

**WALTON COUNTY
WATER DEPARTMENT**

**WATER AND WASTEWATER
POLICIES AND STANDARDS**

August 2017



**WALTON COUNTY WATER DEPARTMENT
WATER AND WASTEWATER POLICIES AND STANDARDS**

TABLE OF CONTENTS

<u>PART</u>	<u>DESCRIPTION</u>
I.	STANDARD POLICIES AND PROCEDURES
II.	CONSTRUCTION SPECIFICATIONS
III.	WATER DISTRIBUTION SYSTEM STANDARD DETAILS
IV.	WASTEWATER SYSTEM STANDARD DETAILS
V.	APPENDICES

(BLANK SHEET FOR PART I TABBED DIVIDER)

PART I. STANDARD POLICIES AND PROCEDURES

CONTENTS

<u>SECTION</u>	<u>DESCRIPTION</u>	<u>PAGE NO.</u>
1	General Policies of the Walton County Water Department (WCWD)	3
	A. Purpose	3
	B. WCWD to Operate	3
	C. Objective of WCWD Standards	3
2	Definitions	3
3	Preliminary Commitment of Water and/or Wastewater Service	4
	A. Purpose	4
	B. Application Requirements	5
	C. Time Limit for Allocation Approval	8
4	Design Approvals	8
	A. Purpose	8
	B. Application for Design Approval	9
5	Construction and Inspection Standards	9
	A. Purpose	10
	B. Land Disturbance and Stormwater Control	10
	C. Preconstruction Conference	10
	D. Inspection of Work	10
	E. Water Main Testing Standards	10
	F. Wastewater Facility Testing Standards	11
	G. Maintenance of Records	11
6	Final Acceptance	12
	A. As-Built Drawings	12
	B. Easements and Final Plat	12
	C. Performance Bond	12
	D. Certification	13
	E. Payments	13
	F. 12-Month Inspection	13

CONTENTS (cont.)

<u>SECTION</u>	<u>DESCRIPTION</u>	<u>PAGE NO.</u>
7	Financial Considerations	13
	A. Water System	13
	B. Wastewater System	13
	C. Treatment Capacity Upgrade	14
	D. Cost Sharing Agreement	14
	E. Non-EPD Permit Costs	14
	F. Water Service Application Fee	14
	G. Wastewater Service Application Fee	14
	H. Water System Connection Fees	15
	I. Sanitary Sewer System Connection Fees	15
	J. Design Review and Construction Inspection Fees	15
	K. Inspection Penalties	15
8	General Design Standards - Water Distribution System	15
	A. Residential Developments	15
	B. Non-Residential Developments	16
	C. County Roads	16
9	General Design Standards - Wastewater Collection/Transmission System	16
	A. All Developments	16
10	General Design Standards - Wastewater Treatment	17
11	Water Line Installation within Projects	17
	A. General Requirements	17
	B. Looping and Easements	17
	C. Accel/Decel Lane Relocation	17
	D. Construction Standards	18
	E. Required Coordination with Other Utilities	19
12	Wastewater Facility Installation within Projects	19
	A. General Requirements	19
	B. Compliance with Wastewater Master Plan	19
	C. Wastewater Collection, Transmission and Treatment Facilities	19
	D. Accel/Decel Lane Relocation	19
	E. Construction Standards	19
	F. Required Coordination with Other Utilities	21

1. General Policies of the WCWD

- A. Purpose: The Walton County Board of Commissioners (BOC) dba the Walton County Water Department (WCWD) is responsible for the safe and efficient operation of its water and wastewater systems within its service territory. To ensure this objective is achieved for all new developments Walton County has adopted these rules. All developments initially submitted after this date shall fully comply with the provisions of this version of the policies of the WCWD.
- B. WCWD to Operate: The BOC is chartered by the Georgia General Assembly as a political subdivision of the State.
- C. Objective of WCWD Standards: In order to insure consistent design, construction and installation standards and in order to operate, maintain and construct its water distribution and wastewater collection, transmission and treatment systems, the WCWD establishes the rules, regulations and standards herein contained.

2. Definitions

The following definitions are used within these Standard Policies:

- a. Agricultural Use – shall refer to water purchased from the WCWD for the purpose of agricultural production.
- b. As-built drawings – shall mean the drawings reflecting the final constructed conditions.
- c. Backflow prevention – shall mean the prevention of flow of any water, foreign liquids, gases, or other substances back into a potable water system caused by either back pressure or back siphonage.
- d. CAD – Computer aided drafting plan for a development or project that is properly geo-referenced.
- e. Commercial Use – shall refer to water associated with the selling of goods and services (e.g. retail, office, restaurant, warehouse, medical, etc.).
- f. County – shall mean Walton County, Georgia acting through the elected County Commission.
- g. Design Development Report (DDR) – shall mean the EPD required report for submission of wastewater treatment designs as modified by WCWD to Georgia EPD.
- h. Developer – shall mean the individual or firm seeking approval from the WCWD for new or expanded development.
- i. Development – A land development project involving the construction of streets, utilities, buildings or other improvements required for the habitation or use of property such as a residential neighborhood, an apartment complex, store, shopping center, office building, manufacturing facility, or similar facilities.
- j. Director – shall mean that person filling the position of Director of the WCWD.

- k. DOT – shall mean the Georgia Department of Transportation.
- l. Easement – A grant by a property owner for the use of real property for the specified purpose of constructing and maintaining utilities; including but not limited to water mains and sanitary sewer lines.
- m. EPD – shall mean the Georgia Environmental Protection Division of the Department of Natural Resources.
- n. Fire Line Connection – shall mean a connection to the water lines of the WCWD for the sole purpose of providing fire protection to private property.
- o. Industrial Use – shall refer to water associated with the manufacturing or other production of goods.
- p. Industrial Wastewater – shall mean those wastewaters that exceed domestic strength wastewaters as defined in the WCWD sewer use ordinance.
- q. Land Application System (LAS) – shall mean an underground application site for the final disposal of treated wastewater. System shall have flows larger than 10,000 gallons per day and less than 150,000 gallons per day.
- r. Monitoring Wells – Shall mean any well or other excavation extended to ground water or within 15 feet of groundwater for the purpose of assessing environmental conditions or evaluating hydrologic conditions or parameters.
- s. Notice of Intent (NOI) – A form used by potential permittee to notify EPD that they intend to seek coverage under a general permit to discharge wastewater.
- t. Perennial Stream – shall mean those streams designated on a USGS Quad sheet having flow throughout the year (Solid blue lines).
- u. Residential Use, Single family – shall mean a structure intended for the living use of a single family.
- v. Residential Use, Multi-family – shall mean structures built for the residential use of more than one family (i.e. duplex or larger).
- w. Sampling Station – shall mean a facility provided for the use of the WCWD to secure water samples for water quality testing.
- x. Wastewater Connection – shall mean any private service connection to any public wastewater collection system pipeline maintained by the WCWD.
- y. Water Service Connection – shall mean any private service connection to a public water main maintained by the WCWD.
- z. WCWD – shall mean the Walton County Water Department acting through the Walton County Board of Commissioners, and established through an intergovernmental agreement between the Walton BOC and the Walton County Water and Sewerage Authority (WCWSA).

3. Preliminary Commitment of Water and/or Wastewater Service

- A. Purpose: The WCWD has received delegation authority from the Georgia EPD for approval of any water main extensions or upgrades for the supply for potable water and fire protection, as well as wastewater collection system and treatment capacity for new developments being served by its water distribution system and wastewater collection system. Allocation of water and/or wastewater capacity must be obtained by all new residential, commercial and industrial developments. In order to maintain this delegated review authority, the WCWD requires the following application procedure to be followed.
- B. Application Requirements:
1. Forms: The Developer must complete the appropriate section and submit the application form shown on Appendix "A" of these Policies to the WCWD Office during normal working hours. A preliminary plat at legible scale showing the proposed development must be attached to the application. The WCWD will not review any proposed projects without submittal of a completed application form and preliminary plat. Both a digital version and hard copy version of the forms and plat shall be submitted by the Developer to the WCWD.
 2. Drawings: The above mentioned form must be accompanied by two (2) 24"x36" copies of the master plan of the entire proposed development. If the development is to be completed in phases, each phase must be submitted for design approval separately. If the master plan is modified at any time during the submission of the various phases an updated master plan must be submitted and clearly marked as being a revised master development plan. A digital CAD version, along with the hard copies, of the plans mentioned above shall be submitted to the WCWD.
 3. Certification of Non-Contamination: In accordance with Georgia EPD regulations, the Developer is responsible for providing a letter to the WCWD from the Walton County Planning and Zoning Office certifying that the project is not located on or near an existing or abandoned landfill. This certification MUST be submitted before the WCWD will review and consider the design of any proposed water main installations.
 4. Preliminary Wastewater Service Allocation: The WCWD will consider, on a case by case basis, the commitment of wastewater service to developments. The WCWD requires the developer to design and construct the entire collection, transmission, pre-treatment and treatment system and, if applicable, land application system. The WCWD will require the developer to prepare all reports and application materials necessary for obtaining all required permits.
 - a. Compliance with Master Plan: In order to provide wastewater service, the Georgia EPD requires the WCWD to develop a master wastewater service plan for the County. To commit wastewater service to a particular development, the WCWD must insure, on a case by case basis, that the development is in compliance with the master plan.

