Department of Health and Environmental Control (SCDHEC).

A. Water System Design Criteria:

1. Distribution Main Size: Minimum 4" diameter unless otherwise approved by the AUTHORITY. Water mains providing fire service shall be a minimum of 6" diameter.
2. Sizing of Lines: For pipelines 6" and larger, sizes shall be based on either 1/5th the instantaneous maximum flow plus the fire flow or maximum instantaneous demand, which ever is greater. The minimum design fire flow in the system shall be 1,000 GPM with a minimum residual pressure of 20 PSI. For pipe sizes 4" and smaller, sizes shall be based on either 1/5th the instantaneous maximum flow plus the blow off flow or maximum instantaneous demand, which ever is greater.
3. Valves: Provide three (3) valves for a tee intersection, four (4) valves for a cross intersection. Sufficient valves shall be provided on water mains so that public inconvenience and sanitary hazards will be minimized during repairs. Valves should be located at not more than 500 FT intervals in commercial areas and at not more than one block or 800 FT intervals in residential areas. Valves on transmission mains and rural distribution mains shall be installed in intervals no greater than 2000 ft. Valves should be placed to minimize the number of customers out of service due to a main break or any other maintenance operation. The AUTHORITY reserves the right to require additional valves if it is deemed in the best interest of current and future customers.
4. Dead ends: Dead ends shall be minimized by designing mains so they are looped and interconnected at intersections. The AUTHORITY reserves the right to reject any dead end pipeline greater than 4" diameter if the possibility exists for stagnation of water due to non-use. The maximum length of 4" water pipelines shall be 1000 FT.

B. Water Pipeline Considerations: All materials and products shall meet Made in America Criteria. Materials not meeting this requirement shall only be acceptable with prior written approval from the AUTHORITY. Natural rubber or other materials, which are capable of supporting microbiological growth, may not be used in any appurtenance in direct contact with potable water. Water mains shall be located out of contaminated areas, unless using pipe materials that will protect (i.e. DIP with chemical resistant gaskets.) Reroute line if possible.

C. Waterlines 4" through 10" may be DIP or PVC. All fittings shall be DIP. Pipe Sizes of 1- 1/4", 1- 1/2", 2-1/2", and 3" are not approved for installation in BJWSA systems. 1" and 2" pipe shall only be approved for service taps. Asbestos cement, concrete and steel piping is not allowed. Refer to Pipeline Materials and Appurtenances located elsewhere herein for relevant material specifications.

II. EARTHWORK/EXCAVATION

SCOPE:

Earthwork shall consist of all necessary site clearing and grubbing, excavation and backfill for structures and trenches, site grading, grassing and restoration, as well as related work as shown on the plans and as specified herein.

GENERAL:

All earthwork shall be confined to the construction area as shown on the plans and shall be done in an approved manner with proper equipment. Earthwork shall be suspended during rain and inclement weather, or when unsatisfactory field conditions are encountered, unless directed by the ENGINEER. At all times during construction, the CONTRACTOR shall maintain proper drainage in the construction area and shall take all measures necessary for erosion and sediment control.

- A. Classification of earthwork: All excavation will be unclassified, for payment purposes, unless otherwise specified.
- B. Existing Utilities: CONTRACTOR shall take every precaution to protect existing utility services from damage during construction operations. If damage occurs, the OWNER of the utility shall be notified immediately and repairs shall be made promptly at the CONTRACTOR'S expense.

All repair work shall be satisfactory to the ENGINEER and the OWNER of the utility. When interruptions of existing utilities occur, temporary service shall be provided as approved by the ENGINEER and OWNER of the utility.

III. CLEARING AND GRUBBING:

A. General:

1. The CONTRACTOR shall consult with the OWNER and ENGINEER prior to beginning clearing, and a full understanding is to be reached as to procedure. The CONTRACTOR shall then conduct clearing and grubbing operations in strict accordance with these agreements.
2. The CONTRACTOR'S operations shall be conducted with full consideration of all proper and legal rights of the OWNER, adjacent property OWNER'S and the public, and with the least possible amount of inconvenience to them.

C. Pipelines: Clearing and grubbing along pipelines shall be done prior to pipe installation and shall be confined to the right-of-way limits as specified below. Adjacent property outside the right-of-way limits shall be protected against damage. All trees, stumps, roots, shrubs, and brush shall be removed as required for construction. Stumps and roots shall be grubbed and completely removed. Sound trees and shrubs, which do not interfere with construction, shall remain in place and shall be adequately protected from damage. Cleared and grubbed material, including debris and rubbish, shall be disposed of as directed by the ENGINEER; burning within pipeline rights-of-way will not be allowed.

1. Trees 6-inches and larger in diameter shall be trimmed into normal 63-inch lengths, unless otherwise directed by the property OWNER. The logs shall be neatly stacked along the edge of the right-of-way in accessible locations for the property OWNER'S use.
2. Limits of the pipe-laying operation shall be confined to the right-of-way. The width of clearing shall be held to a minimum and shall be no more than specified on the plans, without written consent of the ENGINEER.

IV. TRENCH EXCAVATION AND BACKFILL:

A. Pipe Bedding and Backfill Material: Select material shall be material free of large stones, hard lumps, frozen matter, organic material, debris and other objectionable material. If necessary, suitable material shall be provided by the CONTRACTOR from other sources at CONTRACTOR'S expense. All material from the excavation unsuitable for bedding and backfill shall be removed and disposed of by the CONTRACTOR. Angular Material shall be crushed stone or gravel conforming to ASTM C33, Size No. 57, with size range of ¼ to ¾-inch.

B. Trench Excavation: ALL EXCAVATION SHALL BE IN COMPLIANCE WITH CURRENT OSHA REQUIREMENTS. Trenches for pipe and other utilities shall be excavated true to line and grade. Unless otherwise indicated or specified, trenches shall be of a depth to provide a minimum cover of 3 FT over the top of pipelines.

1. Sidewalls of trenches shall comply with current OSHA requirements. Unless otherwise specified, trenches shall be between 12 and 18 inches wider than the outside diameter of the pipe, plus sheeting where necessary. Pavement shall be cut 12 inches wider than the required trench width on each side. For gravity sewer lines the maximum trench width shall be up to a level 12 inches above the top of the pipe or shall be as noted on the plans. Sheeting or shoring shall be used where necessary.
2. Where soil conditions preclude vertical walls, the trench width shall be as specified above with the upper part of the trench limited to the least possible width greater than that specified. Where excessive trench widths are necessary, or where directed by the ENGINEER, sheeting or shoring shall be used to support trench walls.

3. Pressure Pipelines: For pressure pipelines, prepare trench bottoms as follows:
 - a) Trench bottoms shall be graded to provide uniform and continuous bearing for the pipe along its entire length. Bell holes shall be provided for completion of joints. No ridges, sags or undercutting will be allowed.
 - b) If approved by the ENGINEER and subject to suitable soil conditions, trenches may be excavated a few inches below the established subgrade and backfilled to subgrade with select material, well compacted and graded to provide uniform and continuous bearing for the entire length of pipe. Bedding material shall be well compacted up to the spring-line of the pipe, shovel sliced and shaped so that the load is supported throughout the entire length of pipe barrel and not at the pipe bells. Bell holes shall be provided for completion of joints.
 - c) In rock or other unyielding material, excavation shall be made at least 6" below the established subgrade and the trench backfilled to subgrade with select material. Bedding material shall be well compacted up to the spring-line of the pipe, shovel sliced and shaped so that the load is supported throughout the entire length of pipe barrel and not at the pipe bells.
 - d) Where material at subgrade is unstable, soft and incapable of supporting the pipe, trenches shall be excavated below subgrade to a depth as required by soil conditions and backfilled to subgrade with angular material. The material shall be compacted and graded to provide a stable foundation and uniform bearing for the pipe. Bedding material shall be well compacted up to the spring-line of the pipe, shovel sliced and shaped so that the load is supported throughout the entire length of pipe barrel and not at the pipe bells.
 - e) Debris encountered in trench excavation for water and other pipelines shall be removed for the overall width of the trench. It shall be removed to a depth of 6" below the bottom of the pipe for pipes smaller than 24" in size; 8" below the bottom of the pipe for pipes 24" to 36" in size; and 12" below the bottom of the pipe for pipes larger than 36" in size, if debris extends to such depth.
4. Trenches shall be kept free of water during pipe installation. Water shall be removed from trenches and disposed of by the CONTRACTOR to the satisfaction of the ENGINEER.
5. Where required, and as approved by the ENGINEER, sheeting, shoring and bracing shall be used to comply with current OSHA requirements and to prevent injury to personnel and caving of trench walls. Sheeting, shoring and bracing shall be left in place until the trench is refilled to a safe limit. A trench box may be used if trench widths do not exceed the maximum indicated in the pipe bedding details.
- C. Trench Backfill: Trench Backfill shall progress as rapidly as pipe laying and testing will permit. The remainder of the backfill material shall be placed as specified below. No debris or rocks larger than 2 inches in any dimension shall be used in this portion of the backfill.
 1. Paved Roads and Streets: Backfill shall be flowable fill, which shall extend beyond pavement edge at least 4 feet.
 2. In unpaved roads / shoulders within 5' of the tread line, backfill shall be placed in layers not more than 8 inches thick, and thoroughly compacted with mechanical tampers to 95% of maximum as determined by the Standard Proctor test (ASTM D698) or Modified Proctor test (ASTM D1557, Method A). On road shoulders, the top 18 inches of the trench shall be filled with well-compacted fill.
 3. For cross-country lines, outfall lines and at other locations where damage to the system or property will not occur, backfill shall be placed in 12-inch layers and compacted with mechanical tampers. The upper 3 FT portion of the backfill may be compacted by rolling with wheeled equipment.

4. Tops of trenches shall be flush with existing ground elevation. The CONTRACTOR shall, promptly correct all settlement below finish grade occurring as a result of construction. Trenches shall be protected against scour due to surface drainage.
5. Backfilling around manholes shall, in general, conform to the requirements for backfilling trenches, except that backfill shall not be placed around manholes until all mortar has properly set.
6. CONTRACTOR shall correct any future settlement within the warranty period.

V. SITE GRADING:

- A. Site grading shall conform to the lines and grades indicated by the finish contours on the plans.
- B. Where topsoil, pavement, aggregate surfacing, and other items are shown, rough grade shall be finished to such depth below finish grade as necessary to accommodate these items. All areas where structures are to be built on fill shall be stripped to such depth as necessary to remove turf, roots, organic matter and other objectionable materials.
- C. Excavation: Excavation shall be made to the exact elevations, slopes, and limits shown on the plans.
- D. Fill: Material to be used for fill shall be classified as “ML” (low plasticity silts), “SM” (silty sands), or better, in accordance with the Unified Soil Classification System. Fill material shall exhibit a plasticity index of less than 20 and a standard Proctor maximum dry density greater than 90 pounds per cubic foot. Fill shall not contain organic material, debris, or rock larger than 6 inches in any dimension.
 1. Where fill is to be placed all existing vegetation, roots and other organic matter down to 12 inches below grade shall be stripped and disposed of as directed.
 2. Fill shall be placed in successive layers of not more than 8 inches loose thickness. Each layer shall be spread evenly and compacted as specified below before the next layer is placed.
 3. Rock shall not be incorporated in fill sections supporting pavement or structures. Rock shall be evenly distributed. Rock larger than 4 inches in any dimension will not be allowed in the top 12 inches of fills or slopes. Voids between rock material shall be well filled with suitable fill material, and all rock shall be covered with at least 6 inches of fill material.
 4. Where natural slopes exceed 3:1, horizontal benches shall be cut to receive fill material. Slopes of less than 3:1 and other areas shall be scarified prior to placing fill.
 5. Borrow material, as required, shall be obtained from the work site or other acceptable source, at the CONTRACTOR’S expense.
- E. Compaction: Unless otherwise noted, each layer of fill and backfill and the top 12 inches of existing sub grade material in cuts shall be compacted by approved equipment as specified below. The degree of compaction and the density shall be determined by the Standard Proctor test (ASTM D698) or by the Modified Proctor test (ASTM D1557, Method A).
 1. Min. Compaction of Max. Dry Density at Optimum Moisture Content
 - a) Fill or cut under structures and backfill adjacent to structures - 98%
 - b) Top 8 inches of fill or cut under pavement or aggregate surfacing - 98%
 - c) Fill and backfill for highways or shoulders within 5 inches of travel surface - 95%
 - d) Fill and backfill in other areas - 90%
 2. Material too dry for proper compaction shall be moistened by suitable watering devices, turned and harrowed to distribute moisture, and then properly compacted. When material is too wet for proper compaction, operations shall stop until such material has sufficiently dried.

3. All compaction tests, including additional tests required due to failure of materials and work to conform to the specified requirements, shall be done at the CONTRACTOR'S expense. Compaction tests shall be conducted by an independent testing agency acceptable to the ENGINEER. The CONTRACTOR shall be responsible for correcting all deficiencies in the work at his expense. Compaction testing shall continue until test results are satisfactory to the ENGINEER. Copies of all test results shall be promptly submitted to the ENGINEER.

4. Tests shall be made in randomly selected locations as follows:

Material Frequency

- a) Fill and backfill 1 per layer (lift) per 1000 sq. ft.
- b) Sub grade (cuts) 1 per layer (lift) per 2500 sq. ft.
- c) Road Crossings 1 per layer

F. Dressing Off: All cuts, fills and slopes shall be neatly dressed off to the required grade or subgrade, as indicated on the plans

G. Cleanup: Cleanup of the site shall be made upon completion of grading work or any major part thereof. Unless otherwise noted, excess or surplus material shall be wasted and dressed off on the site, or adjacent thereto, to the ENGINEER'S satisfaction. Excess or surplus material wasted in off-site spoil areas shall be spread and leveled as directed.

H. Topsoil Placement: Topsoil shall consist of a natural friable loam, occurring usually in a surface layer 6 to 18 inches thick, and free of roots, grass, weeds, stone and other foreign matter. Topsoil may be obtained from the graded area, if available, and stockpiled for future use. Otherwise, the CONTRACTOR shall provide topsoil from other sources at his own expense. All topsoil shall be acceptable to the ENGINEER. Topsoil shall be placed on the entire graded area as shown on the plans, or as directed by the ENGINEER. Topsoil shall be distributed to a depth of 4 inches, measured loose, and dressed off neatly to finish grade, with all debris removed.

VI. PIPELINE MATERIALS, VALVES AND APPURTENANCES

PIPELINE MATERIALS

All pipe, fittings, packing, jointing material, valves, and fire hydrants shall be new and conform to Section C of AWWA Standards. All pipe material, solder and flux shall be lead free (less than 0.2% lead in solder and flux and less than 8.0% lead in pipes and fittings).