- b. Draft Design Development Report (DDR): A DDR for wastewater treatment systems must be submitted by the developer to the WCWD for approval prior to submission to EPD. The DDR must be compiled by a registered professional engineer, licensed in the State of Georgia.
- c. Environmental Information Document (EID): An EID must be submitted by any developer wishing to dedicate a wastewater treatment system to the WCWD. The EID must be compiled by a registered professional engineer, licensed in the State of Georgia.
- d. NOI: Developer shall prepare and submit Notice of Intent to WCWD and EPD in accordance with the General Land Application System Permit For Large Community Systems (#GAG278000).
- e. Public Hearing: A public hearing is required for every treatment system, prior to permit application and submission of DDR and EID to EPD. The hearing, to be conducted by WCWD, must be held during the initial planning process. The purpose of the meeting is to present the proposed project to the public; its purpose, its design and its environmental effects.
- f. Pre-Treatment Wastewater Standards: Treatment standards shall be as set forth by EPD and stated in the WCWD's Water and Wastewater Construction Specifications. The EPD suggested effluent standards for the pre-treated wastewater are listed below, but are subject to review and final approval of EPD on an individual project basis.
 Total Suspended Solids (TSS): 90 mg/L (prior to drip irrigation filters)
 Biochemical Oxygen Demand (BOD₅)
 Monthly Average: 50 mg/L
 Weekly Maximum: 65 mg/L
 Total Nitrogen: 7 mg/L
- g. Secondary Wastewater Treatment: Secondary treatment standards shall be as set forth by EPD and stated in the WCWD's Water and Wastewater Construction Specifications. In general, the method of treatment shall be subsurface land application through appropriately sized drip irrigation fields. The land application system shall be designed for "no-contact" with humans. WCWD may consider other disposal alternates on a case by case basis.
- h. Wastewater Collection and Transmission: Collection and transmission facilities will be in accordance with the WCWD Wastewater Master Plan and Water and Wastewater Construction Specifications of the WCWD.
- i. Delegation – The WCWD has received delegation for approval of collection system design (up to 36" diameter) and transmission pumping system design (up to 700gpm).
- j. Wastewater Treatment Systems: The design for treatment systems shall be prepared by the developer and submitted WCWD for submission to EPD for approval which must be received prior to any construction on

treatment facilities that must be transferred to WCWD upon completion and start-up.

- k. Ownership: The WCWD will own and operate all approved wastewater facilities once construction is complete and the approved by WCWD. Permits to discharge or land apply wastewater obtained by the developer from EPD will be issued to and owned by WCWD.
5. Wastewater Easements: In certain cases, the WCWD shall require easements to be dedicated along natural drainage ways for future installation of gravity sewer lines and/or other utility facilities. This may be required in accordance with the county wastewater master plan whether or not the particular development is seeking wastewater service at the time of development.
 6. Master Plan: The developer must submit to the WCWD at least two (2) 24" x 36" hard copies of drawings and a digital CAD version of the preliminary master plan for the Development (as submitted to the Walton County Planning and Zoning Office) showing at a minimum the following information:
 - a. preliminary lot configuration
 - b. proposed public rights-of-way or common use private drives
 - c. public or common use areas
 - d. all property lines
 - e. flood prone areas
 - f. perennial streams
 - g. environmentally sensitive areas including greenspace
 - h. on site wastewater treatment areas (if applicable)
 - i. buffer zones required by state or local codes
 - j. closed and/or abandoned landfills or other disposal areas
 - k. historic sites
 - l. cemeteries
 - m. topographic mapping
 - n. soil types
 - o. sidewalk location
 - p. gravity sewer lines and easements
 - q. all utility line and utility easement locations

7. Suitability of Water Service to Meet the Request: The WCWD will evaluate the site for water service as well as the potential need for looping easements and lines by conducting flow and pressure tests, and/or computer modeling in the area of the proposed development.
 8. Fire Line: Any development (i.e. residential, commercial, industrial) desiring close proximity fire hydrants or a “fire line” dedicated specifically for the purpose of fire protection shall complete the form shown in Appendix A. Each request will be considered on a case by case basis, giving adequate consideration to existing system conditions and capabilities. The Director may either accept or reject the application. At a minimum, the following information should be provided:
 - a. Name and type of development.
 - b. Flow, static pressure, residual pressure and duration requirements.
 - c. Any calculations or data used by developer’s engineer for design of fire line or sprinkler system.
 9. Action by WCWD: The WCWD will take any action it deems appropriate such as: commit to serve a specified number of lots or facilities with water and/or wastewater capacity modify the request, or reject the request entirely.
 10. Financial Action by WCWD: The Department and the BOC will also determine the WCWD's financial participation in offsite waterline and/or wastewater facility construction, if appropriate (see Section 7 “Financial Considerations”).
- C. Time Limit for Allocation Approval: The approval for the water and/or wastewater allocation shall expire 365 days after approval by the WCWD unless the installation of the water and/or wastewater system additions and/or improvements has been initiated and at least 25% of the total length of approved water line is installed on the 365th day following the date of approval. Uncompleted portions of phased projects shall lose the water or wastewater allocation for those phases.

4. Design Approvals

- A. Purpose: The WCWD has received EPD delegated review authority for approving water line design drawings for new developments connecting to the WCWD water system. The WCWD, in cooperation with EPD has also received delegated review authority for approving the design of wastewater collection and transmission pumping facility additions to the WCWD sewer system. The intention of this review is to insure that the designs are in full compliance with the WCWD’s standards and that the plan is consistent with the overall master plans of the WCWD. Accordingly, the WCWD through its Engineer will review and, as appropriate, approve submittals by developers for additions to the WCWD's water and/or wastewater systems.
- B. Application for Design Approval

1. Submission requirements: If the WCWD commits to supply water and/or wastewater service to the proposed Development, the Developer must submit to the WCWD a minimum of two (2) hard copies and a digital CAD version of the plans designed in accordance with the Georgia Environmental Protection Division's (EPD) approved Water and Wastewater Construction Specifications for the Walton County Water Department. The design must be submitted to the Director of the WCWD at its Office. Review, comment and/or approval of the design will be completed by the WCWD's Consulting Engineer who has the authority via the WCWD's delegation by EPD to make final approval of the design. Water distribution system plans must be prepared and submitted by a Professional Engineer licensed to practice in the State of Georgia as required by current Georgia law and rule. Design for wastewater collection, pre-treatment, treatment or disposal must be prepared by a Professional Engineer registered licensed in Georgia.

2. Submission Format Standards: The following standards shall be met relative to the submission of the design:
 - a. Size: drawings shall be 24"x36" or 30" x 42".
 - b. Scale: drawing scale shall be no smaller than 1"=100' horizontal and 1"=10' vertical.
 - c. Type: drawings shall be paper.
 - d. Use Standard Symbology shown in Appendix B.
 - e. Include stations on all water and sewer mains, wet wells, sanitary sewer manholes, air release valves, valve vaults, isolation valves, by-pass valves, fire hydrants, and fittings.
 - f. Include angles between manholes in degrees, minutes and seconds.

3. Permit Requirements: The developer shall be fully responsible for submitting and securing all permits required for construction approval from other agencies of the State and County including but not limited to Walton County Planning and Development, Land Disturbance Permitting, Stream Buffer Variances, 404 permitting, etc. Wastewater treatment and disposal systems design approval must be obtained from Georgia EPD after approval of the DDR and EID from WCWD.

5. Construction and Inspection Standards:

- A. Purpose: The WCWD requires inspection and approval of any and all infrastructure which will be transferred to the County for ownership and operation at the completion of all construction activities including, but not limited to, water mains and appurtenances, gravity collection mains, force mains, manholes and wastewater transmission and treatment systems. In order to accomplish this purpose the WCWD requires a pre-construction conference, the ability to inspect the work during construction as well as observation of the contractor's testing of the completed facilities, and an accurate record

of all construction activities in accord with the following policies established by WCWD and the BOC.

- B. Land Disturbance and Stormwater Control: Construction practices shall be in accordance with all current applicable state laws and requirements. Requirements of National Pollutant Discharge Elimination System (NPDES) shall be followed. In general, design engineer shall be responsible for development of erosion and sedimentation control plan and fulfillment of NPDES permit requirements including but not limited to: filing of notice of intent to discharge (NOI), comprehensive monitoring plan, monitoring during construction, termination NOI, permitting fees, etc. These policies in no way relieve developer or design engineer of these duties as required by EPD and/or the local issuing authorities.
- C. Pre-Construction Conference: A representative of the Developer, the licensed utility contractor, and WCWD shall attend a pre-construction conference at the WCWD office at least 7 working days prior to the start of any construction. The purpose of this conference will be to clearly define roles and responsibilities for the correct execution of the proposed water distribution, wastewater collection, transmission and treatment facilities installation.
- D. Inspection of Work: All water distribution, wastewater collection and wastewater treatment facilities, installations shall be inspected during construction. WCWD personnel and/or its engineer shall inspect and verify that all work was installed in accordance with the most recent Water and Wastewater Construction Specifications of the WCWD and the design provided by the developer, or as field conditions require. The WCWD shall receive a set of hard copy and digital CAD version of the as-built drawings, as prepared by the design engineer, at the completion of all work. Payment for the inspection services provided by the WCWD will be billed by the WCWD to the Developer within 7 days of final inspection.
- E. Water Main Testing Standards:
 - 1. Pressure Test: The contractor shall flush lines and perform pressure tests in accordance with the Water and Wastewater Construction Specifications. The construction inspector shall be present during pressure tests and keep detailed records for the WCWD. Notice to the WCWD must be given 48 hours prior to the pressure test.
 - 2. Bacteriological Testing: The contractor shall disinfect, flush lines, and prepare the system for bacteriological testing in accordance with the Water and Wastewater Construction Specifications. It is the sole responsibility of the WCWD to secure the samples and have them tested in an EPD approved water laboratory. The developer will be notified within 4 working days if the sample passed. Successful bacteriological testing must be completed prior to acceptance of the lines by the WCWD.