All standards cited in the text refer to the latest revision of that standard under the same specification number or to the superseding specifications under a new number. Only the materials specified below may be used for pipeline. Steel and cast iron are not permitted for pipelines although steel pipe is permissible for boring casings per Chapter 5.

A. **Polyvinyl Chloride (PVC) Pipe:** PVC pipes for utilities shall be provided as shown on the plans and as specified herein.

- 1. Shop Drawings: Catalog cuts and related data for all pipe and fitting material shall be submitted to the ENGINEER for review. Electronic copies of the approved submittals shall be forwarded to the AUTHORITY.
- 2. Materials: All material under this section shall meet Made in America Criteria. PVC Pressure Pipe shall be as specified below. Fittings and adapters shall conform to the same requirements as for pipe, and shall be compatible with pipe.
 - a) General
 - i) Pipe shall be marked as to the type, class or nominal thickness, weight, manufacturer and date of production.

- ii) PVC pressure pipe shall be installed in strict accordance with the manufacturer's instructions. Minimum depth of cover shall be 36 inches. Adapters shall be provided as required when connections are made to other types of pipe. Refer to Chapter 13 for list of approved manufacturers.
 - iii) All wastewater pressure force main pipe shall be factory dyed industry standard **green** to aid in identification. Potable water pressure pipe shall be factory dyed industry standard **blue**. Effluent transmission pipe shall be factory dyed industry standard **purple**. Polyethylene pipe shall be striped in the appropriate color for intended use.
 - iv) For pressurized pipe, fittings 3" and larger shall be mechanical joint type utilizing synthetic rubber ring gasket and shall conform to the requirements of AWWA/ANSI C110 /A21.10. For gravity sewer, pipe fittings may be ductile iron as above or PVC conforming to AWWA C900.
- b) Water
- i) All potable water pipe shall bear the National Sanitation Foundation (NSF) seal of approval stating compliance with ANSI/NSF Standard 61. PVC piping shall comply with ASTM D1785 and shall be UL/FM approved.
 - ii) Pipe for water mains 4" through 10" in diameter shall conform to AWWA C900, DR 18 or C909 (150 PSI), with pipe made to ductile iron outside diameters.
 - iii) Pipe 12" and larger in diameter shall be ductile iron pipe.
3. Material Testing:
- a) Potable Water and Wastewater Pressure Forcemain Pipe: Each joint of pressure pipe shall be subjected to and successfully meet a hydrostatic proof test at the factory in accordance with the requirements for each type. Certified test results shall be furnished to the ENGINEER for each shipment of pipe. Pipe fittings shall be subject to inspection and testing in accordance with standard manufacturing practice.
4. Installation: Pipe and fittings shall be installed in accordance with the requirements specified in other Chapters and the manufacturer's instructions. Minimum depth of cover shall be 36 inches. All adapters necessary for the proper jointing of pipe and fittings shall be provided. Connections to other types of pipe shall be made as detailed on the plans. Underground fittings shall be well restrained as detailed on the plans and as specified in this section. Mark pipeline with tracer wire and marking tape. Tracer wire shall be extended from the main wire above the pipe to 12" above ground level at all valve boxes to facilitate attachment to tracing equipment.

B. Ductile Iron Pipe (DIP): Ductile iron pipe and fittings shall be provided as shown on the plans and as specified herein.

1. Shop Drawings: Catalog cuts and related data for all pipe and fitting material shall be submitted to the ENGINEER for review. Electronic copies of the approved submittals shall be forwarded to the AUTHORITY.
2. Material: All material under this section shall meet Made in America Criteria. Ductile Iron Pipe shall conform to AWWA C150 and ANSI A21.50, shall be designed for pressure class as follows unless otherwise noted:
 - a) 4-12" 350
 - b) 14-20" 250
 - c) 24"-26" 200
 - d) 30" & greater 150

3. Ductile iron pressure pipe shall conform to ASTM A377. Pipe shall have push-on or mechanical joint ends conforming to AWWA C111 and ANSI A21.11, except where flanged or other type ends are shown or specified. Flanged piping shall conform to AWWA C115 and ANSI A21.15.
 - a) Pipe shall be marked as Type, Class or nominal thickness, weight, manufacturer, and date of production.
 - b) Pipe wall thickness shall be designed in accordance to bury depth.
 - c) Pipe shall be coated on the outside with a standard bituminous coating in compliance to AWWA C104.
 - d) All potable water piping shall be lined on interior surface with high speed cement conforming to AWWA C104 and ANSI A21.4, 45 mil dry film thickness minimum. Water pipe shall bear the National Sanitation Foundation (NSF) seal of approval stating compliance with ANSI/NSF Standard 61.
4. Material Testing: Each joint of ductile iron pipe, prior to lining, shall be subjected to and successfully meet a hydrostatic test at the factory in accordance with ANSI/AWWA C151/A21.51. Certified test results shall be furnished to the ENGINEER for each shipment of pipe.
5. Installation: Pipe and fittings shall be installed in accordance with the manufacturer's instructions and the requirements specified in other sections. Ductile iron pressure pipe shall be installed in accordance with all applicable requirements of AWWA C600. Underground pipe and fittings shall be installed using push-on joints or mechanical joints, except where other type joints are specifically noted. Exposed pipe and fittings shall have Class 125 flanged joints except where Class 250 is specifically noted, or other type joints as shown or specified. All adapters necessary for the proper jointing of pipe and fittings shall be provided. Connections to other types of pipe shall be made as detailed on the plans. Underground fittings shall be well restrained as detailed on the plans and as specified in this Chapter. Detectable marking tape and tracer wire for identification, location, protection, and detection of utility pipelines shall be installed over all lines as specified in this Chapter. Tracer wire shall be extended from the main wire above the pipe to 12" above ground level at all valve boxes to facilitate attachment to tracing equipment. Pipe supports, hangers, and anchors shall be provided as required.

C. Polyethylene (HDPE) Pipe:

1. General: The pipe supplied under this specification shall be cast iron outside diameter (DIPS), SDR 11 high performance, high molecular weight, high density polyethylene pipe, and shall conform to ASTM D 1248 (Type III C, Category 5, P34). Minimum cell classification values shall be 345434C as referenced in ASTM D 3350. All pipe resin shall be manufactured by the same company that manufactures the pipe itself in accordance with these specifications to insure complete resin compatibility and total product accountability. The fittings supplied in this specification shall be molded or manufactured from a polyethylene compound having a cell classification equal to or exceeding the compound used in the pipe.
 - a) All potable water pipe shall bear the National Sanitation Foundation (NSF) seal of approval stating compliance with ANSI/NSF Standard 61.
 - i) 1" and 2" service pipe: see Water Service, Section 7.4
 - ii) 4" and larger shall comply with ASTM D 3035 dimension rating. HDPE mains may be installed along certain routes in areas where taps will not occur; such as wetland, creek, and river crossings and other non-developable areas.
3. Physical Properties: Pipe shall conform to the physical properties described below:
 - a) Typical Physical Properties:

PROPERTY	TEST METHOD	UNIT	VALUE
Density	ASTM Method	gms/cc	0.955
Melt Index	ASTM D 1238	gms/10 min	0.14

b) Coefficient of Linear Thermal Expansion:

PROPERTY	TEST METHOD	UNIT	VALUE
Molded Specimen Extruded Pipe 1.2x10-4	ASTM D 696	in./in./deg. F	8.3x10-5
Conductivity	Dynatech-Colora	BTU-IN/FT/deg	F 2.7

c) Long Term Strength:

PROPERTY	TEST METHOD	UNIT	VALUE
73 degrees F	ASTM D 2837	PSI	1600
140 degrees F		PSI	800
Material Cell Class	ASTM D 3350	345	434c
Material Description	PPI recommendation	PE	3408

d) Environmental Stress Cracking Resistance:

PROPERTY	TEST METHOD	UNIT	VALUE
Condition A,B,&C, F-0 Compressed Ring, F-60 Proposed	ASTM D 1693	HRS	>5000**
Tensile Strength, Yield Type IV Specimen (2"/min)	ASTM D 638	PSI	3200
Elongation at Break	ASTM D 638	%	>750
Vicate Softening Temp	ASTM D 1525	deg F	257
Brittleness Temp	ASTM D 746	deg F	<-180
Flexural Modulus	ASTM D 3350	PSI	125,000
Modulus of Elasticity	ASTM D 638	PSI	105,000
Hardness	ASTM D 2240	Shore D	64

4. Quality Control: The resin used for manufacturer of the pipe shall be manufactured by the pipe manufacturer, thus maintaining complete quality control of the pipe. The pipe shall contain no recycled compound except that generated in the manufacturer's own plant from resin of the same specification from the same raw material. The pipe shall be homogenous throughout and free of visible cracks, holes, foreign inclusions, or other deleterious defects and shall be identical in color, density, melt index, and other physical properties. The polyethylene resin used shall have all ingredients pre-compound prior to extrusion of pipe, in plant blending is not acceptable. the Authority may request, as part of the quality control records submittal, certification that the pipe produced is represented by the quality assurance testing. Additionally, test results from manufacturer's testing or random sampling by the ENGINEER that do not meet appropriate ASTM standards or manufacturer's representation, may be cause for rejection of pipe represented by the testing. These tests may include density and flow rate measurements from samples taken at selected locations within the pipe wall and thermal stability determinations according to ASTM D.

a) The Authority may request certified lab data to verify the physical properties of the materials supplied under this specification or may take random samples and have them tested by an independent laboratory.

b) Pipe Marking: All piping shall marked for identification with a minimum of four (4) longitudinal stripes of color corresponding to use.

- c) Rejection: The authority reserves the right to reject any polyethylene pipe and fittings failing to meet any of the requirements of this specification.
- d) Pipe Dimensions: Pipe supplied under this specification shall have a nominal cast iron outside diameter unless otherwise specified. The SDR (Standard Dimension Ratio) of the pipe supplied shall be as specified by BJWSA.

5. Construction Practices:

- a) Handling of Pipe: Pipe shall be stored on clean, level ground to prevent undue scratching or gouging of the pipe. If the pipe must be stacked for storage, such stacking should be done in accordance with the pipe manufacturer's recommendations. The handling of the pipe should be done in such a manner that it is damaged by dragging over sharp objects or cut by chokers or lifting equipment.
- b) Repair of Damaged Sections: Segments of pipe having cuts or gouges in excess of 10% of the wall thickness of the pipe should be removed.
- c) Installation: Trenching, installation, backfill and testing shall be in accordance with specifications and drawings and special method of installation developed for a specific project.
- d) Directional Drilling: Polyethylene pipe installed by directional drilling shall be installed as directed by the ENGINEER. Directional drilled HDPE pipe shall be pulled in continuous fused sections and connected as outlined above. #8 gauge tracer wire shall be pulled with all directional drills and connected to tracer wiring at interconnection of connecting piping. Directional drills shall not be removed from bore hole once drilling commences. Directional drills that fail once drilling commences shall be abandoned and filled with pressure grout at the CONTRACTORS expense. Directional drilling of polyethylene pipe under public right of ways shall comply with Encroachment permit requirements of appropriate jurisdictional AUTHORITY.

VII. VALVES

- A. General: Gate valves shall be used for all sizes 2" through 12". Butterfly valves may be used where the diameter exceeds 12" or if determined necessary by the Authority. All valves shall open left (counter clockwise). All buried valves shall have a 2" square operating nut. Valves with operating nuts greater than 4 FT deep shall have approved valve nut extenders bringing the operating nut up to three feet below grade. All butterfly valves shall have a minimum 450 FT-LB. actuator. All valves are to be designed for a minimum working pressure of not less than 150 PSI unless otherwise specified. All potable water appurtenances that contact potable water shall bear the National Sanitation Foundation (NSF) seal of approval stating compliance with ANSI/NSF Standard 61.
 - 1. Shop Drawings: Catalog cuts and related data for all valves and fitting material shall be submitted to the ENGINEER for review. Electronic copies of the approved submittals shall be forwarded to the AUTHORITY.
- B. Gate Valves: All resilient wedge gate valves shall comply with all requirements of AWWAC509, latest revision, and with the below listed requirements. Valves shall be designed for 250 PSI working pressure, factory seat tested at 250 PSI with no leakage past the seat from either side of the disc, and shell tested at 500 PSI. Minimum body and bonnet wall thickness shall be as set forth in Table 2, Section 4.3.1 of AWWA C509. Body and bonnet wall thickness less than the minimum thickness shall not be acceptable. Bonnet to body seal shall be affected by a flat neoprene gasket. Bonnet and body flanges shall be fully machined to assure proper sealing of the gasket. Valve body interior and exterior shall be coated with a minimum of 10 mil of fusion bond epoxy or nylon coating. End connections shall be flanged in accordance with Class 125, ANSI B16.1 for above ground installation, and mechanical joint for underground installation in accordance with AWWA C110/111 or slip-on for use with cast iron OD pipe.

- C. Valves shall be of the non-rising stem (N.R.S.) design and shall open left (counter-clockwise). Valves installed above ground and in underground vaults, where specified, shall be furnished with gear actuated hand wheels. All buried valves shall be furnished with 2" square operating nuts. Maximum bury depth to nut shall be 4 FT or valve nut extensions shall be provided. Valves shall have O-Ring sealed stems with one O-Ring located below the thrust collar and with two O-Rings located above the thrust collar. The thrust collar area between the two lower O-Rings shall be factory filled with a lubricant to provide permanent lubrication of the thrust collar area. Valve stems shall be of bronze rolled bar stock and shall have a forged thrust collar. The stem material shall provide 70,000 PSI tensile strength with 15% elongation and a yield strength of 30,000 PSI. Cast stems shall not be acceptable. Stems shall have acme form threads for strength and efficiency. An anti-friction thrust washer shall be provided both above and below the thrust collar for ease of operation. The resilient-seated disc wedge shall be of the resilient wedge fully supported type. Solid guide lugs shall travel within channels in the body of the valve. The disc and guide lugs shall be fully (100%) encapsulated in EPDM rubber. All appurtenances that contact potable water shall bear the National Sanitation Foundation (NSF) seal of approval stating compliance with ANSI/NSF Standard 61. Refer to Chapter 13 for a list of approved manufacturers.

VIII. FITTINGS, APPURTENANCES AND SPECIALTIES:

- A. Pipe Fittings: Pipe fittings 4" and larger shall be ductile iron conforming to ANSI/AWWA C110/A21.10 or ANSI/AWWA C153/A21.53. Ductile iron fittings shall be Class 350 for 24-inch and under, and Class 250 for larger than 24". Ductile iron shall conform to ASTM A536, minimum grade 70-50-05. Fittings shall have mechanical joint connections conforming to ANSI/AWWA C111/A21.11, except where flanged or other type ends are shown or specified. Fittings shall be coated/lined specific to use. Ductile iron fittings shall be used on pipe sized 4" or larger. All potable water appurtenances that contact potable water shall bear the National Sanitation Foundation (NSF) seal of approval stating compliance with ANSI/NSF Standard 61.
1. Pressure Pipe Fittings: Pressure pipe fittings 4" and larger shall be gray cast iron or ductile iron conforming to ANSI A21.10. **Cast iron is only to be used if ductile iron fittings are not available.** Cast iron fittings shall be Class 250 for 12" and under, and Class 150 for larger than 12". Ductile iron fittings shall be Class 350 for 24" and under, and Class 250 for larger than 24". Ductile iron shall conform to ASTM A536, minimum grade 70-50-05. Fittings shall have mechanical joints conforming to ANSI/AWWA C111/A21.11, except where flanged or other type ends are shown or specified. Fittings shall be coated interior and exterior with a minimum 12 mil of fusion bond epoxy or nylon. Fittings for 2" diameter piping shall be IPT brass with compression adapters suitable for use on ASTM D-3035 (OD-Controlled) pipe.
 2. Full circle and bell repair clamps are not approved for use in a new system.
 3. PVC Fittings: Gravity sewer fittings 4" through 10" shall be SDR 26 heavy wall gasketed fittings of a molded, one-piece construction. Gravity sewer fittings 12" and larger shall be SDR 26 fabricated or molded one-piece heavy wall. Service fittings to the main shall utilize true wye style fittings. All fittings shall comply with UNIBELL standards and shall be installed per UNIBELL and manufacturers recommendations.
- B. Flanges: Flanges for pipe and fittings shall be Class 125 except where Class 250 is specifically noted, and shall conform to ANSI/AWWA C110/A21.10. Drilling and facing of flanges shall be in accordance with ANSI B16.1.
- C. Mechanical Restraints: All joints, fittings, tees and hydrant attachments shall be mechanically restrained. Restrained joints for pipe and fittings shall be the ductile iron mechanical joint type designed for a working pressure of 350 PSI for 24" and under and 250 PSI for 30" and larger. Restrained joint pipe and fittings shall be capable of being deflected after assembly.

- D. Pipeline Marking: Detectable marking tape and tracer wire for identification, location, protection and detection of utility pipelines shall be installed over all water lines. Shop drawings and related data shall be submitted to the ENGINEER for review.
1. Marking Tape: Detectable marking tape shall consist of a metalized foil laminated between two layers of color coded inert plastic film suitable for lasting as long as the pipe and shall be resistant to alkalis, acids and other destructive agents found in the soil. The plastic film shall be imprinted with a continuous message, see below. The message shall be in permanent ink. Marking tape shall be not less than 2" wide and not less than 5.5 mil thick with a tensile strength of not less than 120 grams per 1.5 mil. Detectable marking tape shall be the type that can be located by any standard electronic pipe locator. Marker tape should be color coded as follows:
 - a) Blue Water Caution: Water line buried below
 - b) Green Sewer Gravity Caution: Sewer line buried below
 - c) Brown Sewer FM Influent Caution: Sewer line buried below
 - d) Purple Sewer FM Effluent Caution: Sewer line buried below
 2. Tracer Wire: Tracer wire shall be installed on all pressure pipelines and service lines in a continuous fashion. Tracer wire shall be extended from the main wire above the pipe to 12" above ground level at all valve boxes to facilitate attachment to tracing equipment. It shall be brought to the surface at maximum distance of 700 feet. It shall be accessible from surface at all valve and meter boxes. At locations where tracer wire surfaces between valves, a regular valve box with plain lid and collar shall be installed between a pipeline marker pair. Tracer wire shall be 12 GA single strand or up to 7 strands, copper with insulation UL rated for direct bury underground service. Splices shall be UL rated for direct bury and shall be minimized. Wire for directionally drilled bores shall be a minimum of #8 gauge.
 3. Installation: Marking tape shall be buried a minimum of 12" and a maximum of 18" below finish grade. The tape shall be placed during backfill or installed in any other manner acceptable to the AUTHORITY. Tracer wire will be installed on the top of the pipe and extended up to surface level in all valve boxes and at all service laterals. No loops will be allowed in the tracer wire. Tracer wire shall be taped to the top of pipelines at a minimum of 5 FT intervals in a uniform, continuous manner.
- E. Tapping Sleeves: Size on size pipeline taps are NOT approved for installations. Tapping sleeves shall be fabricated stainless steel with stainless steel bolts. Tapping sleeves shall have outlet flange counter bored to accept a mating tapping valve per MSS SP-60 for true alignment of tapping valve and tapping machine. Sleeve shall have a stepped stainless-steel valve flange complying with AWWA C207 Class D, ANSI 316.5, 150 LB drilling. Refer to Chapter 13 for a list of approved manufacturers.
- F. Miscellaneous Appurtenances and Specialties: All material and products under this section must comply with AWWA Section C and shall meet Made in America Criteria. Miscellaneous piping appurtenances and specialties shall be provided where shown on the plans and as required for a complete installation. All appurtenances that contact potable water shall bear the National Sanitation Foundation (NSF) seal of approval for compliance with ANSI/NSF Standard 61.
1. Mechanical Couplings and Adapters: Mechanical couplings and adapters shall be the type and size as shown on the plans, complete with rings, followers, gaskets, bolts, nuts and other items necessary for a complete installation. Couplings and adapters shall be installed in accordance with the manufacturer's instructions to provide permanently tight joints under all reasonable conditions of expansion, contraction, shifting and settlement.
 2. Gaskets: Gaskets for water pipe and fittings shall be vulcanized synthetic rubber free of porous areas, foreign material and visible defects. Gaskets shall be designed to provide a permanent watertight seal at all joints. Rubber gaskets shall conform to all applicable provisions of ASTM

- F477 and must comply with AWWA Section C. Gasket lubricant shall be non-toxic, shall not support growth of bacteria, shall not impart taste or odor to water, must be NSF certified, and shall have no deteriorating effects on gaskets.
3. Lubricant shall be suitable for the intended use and shall remain in a usable stage throughout the range of temperature in which the pipe is normally installed. Lubricant shall be delivered to the job site in unopened containers bearing the manufacturer's name and trade name or trademark. Lubricant shall not be vegetable shortening.
 4. Valve Extensions: Valve nut extensions shall have the following properties:
 - a) All extensions must be pre-approved for use in BJWSA's system.
 - b) Stem: Must not corrode faster than the stem of the valve. Hot Dipped Galvanized, anticorrosive steel alloy, or stainless steel would be acceptable.
 - c) Attachment: The extension attachment is to bolt to the valve shaft with shear resistance equal or greater to that of the valve shaft, or be physically bolted through the valve operating nut.
 - d) All valve nut extensions installations are to be preformed in the presence of the engineer or BJWSA inspector.
 5. Valve Boxes: A gray iron valve box shall be installed on each valve 2" and larger. Valve boxes shall have screw type adjustment. All valve box components shall meet material requirements of ASTM A48 Cl 35. Valve box lids shall indicate use designation ("WATER", "SEWER", FIRE or Plain) cast in the lid. Lids on fire line valves shall be lockable. Gross valve box height adjustment may be accomplished using a single piece of 6" C900 PVC pipe resting on valve box bottom and extending into the bottom of a complete valve box.
 - a) Valves in pavement
 - i) Each lid shall weight approximately 11 pounds.
 - ii) Shall have slip type adjustment
 - iii) Box top shall be a minimum of 12" in length, designed to support road load, and be adjustable to future changes in pavement overlays.
 - b) Valves not in pavement
 - i) Each valve box shall be installed with a four inch (4") thick by twenty-four (24") diameter round pre-cast concrete collar per Standard Detail Drawings. Concrete collar top shall be installed flush with final grade and valve box lid shall not extend above collar.
 - ii) Valve boxes shall have screw type adjustment.
 6. Valve and Pipeline Markers: All bends and valves except hydrant valves shall be marked with a concrete marker. Valve and pipeline markers installed in landscaped areas shall consist of a reinforced 4" square by 54" long reinforced concrete post with round 2" (min.) round cast bronze or brass survey marker imbedded in the top. Markers located in lawn areas shall not extend above final grade more than 18". Pipe lines located in easements, rural areas, or in right-of-ways shall be marked by paired 6" square by 10 feet reinforced concrete rural markers placed at right of way line. Maximum line lay distance between markers is 700 feet. A 2"(min.) round cast bronze or brass survey benchmark with anchoring lug shall be formed into the side perpendicular to rural marker face between 50 and 60" above final grade. Stamp disk with the distance in feet and direction to the feature. Valve and pipeline markers shall be cast with designation on the face as to its purpose. Water line marker need not be painted. Sewer feature markings shall have the top 4" painted with industrial enamel of the appropriate color. Refer to Standard Detail Drawings for dimensions, designations, and installation practices. An approved alternate permanent marking system may be used to reference location of bends and valves.