F. Wastewater Facility Testing Standards:

1. Low Pressure Air Test: The contractor shall flush and clean all gravity lines and remove all debris prior to performing low pressure air test. The construction inspector shall be present during pressure tests and keep detailed records for the WCWD. Notice to the WCWD must be given 48 hours prior to the pressure test. Successful low pressure air testing must be completed prior to acceptance of the lines by the WCWD.
2. Deflection Test: The contractor shall perform a deflection test for all pipe within 30 days after installation, and in accordance with the WCWD's latest construction specifications. In general, the contractor shall use an appropriately sized mandrel with the maximum allowable deflection being 5%. A representative of the Owner and/or Engineer shall be present for testing. Testing shall be at no charge to the WCWD. Successful deflection testing must be completed prior to acceptance of the lines by the WCWD.
3. Pressure Test: All force mains shall be subject to pressure testing in accordance with the Water and Wastewater Construction Specifications with representative of the contractor, Owner and/or Engineer prior to acceptance by the WCWD. Testing shall be no expense to the WCWD. Successful pressure testing must be completed prior to acceptance of the lines by the WCWD.
4. Televised Inspection (TV Inspection): The contractor shall perform a televised inspection for all pipe gravity sewers within 30 days after installation, and in accordance with the WCWD's latest construction specifications. A representative of the Owner and/or Engineer shall be present for testing. The tape will be reviewed to insure joint construction, lateral connection and pipe deflection are all within tolerable limits. If any items require correction, the contractor shall complete the corrections and re-televiser the portion of pipe repaired. Testing shall be at no charge to the WCWD. Acceptable TV inspection must be completed prior to acceptance of the lines by the WCWD. A complete tape of the installed sewer line shall be provided to the WCWD by the contractor or developer.
5. Pump Stations, Wastewater Treatment Units: All pump stations shall undergo an official "start-up" with representatives of the manufacturers of all equipment installed, contractor, Owner and/or Engineer prior to acceptance by the WCWD. Start-up shall be no expense to the WCWD. Likewise, all wastewater treatment units shall undergo an official "start-up". The representatives listed above shall be present and EPD shall be invited to attend also. No wastewater treatment units shall begin operation until authorized by EPD, at which time the WCWD will accept ownership of the units.

- G. Maintenance of Records: The developer must have an executed Change Order from the Design Engineer (Appendix C) in hand before making any field changes that do not conform to water and sewer plans stamped "Approved for Construction".

The developer shall be responsible for maintaining on the project site a field set of the construction drawings. All changes shall be recorded on this set of plans and they shall be utilized in the preparation of the as-built drawing.

6. Final Acceptance

- A. As-Built Drawings: The developer shall submit two (2) hard copies and one digital version of the final as-built plans in a format that can be read by the most recent version of AutoCAD and stamped by the registered professional responsible for their design. As-built drawings shall indicate actual field dimensions and shall represent the actual construction of the water and sewer facilities, to include:
1. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements using stations and offsets or coordinates.
 2. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of construction.
 3. Field changes of dimension and detail.
 4. Changes or details not included in original approved drawings.
 5. Depth, length of lead and manufacturer name of fire hydrants.
 6. Manufacturer name of valves, hydrants and other appurtenances.
 7. Provide state plane coordinates for all fire hydrants, valves, beginning/end of line, and any other necessary appurtenance locations
- B. Easements and Final Plat: The Developer shall submit to the WCWD a copy of the final Development plat for certification. The plat shall reflect that all easements for water distribution and wastewater collection and transmission facilities have been dedicated to the WCWD. If applicable, the final plat shall reflect that all land for wastewater treatment and land application facilities has been transferred to the WCWD on a fee simple basis for permanent ownership, prior to recording of the final plat by the Clerk of the Walton County Court. The Developer shall provide evidence to the WCWD of the recording of all easements prior to final acceptance by the WCWD of the water and wastewater system additions. The Developer shall provide 2 hard copies and one digital copy (in a format that can be read by the most recent version of AutoCAD) of the final plat as recorded by the Walton County Clerk of Court.
- C. Performance Bond: Developer shall be responsible for all replacements and repairs related to materials and/or workmanship or any damage not the responsibility of WCWD associated with water mains and appurtenances and/or wastewater collection, transmission and treatment facilities installed for the development that shall become property of the WCWD for a period of 12 months after final acceptance. For water distribution additions, Developer shall provide a performance bond in the amount of \$10,000 or \$100 per lot, whichever is greater, to insure the workmanship and materials for a period of 12 months. For wastewater collection and transmission system additions, Developer shall provide a bond in the amount of \$20,000 or \$200 per lot, whichever is greater, to insure the workmanship and materials for a period of 12 months from final acceptance of these facilities. For wastewater treatment systems, Developer shall provide a bond in an amount to be determined on a case by case basis to insure the

workmanship and materials for a period of 12 months from acceptance of the treatment system. An irrevocable letter of credit is acceptable in lieu of a bond.

- D. Certification: Developer must complete form shown in Appendix D and submit to Director.
- E. Payments: All payment due the WCWD by the Developer in association with the Development must be paid in full and items A-D above completed prior to the Director signing the final plat.
- F. 12 Month Inspection: Approximately 15 days prior to the expiration of the bond or letter of credit, the WCWD shall make a final inspection of the project and provide the developer with a list of all items that need repair or replacement. Once these final repairs are complete, the WCWD shall release the performance bond or letter of credit.

7. Financial Considerations

A. Water System

- 1. Contractor Responsibility: The Developer and/or Contractor shall bear the sole financial responsibility for all equipment, labor, materials and any other incidental costs required for the installation of all water mains and appurtenances in accordance with the approved plans and these Standards.
- 2. Water Line Size Upgrade Policy: The WCWD may require the Developer to upgrade the water lines and appurtenances within and up to the Development for the sole purpose of improving the overall performance of the county water system. In this instance, the WCWD's financial participation will be agreed upon on a case by case basis.

Wastewater System

- 1. Contractor Responsibility: The Developer and/or Contractor shall bear the sole financial responsibility for all equipment, labor, materials and any other incidental costs required for the installation of all gravity sewer, force mains, manholes, service laterals, pump stations, and treatment facilities within the bounds of the proposed Development site, along the county road or highway right-of-ways adjacent to the development site and any easements, as required.
- 2. Cost Sharing Considerations: The WCWD may require the Developer to upgrade sewer lines and appurtenances within and up to the Development for the sole purpose of improving the overall performance of the county sewer system. In this instance, the WCWD's financial participation will be agreed upon on a case by case basis. Connection to the public sewer system shall be mandatory in accordance with the table below as found in Article 10 of the Walton County Land Development Ordinance. Distance shall be measured from the nearest point on the property to an existing sanitary sewer line.

Development Type	Distance From Sewer Main
Non-Residential Developments	500 feet
Residential Subdivisions	
Less than 25 lots/units	500 feet
25-50 lots/units	1,000 feet
51-75 lots/units	1,500 feet
76-100 lots/units	2,000 feet
over 100 lots/units	2,500 feet

The Developer shall bear the full expense of the required installation from existing lines to the proposed development site.

- B. Treatment Capacity Upgrade: The WCWD may require the Developer to upgrade the capacity of the treatment system within the Development for the sole purpose of implementing the county-wide wastewater treatment master plan. In this instance, the WCWD's financial participation will be agreed upon on a case by case basis.

Cost Sharing Agreement: If the BOC agrees to share in any cost with the Developer, the exact amount of participation must be agreed upon by both parties and a memorandum of agreement must be completed between the BOC and the Developer before construction begins. Under no circumstances will the BOC or WCWD re-negotiate an amount of participation after construction has begun.

- D. Non-EPD Permit Costs: The Developer shall be solely responsible for the preparation and expense of all permits required for the installation of all utility installations up to and within the development, including but not limited to the Department of Transportation (DOT) Utility Encroachment Permits, railroad crossing permits, and Land Disturbance Permits. Copies of all permits shall be provided to WCWD for its records.
- E. Water Service Application Fee: An application fee consistent with the rates set by the Walton BOC shall be paid to the WCWD by the Developer for each proposed residential or new phase of a Development to cover administrative expenses incurred by the WCWD. The Application fee shall be paid when preliminary plans are submitted for review.
- F. Wastewater Service Application Fee: A separate application fee consistent with the rates set by the Walton BOC shall be paid to the WCWD by the Developer for each proposed residential or new phase of a Development providing wastewater service to cover administrative expenses incurred by the WCWD. The Application fee shall be paid when preliminary plans are submitted for review.

- G. Water System Connection Fees: Water system connection fees shall be collected for each new connection to the water system. The fees shall be collected at the current service connection fee as set annually by the WCWD. All fees shall be paid to the WCWD prior to connection for water service.
- H. Sanitary Sewer System Connection Fees: Sewer system connection fees shall be collected for each new connection to the sewer system. The connection fees shall be collected at the current service connection fee as set annually by the WCWD. All fees shall be paid to the WCWD prior to connection for water service.
- I. Design Review and Construction Inspection Fees: The WCWD shall bill the Developer for engineering expenses associated with the review and approval of the proposed residential development water distribution, wastewater collection, transmission and wastewater treatment facility installations. The review shall be performed by the engineer delegated WCWD by the Environmental Protection Division to approve water distribution and wastewater collection and transmission system additions in Developments within Walton County. The bill shall reflect all time and direct expenses incurred by the approving engineer during review. The Developer shall also be billed for all utility installation inspection services performed by the WCWD at a rate as established by the WCWD.
- J. Inspection Penalties: Failure to request inspection or other non-compliance with inspection procedures for facilities that will become property of the WCWD shall result in a penalty fee as set by the WCWD.

8. General Design Standards- Water Distribution System

A. Residential Developments:

- 1. All water lines shall be composed of pressure class 350 ductile iron pipe. Water lines shall have a minimum diameter of 8 inches, but in all cases must be large enough to meet the residential demand of the proposed residential Development and fire flow requirements combined.

Acceptable fire flow in residential areas shall be in accordance with the minimum levels established for the zoning classification of the area to be served as described in the latest edition of the Comprehensive Land Development Ordinance and Subdivision Regulations for Walton County.

The design average residential demand shall be 260 gpd/unit and design peak demands shall be as follows:

$$\text{Peak Day, gpm} = 1.8 \times (\# \text{ of connections}) \times 0.3$$

$$\text{Peak Hour, gpm} = 3.25 \times (\# \text{ of connections}) \times 0.3$$

- 2. The EPD delegated approving engineer shall make the final determination as to size of pipe required to meet the residential and fire flow in the proposed residential Development as well as the possible upgrade needed for overall system performance.