7. Yard Hydrants: Yard Hydrants shall have locking capability and installed with an approved vacuum breaker. Yard hydrants must have a BJWSA furnished meter installed before each hydrant. At sewer pump stations, the yard hydrant must be placed adjacent to the wet well.

IX. FIRE HYDRANTS AND POST TYPE FLUSHING HYDRANTS:

- A. General: Fire hydrants shall be provided as shown on the plans and as specified herein. Fire hydrants shall only be installed on 6" and larger pipelines capable of supporting fire flows of 1,000 GPM in addition to 1/5 maximum instantaneous demand. All pipelines 6" and larger shall be terminated with a fire hydrant for flushing purposes. 4" pipelines shall be terminated with a post type flushing hydrant with a single 2½" nozzle.

All hydrants shall be equipped with an isolation valve to allow for servicing without interruption of system flows. All potable water appurtenances that come in contact with potable water shall bear the National Sanitation Foundation (NSF) seal of approval stating compliance with ANSI/NSF Standard 61. Post type hydrants shall not be used to support or provide fire flows.

- B. Materials: Shop drawings and related data shall be submitted electronically to the ENGINEER for review.
 1. Fire Hydrants shall be the cast iron, compression type, opening against pressure, and shall conform to ANSI/AWWA C502. Hydrants shall have a minimum 6" restrained mechanical joint connections with a minimum 5-1/4" main valve. Each fire hydrant shall have two 2-1/2" hose nozzles and one 4-1/2" pumper nozzle. Post type flushing or yard hydrants shall be equipped with a single 2-1/2" nozzle. Hose connections shall have NST threads and comply with ANSI B26, but will not have chains attaching the caps to the upper barrel. Barrel lengths shall be for a 3-1/2 FT bury, except where other lengths are necessitated by the hydrant location and approved by the Authority. Threads and operating nuts shall be identical to that of existing hydrants on the system.
 2. Hydrants shall be furnished with an O-ring sealed reservoir located in the bonnet so that all threaded and bearing surfaces are automatically lubricated when the hydrant is operated. Hydrant nozzles shall be O-ring sealed, threaded in place, and retained by stainless steel set screws or clips. Hydrant shall have a bronze seat ring that threads into a bronze drain ring. All working parts shall be removable without disconnecting the hydrant.
 3. Hydrants shall be furnished with a breakable feature designed to break cleanly upon impact and consisting of a two-part breakable safety flange or breakable lugs with a breakable stem coupling.
 4. All retaining bolts and hardware shall be stainless steel.
 - Above ground may be 304, 410, or 316
 - Below ground shall be 410 or 316
 5. All bronze or brass internal working parts in contact with service water shall be a maximum of 16% in zinc content and 79% minimum in copper.
 6. EPDM rubber shall be provided on hydrant main valves.
 7. Interior coating of shoe and main valve shall be two part thermosetting or fusion bonded epoxy coated, holiday-free to a minimum thickness of 4 mil and conforming to "AWWA C550.
 8. Exterior casting shall indicate type, main valve size, design, date of manufacture, and location of manufacture.
 9. Opening direction (rotate clockwise or counterclockwise) shall be determined by the local fire department.
 10. Exterior coating shall be factory coated and based on the opening direction as determined by the local fire department.

- a) Hydrants which open clockwise or right shall be painted Safety Yellow (Sherwin-Williams—Steel Master line #9500 Code- Safety Yellow B56Y300).
- b) Developer may choose a different fire hydrant color if developer maintains fire hydrant, and color is approved by Authority.

11. Post hydrants painted white and open counterclockwise.

12. All fire hydrant installations on paved roadways shall be provided with industry standard “blue hydrant reflector” installed in the center of the closest travel lane. Reflectors shall be SCDOT approved.

C. Installation: Hydrants, Service Connections and Pipeline

- 1. Fire hydrants shall, in general, be set well back of the curb or ditch line at the property line, with the break ring approximately 2” above finished grade or pavement elevation.
- 2. Fire hydrants shall not be lifted in a manner as to damage the factory-applied coatings. Fire hydrants damaged during installation shall be rejected.
- 3. Each hydrant shall be connected to an individual hydrant gate valve attached to a hydrant tee on the main line. Hydrants shall be restrained, as specified in elsewhere herein. Mechanical joint restraints shall be used on all fittings. Restraint rods or thrust blocking shall not be used unless approved by the AUTHORITY.
- 4. Pipeline from hydrant tee and gate valve assembly to fire hydrant shall be a minimum of 6-inch diameter and constructed of ductile iron. Pipeline from gate valve to yard hydrant shall be a maximum of 3” diameter
- 5. A minimum of 2 cubic feet of crushed stone shall be placed under and around the bottom of each hydrant to facilitate drainage. Crushed stone for the hydrant foundation shall be #57 stone.
- 6. Hydrant drains shall not be connected to or installed within 10 feet of sanitary sewer systems.

X. POTABLE WATER SERVICE CONNECTIONS:

- A. General: Water service connections shall include tapping the main line and providing all saddles, corporation stops, fittings, piping, curb stops, meters, meter boxes and other materials required for proper installation. Maximum length of 1” service lines shall be 100 FT.
- B. Material: All material and products must comply with AWWA Section C and shall meet Made in America Criteria. Shop drawings, catalog cuts and related data for service pipe, and appurtenances shall be submitted electronically to the ENGINEER for review.
 - 1. Service Saddles: Service saddles shall comply with all applicable parts of ANSI/AWWA C800. Service saddles shall have fusion bond epoxy or nylon coated ductile iron body meeting the requirements of ASTM A395 with 304 stainless steel straps. Service saddles on mains greater than 8” and on 2” services shall have a minimum of 4 bolts. Seal shall consist of a nitrile o-ring gasket securely affixed to the body. 2” service outlets shall be tapped with AWWA iron pipe thread (FIPT). 1” outlets shall be tapped with CC threads.
 - 2. Taps: Tap diameter shall be within 1/8 inch of exiting pipe diameter.
 - 3. Service Termination Fitting: Service termination fitting shall allow for flushing and withstand pressure test.
 - 4. Service Pipe: Service pipe shall be flexible high density polyethylene PE-3408. 1” service tubing shall be iron pipe size (IPS – ID controlled) SIDR rated conforming to ASTM D2239. 2” service tubing shall be iron pipe size (IPS – OD Controlled) conforming to ASTM D-3035-SDR rated. Both size pipes shall be designated for 200 PSI. **Well pipe shall not be used.** Service pipe shall bear the manufacturer’s name, pipe size, ASTM specification, NSF approval, working pressure

and production code; letters shall be at least 3/16-inch high and repeated on the pipe at 24" intervals. Pipe shall be coiled and suitably packaged for protection during shipment, handling, and storage. Packages shall be labeled with the manufacturer's name, NSF seal, pipe size, coil length and part number. Service pipe to 1" and 2" shall be blue in color or designated with a longitudinal blue strip.