3. All sidewalks shall be clearly indicated on the design drawings submitted for approval. In no case should sidewalks be located on top of waterlines or other appurtenances, including valves, meter boxes or sampling stations. In the event that sidewalks are to be located on the same side of the street as the water main, the developer shall be required to dedicate a separate easement outside but directly adjacent to the edge of the right-of-way for a width of 5 feet. The location of the waterlines shall be adjusted to be within the new easement that is to be dedicated to the WCWD and shall be recorded on the final plat.
- B. Non-Residential Developments: Each non-residential development shall be considered by the WCWD on a case by case basis. In general, non-residential developments shall follow the same design standards as residential developments. However, acceptable fire flow in non-residential areas shall be in accordance with the minimum levels established for the zoning classification of the area to be served as described in the latest edition of the Comprehensive Land Development Ordinance and Subdivision Regulations for Walton County. Special flow or pressure requests will be considered on a case by case basis.
- C. County Roads: Water lines on County roads shall be composed of ductile iron pipe and have a minimum nominal diameter of 12 inches or as otherwise approved by the WCWD.

9. General Design Standards- Wastewater Collection/Transmission System

- A. All Developments:
 1. Collection systems shall be non-pressurized gravity systems with one common collection point per development when practical. This collection point shall be generally located at the lowest point within the development. In general, gravity sewer lines shall be located along the centerline of the streets within the development with manholes spaced at a maximum of 400 linear feet. Sewer lines shall have a minimum diameter of 8 inches, but in all cases must be large enough to meet the peak flow requirements of the proposed Development. The residential flow requirements shall be 280 gallons per day per unit, with a peaking factor of 3.0 used for pipe sizing. Gravity sewers shall be sized to accommodate peak flow at half pipe flow conditions.
 2. Force Main Requirements: All force mains shall be composed of C-900 DR 18 PVC pipe. Force mains shall have a minimum diameter of 4" within developments and 6" outside developments. In all cases, force mains shall be appropriately sized to accommodate the flow.
 3. Lift Station Design Requirements: Lift stations shall be submersible, non-clog or suction lift duplex lift stations with Godwin standby pumps, audible alarm and alarm light. Lift station design shall conform with the current Water and Wastewater Construction Specifications of the WCWD. All lift stations shall have sufficient volume to hold 6 hours of average flow and shall have a Godwin emergency backup pump.
 4. In all cases, all wastewater facilities shall be located in either right-of-ways deeded to the County or easements dedicated to the WCWD. This includes but is not limited to all collection and transmission lines and appurtenances and

treatment systems. The location of all facilities to be dedicated to WCWD shall be recorded on the final plat.

5. Fee Simple Transfer of Treatment Facility site to WCWD: At completion of construction and satisfactory facility start-up, Developer shall transfer land on which treatment facilities are located to the WCWD on a fee simple basis.

10. General Design Standards- Wastewater Treatment:

The WCWD will enforce the approved EPD requirements and design.

11. Water Line Installation Within Projects:

- A. General Requirements: All water facilities must meet the design criteria outlined in the latest edition of the construction specifications as adopted by the WCWD.
- B. Looping and Easements:
 1. Need for Looping: The overall distribution plan adhered to by the WCWD utilizes extensive looping of water lines. This looping allows the use of relatively small lines in most cases and provides adequate fire flow protection while eliminating dead ends and stagnated water.
 2. Looping Requirements: It is the WCWD's policy to require 20 ft wide utility easements with water lines installed within the easement between lots on any new development where a loop could be installed to connect to any other potential Development or water main line in the future. The design engineer should determine the location of possible future Development around the proposed development, consider the ease of construction of a loop to the future Development, and discuss the findings with the WCWD so as to determine the most effective looping configuration and location. All easements must be shown on the plans and on the final recorded plat as 20 ft wide utility easements dedicated to the Walton County Water Department.
 3. Looping Installation: The Developer must provide and install the water line along the entire length of each required easement to the adjoining property with a dead-end gate valve at the end, at no cost to the WCWD.
 4. Looping Easements: Water lines are to be installed only on right-of-ways or dedicated easements. In general, easements dedicated to the WCWD will be entered by WCWD personnel for water line maintenance purposes only. No structures, fences or plantings shall be allowed within the water line easements.
- C. Accel/Decel Lane Relocation: If the development is required by the County, City or GaDOT to install an acceleration or deceleration lane for the entrance to the development, the developer shall be required to relocate any existing water mains located under the proposed decal lane to the back five (5) feet of the right-of-way.

D. Construction Standards:

1. General: All water mains must conform to the most recent version of the "Water and Wastewater Construction Specifications".
2. Location within ROW: Water lines within developments shall be located on the north side of east-west streets, and the west side of north-south streets, unless otherwise agreed to by the WCWD. The water lines shall be located according to the most recent version of Walton County Subdivision Underground Utility Location standard as issued by the Walton County Planning and Zoning Office.
3. Cover: Development water lines shall have a minimum cover of 4 ft to the top of the pipe after final grading of the ROW or easement where the pipe is installed. Water lines shall also be installed so that the top of pipe is at least 4 ft below the top of pavement of adjacent roads, except as approved by the WCWD.
4. Pipe Types: All water main piping shall be pressure class 350 ductile iron pipe (DIP). The piping shall conform to the specifications set forth by the Water and Wastewater Construction Specifications of the WCWD.
5. Chlorination Station: A 3/4-inch service tap and corporation stop for chlorination shall be indicated on the plans within 3 to 5 feet from the beginning point of the waterline installation.
6. Service crossings: All services crossing streets inside the development shall be installed inside 1-1/2" or 2" SCH 40 PVC conduit. Conduit shall extend to a minimum of 5 ft on each side of the curb/pavement. Service line material must conform to current Water and Wastewater Construction Specifications of the WCWD.
7. Sampling Station: One water sampling station shall be included in the first phase of each residential development. The station's location shall be shown on plans for approval by the WCWD.
8. Meter Markers: At each water meter installation, a 2" PVC marker shall be placed such that it protrudes at least 2' above the surrounding ground for ease of location by the WCWD and other contractors working in the area.
9. Air Release Valves: Air release valves shall be included in each development located generally at the highest point along the waterlines within the development. The valve's location shall be shown on the plans for approval by the WCWD.
10. Water pipe shall be designed in order to provide a minimum horizontal separation of 10' between any water pipe and a wastewater pipe. Where a water pipe crosses a wastewater pipe, the water pipe shall be a minimum of 18" vertical above the wastewater pipe.
11. Fire Hydrants: Fire hydrants shall be generally located every 500 feet starting at the beginning of the project, and shall be placed on a lot line.

12. Isolation Valves: Gate valves used for isolating line segments shall be generally located every 2,000 feet, or at every street intersection, starting at the beginning of the project. Gate valves shall also be provided on all fire hydrant assemblies within 5 feet of the hydrant.
 13. Walton County Comprehensive Land Development Ordinances shall be followed and specific attention shall be paid to Article 9, Section 109.D as it pertains to clear zone requirements.
- E. Required Coordination with Other Utilities: Developer shall be responsible for contacting and coordinating installation with all other utilities so as to avoid conflicts. Any damage to water mains, services, meter boxes or other appurtenances caused by the installation of other utilities shall be repaired or replaced at no cost to the WCWD. See Section 6, paragraph C of these policies.

12. Wastewater Facility Installation Within Projects

- A. General Requirements: All wastewater facilities must meet the design criteria outlined in the latest edition of the construction specifications of the WCWD.
- B. Compliance with Wastewater Master Plan: The WCWD may require the Developer to upgrade collection and/or transmission facilities for the sole benefit of the WCWD and implementation of its wastewater master plan. These upgrades will be considered on a case by case basis.
- C. Wastewater Collection, Transmission and Treatment Facilities: Wastewater facilities must conform to the latest version of WCWD's Water and Wastewater Construction Specifications and EPD requirements.
- D. Accel/Decel Lane Relocation: If the development is required by DOT to install an acceleration or deceleration lane for the entrance to the development, and if an existing wastewater line is located on the same side of the road or highway as the accel/decel lane, then the developer will be required to relocate the facility as directed by the WCWD. Relocation is required by the Department of Transportation along State highways. The line must be relocated to the back five (5) feet of the right-of-way from property line to property line (i.e. the entire length of road frontage of the development). New facilities must conform to the most recent set of Water and Wastewater Construction Specifications of the WCWD.
- E. Construction Standards:
 1. General: All wastewater facilities must conform to the most recent version of the "Water and Wastewater Construction Specifications" of the WCWD and specifications of the EPD.
 2. Location within ROW: Gravity collection mains shall generally be located in the center of the street within developments. Force mains shall be located within public right-of-ways or utility easements dedicated to the Walton County Water Department. In all cases, wastewater facilities shall be located either within public right-of-ways or on dedicated easements.

3. Cover: Wastewater collection lines shall generally have a minimum cover of 6 feet once final grade is completed. Force main lines shall have a minimum cover of 4 feet from final grade to the top of the pipe
4. Pipe Types: Piping shall conform to the Water and Wastewater Construction Specifications of the WCWD. In general, gravity sewer lines shall be constructed of PVC while sewer force mains shall also be constructed of DIP.
5. Proximity to Water Lines: When installed parallel with water lines, wastewater mains shall have a minimum horizontal separation of 10 feet. When crossing a waterline, there shall be a minimum vertical separation of 18" waterline over sewer line.

Gravity Collection Lines: Gravity sewer lines shall have a minimum diameter of 8". Materials used for gravity lines shall conform to the table below. Gravity mains shall be installed at the minimum grade outlined in the construction specifications.

Gravity Sewer Material Requirements

	Depth	Pipe Material Required
Depth of Cover	0 – 8.0 feet	DR 26 PVC
	8.1 – 16.0 feet	DR 18 PVC
	>16.0 feet	DIP w/ Protecto 401 Lining
Aerial Crossings	All	DIP w/ Protecto 401 Lining
Areas of Rock Excavation	All	DIP w/ Protecto 401 Lining

7. Force Main Requirements: Force mains shall be composed of C-900 DR 18 PVC pipe. Force mains shall have a minimum diameter of 4" within developments and 6" outside developments. In all cases, force mains shall be appropriately sized to accommodate flow of entire development. Force mains should be sized to be the maximum diameter that will maintain a minimum velocity of 2 fps.
8. Lift Stations: Lift stations shall be pre-cast concrete with a minimum diameter of 6'. Pumping systems shall be duplex with non-clog submersible pumps, Godwin backup pump, audible alarms and alarm light. Lift stations shall have access via heavy duty hatch doors as sized by the pump supplier to allow for adequate clearance for easy removal of the pumps.
9. Service Laterals: PVC service laterals shall be used for single family residential sewer connections and installed at a minimum slope of 1% from the collection main to the property line, and depth at property line must be sufficient to serve lowest fixture in structure. A cleanout shall be installed along service lateral at property line. In all cases, the service lateral shall be sized to sufficiently convey the estimated peak flow. Service laterals for connections other than single family residential will be considered on a case by case basis.

10. Manholes: Manhole location and design shall conform to the most recent version of the Water and Wastewater Construction Specifications for the Walton County Water Department. In general, manholes shall be located at the end of each gravity collection main, at any change in vertical or horizontal alignment, at any change in slope, and at a maximum interval of 400'. Manholes shall be pre-cast concrete a minimum of 48 inches in diameter with a minimum access of 22 inches diameter.
11. Stub-out Markers: At each wastewater stub-out installation, a 4" PVC marker shall be placed such that it protrudes at least 2' above the surrounding ground for ease of location by the WCWD and other contractors working in the area.

Required Coordination with Other Utilities: Developer shall be responsible for contacting the power company, telephone company, gas company, cable television company and any other utility to determine where the transformers will be positioned so as to avoid conflict with manhole and clean-out locations. Any damage to collection lines, service laterals, force mains, or other appurtenances caused by the installation of other utilities shall be repaired or replaced at no cost to the WCWD. See Section 6, paragraph C of these policies.

END OF STANDARD POLICIES AND PROCEDURES

(BLANK SHEET FOR PART II TABBED DIVIDER)

PART II. CONSTRUCTION SPECIFICATIONS

CONTENTS

<u>SECTION</u>	<u>DESCRIPTION</u>	<u>PAGE NO.</u>
1	General Water Distribution System	1-1
1.01	General	1-1
1.02	Health Agency Approval	1-1
1.03	Safety Requirements	1-1
1.04	Coordination with the Project Representative	1-2
1.05	Location of Existing Utilities	1-2
1.06	Protection and Replacement of Existing Utilities	1-2
1.07	Approval of Material and Equipment	1-3
1.08	Testing	1-3
1.09	Preconstruction Conference	1-3
1.10	Contractor's Qualifications	1-3
1.11	Work Progress	1-4
2	Excavation and Backfill	2-1
2.01	General	2-1
2.02	Closing of Streets and Drives	2-1
2.03	Replacement of Pavement	2-1
2.04	Clearing and Grubbing	2-1
2.05	Trench Excavation	2-2
2.06	Sheeting, Shoring and Bracing	2-2
2.07	Underwater Excavation	2-3
2.08	Rock Excavation	2-3
2.09	Inspection of Rock Surface	2-3
2.10	Rock in Pipe Trenches	2-3
2.11	Drilling and Blasting	2-4
2.12	Borrow Excavation	2-4
2.13	Backfilling Trenches	2-4
2.14	Sand Cushion	2-5
2.15	Disposal of Materials	2-5
2.16	Maintenance	2-6

CONTENTS (cont.)

<u>SECTION</u>	<u>DESCRIPTION</u>	<u>PAGE NO.</u>
3	Water Line Piping	3-1
	3.01 General	3-1
	3.02 Ductile Iron Pipe	3-1
	3.03 Flexible Joint Pipe	3-3
	3.04 Surge Blocking	3-3
	3.05 Installation	3-3
4	Water Line Valves and Accessories	4-1
	4.02 Gate Valves	4-1
	4.03 Tapping Sleeves and Tapping Valves	4-2
	4.04 Air Release Valves	4-2
	4.05 Fire Hydrants	4-3
	4.06 Residential Service Connections	4-4
	4.07 Sampling Stations	4-4
	4.08 Inspection	4-5
	4.09 Valve Markers	4-5
	4.10 Water Meters	4-5
	4.11 Retainer Glands	4-5
	4.12 Concrete	4-5
	4.13 Double Check Detector Assembly and Vault	4-6
	4.14 Detection Tape	4-6
5	Highway, Railroad & River Crossings	5-1
	5.01 General	5-1
	5.02 Casing	5-1
	5.03 Open Cut Road Crossing	5-2
	5.04 Bored Crossings	5-2
	5.05 Cul-de-Sacs	5-3
	5.06 Insurance Requirements	5-3
	5.07 Safety Materials	5-3
	5.08 Creek Crossings	5-3
	5.09 Major Culvert Crossings	5-3
6	System Testing and Disinfecting	6-1
	6.01 General	6-1
	6.02 Leakage and Pressure Test	6-1
	6.03 Disinfecting and Sampling	6-2

CONTENTS (cont.)

<u>SECTION</u>	<u>DESCRIPTION</u>	<u>PAGE NO.</u>
7	Erosion Control	7-1
	7.01 General	7-1
	7.02 Monitoring	7-1
	7.03 Silt Fence	7-1
	7.04 Rock Check Dams	7-1
	7.05 Grassing	7-2
8	Wastewater Pumping Stations	8-1
	8.01 General	8-1
	8.02 Design	8-1
	8.03 Suction-Lift Pump Stations	8-4
	8.04 Submersible Pump Stations - Special Considerations	8-5
	8.05 Alarm Systems/Telemetry	8-6
	8.06 Emergency Operation	8-6
	8.07 Instructions & Equipment	8-7
	8.08 Force Mains	8-7
9	Design of Sewers	9-1
	9.01 Approval of Sewers	9-1
	9.02 Design Capacity and Design Flow	9-1
	9.03 Details of Design and Construction	9-1
	9.04 Manholes	9-7
	9.05 Sewers in Relation to Streams	9-9
	9.06 Protection of Water Supplies	9-9

SECTION 1

GENERAL-WATER DISTRIBUTION SYSTEM

1.01 GENERAL

- A. Work shall include the furnishing of all materials, equipment, labor, and means of construction necessary for the installation of the water lines specified herein.
- B. The Contractor shall be responsible for obtaining and paying for all necessary local and state construction licenses and permits.
- C. No work shall begin until after the pre-construction conference is held and all questions of responsibility during construction are resolved.
- D. The Contractor will not be allowed to start the installation of pipe unless all road beds and ditch lines or all curbs and gutters have been established at finished grade.
- E. The Contractor is required to hold a copy of the drawings stamped "Approved for Construction" and EPD approved specifications on the job site at all time during construction.
- F. The WCWD or its representative retains the right to reject any subdivision water lines that are not installed according to the approved drawings and specifications.
- G. The Contractor shall not begin installation of pipe until all erosion control devices are installed according to the approved Land Disturbance Permit.
- H. Any pipe, solder or flux used in the installation or repair of the water lines must be lead-free. Pipes and fittings must not contain more than 8.0% lead and solders and flux must not contain more than 0.2% lead.

1.02 HEALTH AGENCY APPROVAL

- A. These specifications and drawings require approval of the Georgia Department of Natural Resources, Drinking Water Permitting and Engineering Program, or the approval of the delegated consulting engineer approved by Georgia Environmental Protection Division.
- B. No construction work on the system shall be started prior to written approval by the WCWD.

1.03 SAFETY REQUIREMENTS

- A. All construction work on streets, railway, or highway rights-of-way shall be done in accordance with the rules and regulations of the agencies having jurisdiction. Safety plans and equipment on highway rights-of-way shall generally conform to the requirements of the "Georgia Manual on Traffic Control Procedures for Utilities" as approved by the Georgia Department of Transportation. All safety equipment and markings shall be furnished by the Contractor.

- B. All construction work shall be performed in accordance with established construction safety standards and the requirements of the Occupational Safety and Health Administration. The Contractor shall be generally responsible for the safety of the employees and the public in the work area.

1.04 COORDINATION WITH THE PROJECT REPRESENTATIVE

- A. During the course of the work under this contract, the Contractor shall be responsible for keeping the WCWD or the WCWD's representative informed of his work schedule, and of his requirements concerning matters such as inspections as herein specified.
- B. Any work subject to inspection or testing by the WCWD which is installed without notification in time for such testing or inspection to be done shall be subject to removal and replacement by the Contractor.
- C. The Contractor shall put no workmen on the job nor perform any work on any portion of the project without prior knowledge of the WCWD that such work is to be done, the place of work, and the scheduled starting time. A 24-hour notification to the WCWD shall be considered the minimum notification requirement for such activity.
- D. The Contractor shall not be permitted to work on Saturdays, Sundays, or at night without the approval of the WCWD.

1.05 LOCATION OF EXISTING UTILITIES

- A. Contractor shall be responsible for locating existing waterlines, storm drains, and appurtenances, and shall comply with the utility location criteria of Walton County as shown on Standard Detail D-1.
- B. Locations of underground utilities such as power, gas, and telephone shall be obtained by the Contractor by properly notifying the utility companies and providing sufficient time for representatives to mark locations of underground facilities and, if necessary, to protect them during the construction period. In no case shall the Contractor begin underground excavation without providing proper notification and time for response.

1.06 PROTECTION AND REPLACEMENT OF EXISTING UTILITIES

- A. The Contractor shall protect existing underground utilities from damage during his operations.
- B. In cases where the Contractor damages or disrupts existing water, gas, telephone, sewer lines, or other underground service facilities, such facilities shall be replaced or repaired at no expense to the WCWD.
- C. In the installation of water mains near sewer lines, the Contractor shall maintain a horizontal clearance of at least ten feet from existing sewer lines, and where water mains cross existing sewer lines, a vertical clearance of at least 18 inches shall be maintained, where the water main is above the sewer line.