5. Meter Boxes: Meter Boxes shall be at the discretion of the Authority.

- C. Installation: Service connections shall be installed at locations as designated by the AUTHORITY. Service lines shall have a minimum of 36" cover, which shall reduce to 12" at point of connection to the meter 1-FT outside the property line. A 1/2" x 3 FT long steel rod shall be driven into the ground at each service with 1 foot protruding out the ground and encased with 24" of blue PVC sleeve. The locations and measurements of services from lot corners must appear on record drawings. Where curb and gutter storm drainage is installed in new subdivisions, each service location shall be designated by a curb marking (consisting of a minimum 3" tall "W") located perpendicular to the service location. Curb marking shall be embossed in the curb at time of installation of the curbing.
1. Taps: Appropriate size taps shall be made on the distribution line. A tapping saddle shall be used on all plastic pipe. A corporation stop, with the proper bend and pipe adapter, shall be installed in the tap.
 2. Service Pipe: Each service shall have a separate service connection and shall run perpendicular to the roadway to its termination. Service pipe shall be cut to the required length and properly laid in the service ditch. Adequate provisions shall be made to protect against expansion and contraction. Locator wire shall be wrapped around service pipe and terminate above the ground being wrapped around locator rod. Services shall terminate in a HDPE by IPT adapter and valve.
 - a) 1" service pipe shall be connected to the service termination fitting adapter.
 - b) 2" service pipe shall be connected via a PE x male IPS grip joint or compression adapter to a 2" iron body gate valve tap off the distribution main.
 3. Meter Box with integral curb stop and ball valve (PVC Schedule 40) shall be connected to each service pipe. Meter box shall be properly installed by a utility contractor approved by the Authority and adjusted so that the top is flush with final grade. Meter and backflow assembly shall be installed by the AUTHORITY. A brass nipple shall be used between the Meter box and the ball valve. A turf box shall be properly installed over ball valve so that top is level with the final grade.

XI. WATER PIPELINE INSTALLATION:

Piping and appurtenances shall be installed in accordance with applicable AWWA Codes, best practices, manufacturer's instructions, and ENGINEER's direction. Where the pipeline crosses under or is installed on highway or railroad right-of-way, the work shall be done in accordance with requirements specified in other sections.

- A. Locations: Piping and appurtenances shall be installed at the locations shown on the plans and to the position, alignment, and grade shown. Prior to beginning work at any location, the CONTRACTOR shall consult with the AUTHORITY and ENGINEER to determine that all rights-of-way, permits, and other legalities are in order. CONTRACTOR shall familiarize himself with all conditions and/or limitations of such rights-of-way or permits and shall fully comply with all requirements. All work shall be confined to rights-of-way or permit limits and any encroachment beyond such limits shall be the CONTRACTOR's liability.
- B. Installation of Pipe and Appurtenances: Earthwork along pipelines shall be as specified elsewhere herein. Trenches for water lines shall follow the contour of the ground so as to provide a minimum cover of 36" and a maximum cover of 60", unless otherwise noted. Pipelines installed under berms,

hardscaped areas, decorative signs, or fences shall be installed in casing as specified elsewhere herein for a distance of 5' beyond the area in question. Where allowed by the AUTHORITY, pipe and appurtenances shall be hauled to the work site and distributed neatly along the trench prior to laying. Pipe shall be carefully handled to prevent damage by using mechanical hoists or other approved methods. All damaged pipe and appurtenances shall be rejected and removed from the work site. Installation shall proceed as follows:

1. Pipe and appurtenances shall be kept clean and open ends securely plugged when pipe laying is not in progress. The inside of pipe, bells and spigots shall be thoroughly inspected and cleaned prior to lowering into the ditch. Care shall be exercised after the pipe is in place to prevent dirt or other extraneous material from getting into the pipe, bells, and spigots.
2. Spigots shall be seated in bells per manufacturer's instructions and the pipe shall be uniformly bedded on the bottom of the trench for its entire length, with bells laying in previously dug bell holes sufficiently large to allow for proper bedding and jointing. Pipe shall be cut where necessary. After jointing, a reasonable amount of deflection may be made in the joint. Such deflection shall not exceed 50% of the maximum allowable amount recommended by the manufacturer of the pipe.
5. Fittings, valves, fire hydrants and other appurtenances shall be installed where shown on the plans or as directed by the ENGINEER. Fittings and hydrants shall be well restrained as specified elsewhere herein.
6. Flushing hydrants/Yard hydrants shall be provided where shown on the plans or directed by the ENGINEER and shall be carefully installed in accordance with applicable portions of these specifications. All pipelines shall be provided with a readily accessible means of flushing at a minimum velocity of 2.5 FPS while maintaining a minimum pressure of 20 PSI on lines with fire flow and 25 PSI on lines without fire flow. Pipelines 6" and larger shall be flushed via a standard fire hydrant at its termination. Pipelines less than 6" shall be provided with a post type flushing hydrant.
7. Connections to existing facilities shall be made where shown on the plans or where directed by the ENGINEER. All connections to existing system shall be performed in the presence of the AUTHORITY Inspector unless prior written approval is granted. The CONTRACTOR must make arrangements with THE AUTHORITY to install a jumper and meter at one end of each connection to existing system. Under no circumstances shall the interconnecting valve be opened. Only AUTHORITY personnel are authorized to open valves between existing systems and non-approved systems. **Violation of this policy will result in fines or criminal prosecution or both.** Connections shall be made with tapping sleeves and valves, except where other type connections are specifically shown.
8. Waterlines shall be installed in accordance with "State Primary Drinking Water Regulations" Section R.61-58.4(D)(12). Where the new water line crosses under or over a sewer forcemain, sanitary sewer, or storm sewer, the waterline shall be a full joint of ductile iron pipe centered on the sewer. Whenever possible, the water main shall be located above the sewer line. Water mains crossing sewers shall be laid to provide a minimum of 18 inches between the outside of the water main and the outside of the sewer. During replacement of sewer pipe, all work shall be performed in a manner to cause the least interference with the operation of existing sewer lines. CONTRACTOR shall take measures to ensure that at no time will raw sewage be discharged on the premises.
9. Water mains shall be laid:
 - a) At least 10 FT horizontally from any force main, sanitary sewer or sewer manhole, or
 - b) At least 18 inches above and 3' horizontally and in a separate trench from any, sanitary sewer, or sewer manhole.