1.07 APPROVAL OF MATERIAL AND EQUIPMENT

- A. The Contractor shall submit shop drawings and/or manufacturer's description sheets for the following materials and/or equipment for the approval of the WCWD at the pre-construction conference:
- B. Submittals shall include three copies for each item. Drawings and manufacturer's descriptive material shall include sufficient detail to clearly establish that the item submitted meets the specifications in the Technical Specifications.
 - 1. Pipe and fittings
 - 2. Valves, air relief valves, tapping sleeves and tapping valves
 - 3. Fire Hydrants
 - 4. Sampling Stations
 - 5. Service lines, saddles, corporation stops, meters, and backflow preventers.
- C. Items installed without approval of the WCWD shall be subject to removal and replacement at the Contractor's cost. If the Contractor wishes to substitute materials, they must be submitted 7 days prior to bidding and be pre-approved by the Engineer. Brand names mentioned in these specifications are automatically approved, while materials not pre-approved prior to bidding are subject to rejection upon review by the Engineer or Owner.

1.08 TESTING

Testing will be performed in accordance with the procedures detailed for each section of the utility system improvements.

1.09 PRECONSTRUCTION CONFERENCE

- A. After the approved plans are in hand and prior to the start of any construction, a pre-construction conference shall be held.
- B. The following people shall be invited to attend:
 - 1. WCWD
 - 2. Utility Contractor
 - 3. DOT Representative (If required by WCWD)
 - 4. Owner/Developer Representation

1.10 CONTRACTOR'S QUALIFICATIONS

- A. The Contractor shall be required to have a business telephone that is staffed during normal working hours.

- B. The WCWD shall require that all utility Contractors performing work be licensed as Utility Contractors by the State of Georgia.

1.11 WORK PROGRESS

In the execution of this contract there shall be no more than 25 percent of the total project that is being worked upon unless all previous work has been completed and is ready for service. The work shall begin at an existing point of available water supply.

END OF SECTION

SECTION 2

EXCAVATION AND BACKFILL

2.01 GENERAL

- A. Work under this section shall include all clearing, grubbing, trench excavation, preparation of the trench for pipe installation, pipe bedding, trench backfill and compaction, dressing, seeding, and other restoration of the surfaces to a condition which is nearly equal to the original and which is satisfactory to the WCWD.
- B. Prior to any excavation, the Contractor shall contact local utilities and determine as accurately as possible the location of existing water and sewer lines, storm drains, and all buried cables. The Contractor shall coordinate with the utilities, and shall allow sufficient time for their representatives to locate and otherwise protect their facilities before any digging occurs. In the event of accidental damage to any existing structures, repair and restoration shall be made at once, and no backfill shall be placed until repairs are accomplished.
- C. The installation of all water supply pipe shall conform to the standards of AWWA C605 and AWWA C600 as appropriate.

2.02 CLOSING OF STREETS AND DRIVES

- A. The WCWD and Walton County Department of Public Works (WCDPW) shall be notified in advance of the Contractor's plan to close or partially close any street or drive, and approval shall be given before any closure occurs. Notification shall include a scheduled time for closing the street and a schedule for completion of the work.
- B. The Contractor shall not close more than one city block at any one time to traffic, and shall be required to maintain not less than one lane open to local traffic. Exceptions to this section shall occur only with the approvals of the WCWD and WCDPW.
- C. Driveways which are cut for the installation of pipe shall be backfilled and returned to serviceable condition within four hours of being cut. No driveway shall be left in unserviceable condition overnight. Property owners shall be notified in any cases where conditions are such that restoration of driveways may be delayed.

2.03 REPLACEMENT OF PAVEMENT

- A. Pavement to be removed for installation of trenches shall have edges saw cut straight and smooth. No ripping or tearing of pavement shall be permitted during removal.
- B. Replacement paving shall be installed in accordance with the details on the drawings.

2.04 CLEARING AND GRUBBING

- A. Clearing and grubbing shall include removal of all weeds, briars, trees, and tree stumps encountered within the trenching limits. The Contractor shall remove from the site and satisfactorily dispose of all cleared material.

2.05 TRENCH EXCAVATION

- A. Maximum permissible trench widths from the bottom of the trench to a point 12" above the top of the pipe shall be outside diameter of pipe barrel plus 16" per Standard Detail D-3.
- B. If the excavated trench width up to a point 12" above the top of the pipe is greater than the maximum permissible trench width as set forth in (A) above, then the Contractor shall install and backfill the line with full depth and full width compaction to a minimum density of 95% Standard Proctor (ASTM D 698) at $\pm 2\%$ of optimum moisture content.
- C. Holes for bell-and-spigot pipe and flange pipe shall be excavated at proper intervals so that the barrel of the pipe will rest for its entire length upon the bottom of the trench. Bell and flange holes shall be large enough to permit proper installation of joints in the pipe.
- D. When muck, quicksand, soft clay, saturated or other materials unsuitable for foundations or sub-grade are encountered which extend beyond the limits of the excavation, such material shall be removed and replaced with sand cushion as outlined in these specifications.
- E. Pipe trenching shall be performed so as to cause the least possible inconvenience to the public. Temporary bridges or cross walks shall be constructed where necessary to maintain vehicular or pedestrian traffic. Crosswalks and bridges shall have handrails or other features necessary for safe use by the public.
- F. Whether or not specifically indicated on the plans, it shall be the Contractor's general responsibility to control erosion and siltation in the areas where excavation takes place.

2.06 SHEETING, SHORING AND BRACING

- A. The sides of all excavations shall be sufficiently sheeted, shored, and braced whenever necessary to prevent slides, cave-ins, settlements or movement of the banks and to maintain the excavation clear of obstructions that will, in any way, hinder or delay the progress of the work or endanger workmen. Wood or steel sheet piling of ample design and type shall be used when necessary. All sheeting, shoring and bracing shall be constructed with sufficient strength and rigidity to withstand the pressures exerted and to maintain the walls of the excavation properly in place and protect persons or property from injury or damage.
- B. Where excavations are made adjacent to existing buildings or other structures or in paved streets or alleys, the Contractor shall take care to sheet, shore and brace the sides of the excavation adequately to prevent undermining of or settlement beneath such structures or pavement. The Contractor will be considered responsible for any damage to structures or injury to persons that result directly from his operations.
- C. Sheeting and shoring materials shall be withdrawn as trenches are backfilled, after backfill has been placed over the pipe at least 18". If their removal before backfill is complete endangers any adjacent structure, they shall be left in place until backfill is complete and then withdrawn, if possible. Voids caused by sheeting withdrawal shall be backfilled and

tamped with thin rammers designed for the purpose. If the sheeting is impossible to withdraw, it shall be cut off not less than 18" below the surface.

2.07 UNDERWATER EXCAVATION

- A. Where the excavation area shown on the plans is below the ground water surface or near the banks of a flowing stream or other body of water, the Contractor shall be responsible for de-watering the excavated area by a method satisfactory to the WCWD which allows satisfactory progress and protection of the work. In such cases, the excavated area shall be effectively protected from damage during the excavation period and until all contemplated construction work therein has been completed.

2.08 ROCK EXCAVATION

- A. The removal of sound, solid rock of whatever nature which occurs in its original position in ledges, bedded deposits or stratified and unstratified masses within the excavation limits shown on the plans, and which is of such hardness or texture that it cannot be loosened, or broken down and removed by use of heavy construction equipment, such as a Caterpillar Model 215 track-type hydraulic excavator equipped with a short tip radius rock bracket or a bulldozer such as a Caterpillar Model DOK track-type tractor equipped with a single tooth hydraulic ripper, shall be classified as rock excavation. Likewise, the removal of boulders, pieces of stone and old masonry masses one cubic yard or larger in volume shall be classified as rock excavation. Payment for rock excavation shall be as bid per cubic yard of rock. Maximum trench width, for full depth of trench, which will be allowed for each pipe size shall be as specified in paragraph below.
- B. The removal of hard pan, chert, clay, soft or disintegrated shale, and of other rock materials and boulders less than one cubic yard in volume, shall not be classified as rock excavation although the Contractor may elect to excavate same by drilling and blasting methods. The excavation and removal of all such materials shall be classified as common excavation.

2.09 INSPECTION OF ROCK SURFACES

Where rock is encountered in the process of excavation within the excavation limits shown on the plans, or specified herein, and where payment is to be made for its removal, it shall be completely uncovered and stripped of all loose material over the entire area. The Engineer or his inspector shall then make a detailed inspection of the exposed rock surface and shall take surface elevations and measurements as may be necessary to determine ultimately the volume of rock excavated. All materials removed from the area prior to inspection and approval by the Engineer shall be considered as common excavation.

2.10 ROCK IN PIPE TRENCHES

- A. Rock encountered in trench excavation shall be removed for the overall width of trench, which shall be equal to the outside diameter of the pipe plus 16 inches. It shall be removed to a depth of six (6) inches below the bottom of pipe if rock extends to such depth.

- B. After the Engineer has inspected the completed excavation, the space below the ultimate pipe grade shall be filled with fine earth, crushed stone, or other approved materials as required, compacted to proper grade and made ready for pipe laying. Fine earth removed from the pipe trench shall be used for bedding material. Fine earth so used shall be thoroughly compacted with approved power tools. No allowance shall be made under this item for bell hole excavation.

2.11 DRILLING AND BLASTING

Drilling and blasting methods used in rock excavation shall be optional with the Contractor but shall be conducted with due regard to the safety of persons and property in the vicinity of the work in strict conformity with all laws, ordinances or regulations governing blasting and the use of explosives. Rock excavation near existing structures of all types shall be conducted with the utmost care and every precaution shall be taken to prevent damage to such structures. Any damage or injury of whatever nature to persons or property caused directly or indirectly by blasting operations shall be promptly repaired, replaced or compensated for by the Contractor at his or her own expense and to the entire satisfaction of the persons injured or the owners of the property damaged.

2.12 BORROW EXCAVATION

- A. Wherever the backfill requires a volume of material that is in excess of the volume of suitable materials available from excavation for trenching, the Contractor shall be responsible for locating and obtaining additional backfill material from borrow pits which are acceptable to the Engineer.
- B. Borrow pits shall be properly cleared and grubbed prior to excavation. Any unsuitable materials shall be removed from the borrow pit material prior to its placement in the backfill.
- C. Borrow pits shall be excavated so that the remaining surfaces and slopes will be reasonably even and smooth and will provide adequate drainage over the entire area. Where necessary, drainage ditches shall be constructed to provide outlets of water to the nearest natural channel and to avoid ponding or standing water within the borrow pit area. Sides of borrow pit cuts shall be left at two-to-one slope unless otherwise authorized by the Engineer.

2.13 BACKFILLING TRENCHES

- A. The backfilling of pipeline trenches shall begin immediately after the pipe work has been inspected and approved. Backfill material shall consist of fine loose earth, free of large clods, stones, sticks, organic matter, debris, and/or other unsuitable material. If the trench extends along or across streets, roadways, proposed roadways, usable alleys or sidewalks, the trench shall be backfilled and tamped to its full depth to provide a minimum density of 95% Modified Proctor for the full depth; otherwise, the trench may be backfilled with loose material and compacted with excavation equipment to prevent excessive settlement. Where tamping of material is not required for the full depth of the trench, this material (from a height of one (1) foot above the pipe upward) shall be as hereinbefore specified.

- B. Earth material for backfill to be placed under pavement that, in the opinion of the Engineer, is too dry to allow thorough compaction, may receive an admix of sufficient water prior to compaction to insure such compaction, but earth material considered by the Engineer to have excessive water content shall not be placed.
- C. Efforts to achieve satisfactory compaction by methods such as puddling (introducing water to the full depth of the backfill) will not be allowed. If the backfill material cannot be further tamped in place to achieve satisfactory compaction, the Contractor will be required to remove unsatisfactory material and replace it with backfill which can be compacted satisfactorily.
- D. Where excavation has been made within the limits of easements across private property, the top one (1) foot of backfill material shall consist of fine loose earth free from large clods, sticks, organic matter, large stones, and/or other objectionable materials.

2.14 SAND CUSHION

- A. Sand cushion shall consist of coarse sand, gravel, or crushed stone. All cushion material shall pass a 1-1/2 inch screen and at least 90 per cent shall be retained on a 20 mesh screen. Cushion material shall be stored and handled on the job in such manner that it will be kept clean and free from dirt, clay, and other foreign material and will retain its ability to pass water freely.
- B. Sand cushion shall be used in all local areas where unsuitable materials such as muck, quicksand, soft clay, saturated soils, or excessive groundwater make it necessary to provide a satisfactory pipe foundation.
- C. Cushion material shall be compacted by tamping with suitable tools and shaped to receive the pipe and to support the full length of the barrel of the pipe.

2.15 DISPOSAL OF MATERIALS

- A. All materials removed by excavation which are suitable for the purpose shall be used whenever practicable for fills, embankments, backfilling pipe trenches, and for such other purposes as may be shown on the plans or authorized by the WCWD. All materials not used for such purposes shall be considered as waste materials and disposed of by the Contractor.
- B. Waste materials may be deposited in spoil banks at locations to be authorized by the WCWD. Such materials shall not be left in unsightly piles but shall be spread in uniform layers and neatly leveled and shaped. Spoil banks shall be provided with adequate openings to permit surface drainage of adjacent land.
- C. On completion of any phase of the work, proper disposal shall be made of all surplus or unused materials left within the construction limits of such work and the surface of the work left in a neat and workmanlike condition.

2.16 MAINTENANCE

All excavated areas, backfills, embankments, trenches, and access roads, grading, and ditches shall be maintained by the Contractor in good condition at all times until final acceptance by the WCWD. Where trench backfill has settled below the original surface, additional backfill shall be installed and compacted.

END OF SECTION

SECTION 3

WATER LINE PIPING

3.01 GENERAL

Work included under this section shall also include specific installation precautions as specified herein for a particular kind of pipe and surge blocking required for water line piping installation. All new water mains shall be ductile iron pipe. All materials used that come into contact with drinking water during its distribution shall not adversely affect drinking water quality and public health and must be certified for conformance with American National Standards Institute/National Sanitation Foundation Standard 61 (ANSI/NSF Standard 61). All pipe shall have a minimum cover of 48" as shown in the detail drawings, unless otherwise approved by the WCWD.

3.02 DUCTILE IRON PIPE AND FITTINGS

A. Pipe

1. Unless otherwise specified, ductile iron pipe for water lines shall conform to the latest requirements of ANSI/AWWA C151/A21.51.
2. Unless otherwise specified, ductile iron pipe shall be pressure class 350.
3. Ductile iron pipe shall be cement lined in accordance with ANSI/AWWA C104/A21.4.
4. Ductile iron pipe shall be manufactured by U.S. Pipe, American Cast Iron Pipe Company or pre-approved equal.

B. Gaskets

Gaskets shall comply with ANSI/AWWA C111/A21.11 for push-on and mechanical joints.

C. Fittings

Unless otherwise specified, fittings shall conform to ANSI/AWWA C110/21.10 or ANSI/AWWA C153/21.53 and shall be flanged, mechanical joint or restrained push-on joint to suit the conditions specified. All fittings shall have a minimum working pressure of 250 psi plus water hammer allowance of 100 psi.

D. Joints

1. Unrestrained Joints

- a. Push-On Joints - Unless otherwise specified, unrestrained joints shall be the rubber ring compression, push-on type joint suitable for buried service. Unrestrained joints shall be the Fastite Joint as manufactured by U.S. Pipe, or equal. This joint is not permitted on fittings or specials, unless otherwise specified. Unless otherwise specified, joints shall have an allowable deflection up to 5 degrees at specified pressures. Joints assembly and field cut joints shall be made in strict conformance with AWWA C600 and manufacturer's recommendations.

- b. Mechanical Joints - Where specified, mechanical joints for above or below ground service shall meet the requirements of ANSI/AWWA C110/A21.10.

2. Restrained Joints

- a. General

Restrained joints are required for exposed piping, all piping installed under pavement and all buried fittings and specials. Restrained joints for buried pipe sections shall be provided as required for thrust restraint or where specified. Unless otherwise specified, restrained joints shall be flanged-end for exposed service and push-on for buried service.

- b. Push-On Joints

Restrained push-on joints shall be Flex-Ring or Lok-Ring Joint as manufactured by American Cast Iron Pipe Company, TR Flex Joint as manufactured by U.S. Pipe, or approved equal. Restrained joints shall be capable of being deflected after full assembly. Joint assembly shall be in strict conformance with AWWA C600 and manufacturer's recommendations.

- c. Flange Assemblies

Unless otherwise specified, flanges shall be ductile iron and shall be threaded-on flanges conforming to ANSI/AWWA C115/A21.15 or cast-on flanges conforming to ANSI/AWWA C110/A21.10. Flanges shall be adequate for 250 psi working pressure plus water hammer allowance of 100 psi. Bolt circle and bolt holes shall match those of ANSI B.16.1, Class 125 flanges.

- d. Mechanical Joints

Where specified, restrained mechanical joints shall be the positive restraint type.

E. Bolts and Nuts

Corrosion-resistant bolts and nuts for use with ductile iron joints shall be high-strength, low-alloy steel as specified in ANSI/AWWA C111/A21.11.

- F. Where Ductile Iron Pipe is joined to SDR rated PVC pipe, a ductile iron mechanical joint solid sleeve shall be used. The sleeve shall be the long pattern type with the required transition gaskets.

- G. As shown on the plans or at the direction of the WCWD during construction, the Contractor shall install retainer glands on each joint of ductile iron pipe.

3.03 FLEXIBLE JOINT PIPE

- A. When flexible joint pipe is required for stream crossings and indicated on the plans, the pipe shall be ductile iron pipe conforming to ANSI/AWWA C151/A21.51, Class 50 designed for a water working pressure of 350 psi.
- B. The restrained joint fittings shall be meet the requirements of ANSI/AWWA C110/A21.10 and/or C153/A21.53 and be capable of being deflected after assembly. Pipe shall be TR Flex manufactured by U. S. Pipe or approved equal.

3.04 SURGE BLOCKING

- A. Concrete surge blocking with megalug restraints shall be installed at all bends of 11-1/4° or greater in the pipeline, and at all plugs, tees, and caps. A concrete dead-man shall be required at all ends of lines as shown in Standard Detail D-4.
- B. Surge Blocking shall be placed against firm, undisturbed earth and installed with minimum dimensions not less than as shown in Standard Detail D-5.
- C. Surge rodding shall be installed on fire hydrants located at the end of cul-de-sacs, as necessary for proper joint restraint, as well as on fire hydrant extensions as shown in Standard Detail D-14.

3.05 INSTALLATION

- A. Pipe curvatures shall be within horizontal or vertical permissible deflection at joint, as specified by manufacturer or AWWA Specification C600.
- B. Pipe and appurtenances shall be installed only when trench conditions are suitable.
- C. Trenches must be dry.
- D. Proper implements, tools, and facilities shall be provided by CONTRACTOR for safe and convenient performance of the work.
- E. Lower pipe, fittings, valves, and hydrants carefully into trench piece by piece by means of derrick, ropes, or other suitable tools or equipment.
- F. Prevent damage to water main materials and protective coatings and linings.
- G. Do not drop or dump water line materials into trench.
- H. Carefully examine pipe and fittings for cracks and other defects while suspended above trench immediately before installation in final position. Defective pipe or fittings shall be clearly marked and shall be removed from site.
- I. Clean bell and spigot ends of each piece of pipe thoroughly before pipe is laid.
- J. Prevent foreign material from entering pipe while it is being placed in line.
 - 1. Provide protective covering for ends of pipe until connection is made to adjacent pipe, if necessary.