- c) At least 3' horizontally from Storm Drain structures
 - d) At least 5' horizontally from Gas Mains and underground electric utilities.
 - e) The distance shall be measured edge-to-edge.
10. Potable water lines shall not be laid within 25 FT of any wastewater tile field or spray field.
 11. Water lines shall not pass through storm drain structures unless approved by the Authority.
 12. High point in the water mains shall be noted on the plans and air release valves shall be installed at these points. If obstructions are encountered which would require a change in the grade of the work, the AUTHORITY shall be notified immediately.
 13. here angular deflections from a straight line or grade are made necessary by vertical or horizontal curves of offsets in the pipe, the deflection shall not exceed 50% of the manufacturer's recommendation.
 14. Pipes shall be laid with the bell facing the direction of laying. For lines of appreciable grade, the joints shall be facing upgrade.
 15. Mechanical thrust restraints shall be applied on all pressure pipelines 3" in diameter or larger at all bends, tees, valves, hydrants, and plugs. Concrete blocking shall only be used if mechanical thrust restraints are not feasible. Use of concrete thrust blocking will require prior approval by the AUTHORITY.
 17. Backfilling of trenches shall be as specified elsewhere herein.
 19. Pipeline marking shall be as specified elsewhere herein.
- C. Inspection and Acceptance: All work shall be subject to inspection and approval prior to final acceptance and payment.
1. Pressure and Leakage Tests shall be as required by SC-DHEC.
 2. Disinfection of potable water lines shall be as per minimum industry standards.
 3. Cleanup and site restoration shall be as specified elsewhere herein.
 4. Closeout documentation, including engineer's certification, test results, as-built record drawings, easement and conveyance documents, shall be submitted to the appropriate agencies.

XII. PIPELINE TESTING AND DISINFECTION PROCEDURES:

The CONTRACTOR shall test all pressure piping as specified herein and as directed by the ENGINEER. Testing shall be conducted so as to minimize interference with the progress of the work.

- A. Hydrostatic Testing of Pipelines: Each pressure pipeline or valved section thereof shall be subjected to hydrostatic testing in accordance with all applicable provisions of AWWA C600 for ductile iron pipe and AWWA C605 for PVC pipe, latest edition.
1. Pressure Test: Unless otherwise specified, pressure lines shall be tested to 1.5 times the working pressure but not less than 150 PSI or greater than pressure rating of pipe based on the lowest point of the section under pressure. Before applying the test pressure, all air, dirt, and foreign matter shall be expelled completely from the line. The test shall be maintained at full pressure for two hours. All damaged or defective pipe, fittings, joints, valves, hydrants and appurtenances discovered after the pressure test shall be repaired or replaced, and the pressure test repeated until satisfactory to the ENGINEER. Pressure gauges on test apparatus shall be a minimum of 4" diameter with a minimum of 1-PSI graduations.
 - a) No leakage will be allowed. Pipeline must maintain test pressure for 2 hours.

- b) If during the test a pressure drop occurs, the CONTRACTOR shall, at his own expense, locate, and repair all defects until there is no leakage or drop in pressure. All visible leaks shall be repaired regardless of the amount of leakage.
 - c) Water for testing will be furnished by the CONTRACTOR, who shall furnish the test pump, measuring devices and all necessary pipe or hose extensions or transportation to the point of use, and shall exercise care in the use of water.
 - d) All valves within the test section shall be exercised during the test period.
- B. Disinfection Procedures: Before placing in service, each potable water line and each tank or other structure utilized for potable water storage shall be disinfected by the CONTRACTOR in accordance with AWWA C651 and as specified herein and as directed by the ENGINEER. All chemicals or products added to the potable water supply shall be third party certified as meeting the specification of ANSI/NSF Standard 60.
- 1. Pipeline Disinfection: All pressure and leakage tests shall be completed prior to disinfection. When flushing, the CONTRACTOR shall make arrangement with the AUTHORITY to meter the water used. The CONTRACTOR may be invoiced the standing wholesale rate for the amount used. The CONTRACTOR shall furnish all chemicals required for disinfection, and all necessary pipe or hose extensions or transportation to the point of use and shall exercise care in the use of water. Disposal of water after disinfection shall be by methods acceptable to the ENGINEER.
 - 2. Prior to disinfection, water lines shall be thoroughly flushed at a minimum velocity of 2.5 ft/sec to remove dirt, sediment, and other foreign matter. At the CONTRACTOR's option, water lines may be disinfected in sections isolated by means of valves or other approved methods.
 - 3. All new potable water lines shall be thoroughly disinfected by means of sodium hypochlorite or chlorine solutions. Water from the existing distribution system shall be controlled so as to flow slowly into the newly laid pipeline during the application of chlorine. The chlorine solution shall be added and dispersed in concentrations sufficient to produce a chlorine residual of at least 50 mg/l (PPM) throughout the system. The chlorine solution shall remain in the system for a period of 24 hours. At the end of the 24 hour period, the treated water in the system shall have a chlorine residual of at least 10 mg/l (PPM), or the disinfection process shall be repeated until results are satisfactory. After disinfection, the system shall be flushed with fresh water from an approved source until the chlorine solution is dispelled.
 - 4. After disinfection is completed and before the water line is placed in service, DHEC certified lab personnel shall collect bacteriological samples from locations satisfactory to and plumbed in a manner satisfactory to DHEC. At least two (2) samples shall be taken. The total number of samples depends on the amount and layout of the pipe. All dead-end lines shall be tested and long pipeline segments shall be sampled at a maximum distance of 1200 LF along its length to obtain a representative analysis of its water quality. Chlorine residuals must be measured and recorded at the time the sample is taken and results furnished to the ENGINEER for submission to SCDHEC. The contractor is responsible to flush lines until chlorine is present before sample is taken. All cost associated with sample collection and testing shall be paid by the CONTRACTOR.
 - a) Bacteriological Sampling:
 - i) Samples must be collected at least twenty-four (24) hours apart and must show the water line to be absent of total coliform bacteria.
 - ii) The chlorine residual must also be measured and reported. If the membrane filter method of analysis is used for the coliform analysis, non-coliform growth must also be reported. If the non-coliform growth is greater than eighty (80) colonies per one hundred (100) milliliters, the sample result is invalid and must be repeated.

5. Disinfecting Tanks and Other Structures: Painting of tanks and structures shall be completed. Prior to disinfection, tanks and structures shall be thoroughly flushed or cleaned to remove dirt, sediment and other foreign matter.
 - a) Each tank shall be disinfected using either one of the following methods:
 - i) Contact with a chlorine solution of concentration not less than 50 mg/l (or PPM) for a minimum contact period of 24 hours.
 - ii) A thorough wetting of the surface to be disinfected by means of brush or spray application of a chlorine solution of concentration not less than 200 mg/l (or PPM) for a minimum contact time of 2 hours.
 - b) After disinfection is completed and before the tank is placed into service, at least two satisfactory bacteriological samples shall be collected 24 hours apart from the tank and tested by BJWSA or a state approved private laboratory. Samples shall be collected and tested at the CONTRACTOR's expense.
6. Bacteriological Laboratory Test: Only personnel from a SCDHEC certified lab shall be used to collect bacteriological samples. The lab collecting the sample shall perform the required SCDHEC testing and reporting and shall be SCDHEC certified.
7. Removal of Temporary Connections: The Contractor is responsible for removal of all construction jumpers and sampling points. BJWSA inspector is to witness the removal and plugging of temporary connection points.
 - a) Jumper removal includes the installation of a brass plug/cap on the tapping valve to the existing system and the installation of brass plug into the saddle on the new line.
 - b) Sampling points that are not service points shall be removed. Install brass plug in the tapping saddle.