2. No debris, tools, clothing, or other materials shall be placed in pipe during laying operations.
- K. As each length of pipe is placed in trench, spigot end shall be centered in bell and pipe forced home and brought to correct line and grade.
1. Pipe shall be secured in place with approved backfill material tamped around it.
 2. Precautions shall be taken to prevent dirt from entering joint space.
- L. Open ends of pipe shall be closed by watertight plug, or other means approved by Engineer, at times when pipe laying is not in progress. If water is in trench, plug shall remain in place until trench is pumped completely dry. Water shall not be allowed to run into pipe at any time during construction.
- M. Lay pipe with bell ends facing in direction of laying, unless directed otherwise by Engineer. Where pipe is laid on grade of 10 percent or greater, laying shall start at bottom and shall proceed upward with bell ends of pipe upgrade.
- N. Cut pipe for inserting valves, fittings, or closure pieces in neat and workmanlike manner without damage to pipe or lining and so as to leave smooth end at right angles to axis of pipe.
- O. Jointing
1. Jointing of pipe, fittings, and valves shall be made in strict compliance with manufacturer's printed instructions.
 2. Mechanical Joints
 - a. Thoroughly clean outside of spigot and inside of bell.
 - b. Clean gasket.
 - c. Tighten nuts with torque limiting wrench.
 - d. Nuts spaced 180 degrees apart shall be tightened alternately in order to produce equal pressure.
 3. Push-On Joints
 - a. Furnish and install adaptors if required to join bells and spigots of different sizes.
 - b. Thoroughly clean inside of bell and outside of spigot end.
 - c. Insert and lubricate gasket using lubricant furnished or recommended by pipe manufacturer.
 - d. Spigot end of pipe shall be entered into socket with care used to keep joint from contacting ground.
 - e. Complete joint by forcing plain end to bottom of socket with forked tool or jack-type tool.

- P. Stream and Utility Crossings
1. Where indicated on the plans, or required by conditions encountered, pipe shall be placed beneath stream beds or ditches, around, over, or under sewers, culverts, gas mains, telephone ducts, water mains, or other structures.
 2. Do not pass pipe through any drainage pipe, culvert, sewer, or manhole.
 3. Provide minimum of 48 inches under stream beds or ditches, unless approved by Engineer in writing.
 4. Provide minimum of 6 inch earth or sand cushion between proposed water line and any other utility or structure, or as indicated on drawings.
- Q. Anchorage of fittings shall be in accordance with Specification Section 3.04.
- R. Testing and disinfection of water lines shall be in accordance with Specification Section 6.

END OF SECTION

SECTION 4

WATER LINE VALVES AND ACCESSORIES

4.01 GENERAL

- A. The work included in this section consists of the installation of valves, fire hydrants, and service connections.
- B. All materials used that come into contact with drinking water during its distribution shall not adversely affect drinking water quality and public health and must be certified for conformance with American National Standards Institute/National Sanitation Foundation Standard 61 (ANSI/NSF Standard 61).
- C. Surge blocking for valves and fire hydrants shall be as specified under Section 3.04 and in accordance with Standard Detail D-5.
- D. Excavations for all specialties shall be stabilized with gravel or sand cushion, if necessary due to unsuitable foundation conditions and tamped. Surge blocking shall be provided after the item is placed, and backfill shall be hand or mechanically tamped in no more than 6" lifts.
- E. Depth adjustment shall be provided for valve boxes, and valves to be set in roadways or paved areas shall be adjusted to finished surfaces.
- F. Detection tape shall be installed directly above all water lines as shown in Standard Detail D-3.

4.02 GATE VALVES

- A. Gate valves shall be located as shown on the drawings and installed as detailed on the drawings complete with cast iron valve boxes and concrete pad. Any valve which is installed on pipe having a depth of cover of more than 5 feet shall be provided with a permanently installed valve stem extension and guide.
- B. Gate valves shall:
 - 1. Conform to the latest revision of AWWA C509.
 - 2. Be resilient seated valves designed for 200 psi working pressure and 400 psi hydrostatic test pressure.
 - 3. Have non-rising, bronze stem with "O" ring seals and be wrench operated with two inches square operating nuts.
 - 4. Have cast iron bodies with bonded epoxy coating conforming to AWWA C550.
 - 5. Have rubber-covered gates.
 - 6. Open to the left.
 - 7. Have mechanical-joint type connections.

- C. Valve Boxes
 - 1. Shall be of adjustable screw type, of length required with a minimum 6" of adjustment allowed.
 - 2. Shaft shall be 5¼ inch diameter with base to be minimum of 8¾ inch diameter by 9-inch height inside.
 - 3. Base size and extension piece shall be as required for each individual size of valve and depth.
- D. Contractor shall locate each valve by measurements to two prominent terrain features or structures (i.e., center of road, fire hydrant, power pole). Each measurement should be taken as perpendicular to the other as possible, and a record of these location distances shall be submitted to the WCWD at the conclusion of the work. The sketch of each location shall be neatly drawn on a separate 5" x 7" card and shall be considered part of and referenced to the as-built drawings.
- E. One valve key shall be provided for each project. Valve key shall be 72 inches long with a tee handle and be sized for a two inches square nut.
- F. Valves shall be manufactured by Clow, Mueller, M & H, or approved equal.

4.03 TAPPING SLEEVES AND TAPPING VALVES

- A. The Contractor shall furnish and install tapping sleeves and valves suitable for connection to the existing water mains at locations indicated on the drawings, or required by the WCWD and shall furnish the tapping machine and competent supervision for the making of taps and shall be configured as shown in Standard Details D-6 and D-7.
- B. Tapping sleeve shall be Rockwell or JCM split steel type tapping sleeve, or approved equal. Outlets shall be sized to permit a tap to be made using a full size shell cutter. The existing pipe shall be thoroughly cleaned prior to the installation of the sleeve. Strap saddle sleeves shall not be permitted for taps larger than 2 inches. Tapping valves shall conform to Section 4.02 except for modifications necessary to permit the use of a full size cutter.
- C. After installing the sleeve and prior to making the tap, the Contractor shall hydrostatically pressure test the complete tapping sleeve and valve at 200 psi. The tapping sleeve and valve shall be properly supported before mounting the tapping machine.
- D. Back taps shall not be made without prior approval of the WCWD, but if approved, shall conform to the details shown on Standard Detail D-8.

4.04 AIR RELEASE VALVES

- A. Air release valves shall be installed where shown on the plans and as shown in Standard Detail D-9. It shall be designed to exhaust small quantities of air, which collect in the line while operating under pressure.
- B. Valve shall have a 1-inch inlet and operate by float and compound lever with an orifice size of 7/32 inches. Valve shall be designed for a minimum working pressure of 200 psi.
- C. Valve shall be an APCO, Model No. 200A.

- D. Chambers or pits containing air release valves shall be drained to the surface of the ground where they are not subject to flooding or to an underground absorption pit.

4.05 FIRE HYDRANTS

- A. Fire hydrants shall meet the requirements of the latest revisions of AWWA Specification C 502.
- B. Fire hydrants shall have a 5-1/4 inch valve opening, two 2-1/2 inch hose nozzles and one 5-1/4 inch pumper nozzle.
- C. All fire hydrants shall have 6 inch gate valves as specified above and shall be located as shown on the drawings and installed as shown in Standard Detail D-10.
- D. Each fire hydrant shall have a 6-inch diameter ductile iron lead with a minimum cover of 4 ft. Piping for lead shall adhere to all requirements in Section 3 of these specifications.
- E. Hydrants shall be compression type, non-freezing, provided with safety flange and coupling, and may be oil or grease lubricated. Drain mechanism shall be simple, positive, and automatic in operation.
- F. The safety flange on barrel and safety coupling on valve stem shall be constructed so as to reduce damage to barrel and stem in case of a traffic accident. The force of impact shall break the flange and spread the coupling. The construction of flange and coupling shall be such as to permit rapid and inexpensive replacement of the hydrant. Traffic flanges shall be located at or close to the ground line.
- G. Painting and Coating
 - 1. Iron parts of hydrant shall be thoroughly cleaned inside and outside.
 - 2. Unless otherwise stipulated or directed, surface shall be coated or painted with, or dipped in, and asphalt or bituminous base paint or coating, except for the exterior portion above the groundline.
 - 3. Exterior of hydrant valve above finished groundline shall be thoroughly cleaned and painted in shop with two coats of Koppers Primer 621 or approved equal.
 - 4. Following installation, all outside surfaces of hydrants above groundline shall be painted with two field coats of silver Koppers Glamortex 501 or approved equal.
- H. Fire hydrants shall be Mueller 423, Super Centurion 250, M&H 129, or U.S Metropolitan M-94.
- I. Contractor shall supply one hydrant wrench for each water system installed. Wrench shall be Combination Wrench and Spanner as manufactured by Pollard or approved equal.

4.06 RESIDENTIAL SERVICE CONNECTIONS

- A. Service laterals shall be located with a minimum bury equal to that of the main line within the right-of-way and shallowing to a bury of 18 inches at the water meter location. Service line size shall be 3/4" for single residential service and 1" for double residential service. Contractor to install appropriately sized service saddle and corporation stop at the main, service laterals, and 3/4" curb stops with swivel nuts in the meter boxes. For double residential services, contractor shall provide the wye, bends, and two 3/4" curb stops, each in separate meter box (see Standard Detail D-11).
- B. All sections of the service laterals located under pavement shall be encased in 1-1/2 inch or 2 inch diameter PVC conduit.
- C. **3/4 inch and 1 inch residential service piping shall be copper.** Pipe shall conform to the ASTM Specifications B88, Type K. Fittings shall be of the compression pack-joint coupling type. THE USE OF SOLDERED JOINTS OR FLARE-JOINTS FOR COPPER PIPE AND FITTINGS IS PROHIBITED.
- D. Water meter boxes shall be composed of plastic with cast iron top with 2" diameter opening. Box shall be 20" long x 10-1/2" wide x 12" deep, nominal size, set at property lines, with the top flush with the finished grade. (See Standard Detail D-11A)
- E. Service take-offs from mains shall be made from top quadrant of main, with axis of tap no more than 45 degrees inclination with the vertical.
- F. Residential service saddles shall be heavy duty double strap malleable iron service saddles. Iron body shall meet ASTM A-47 ductile iron. Bolts or straps shall be minimum 1/2" diameter stainless steel with stainless nuts.
- G. Meter setter shall include and be assembled using lead free solder, saddle nuts on inlet and outlet side of meter connection, dual angle check valve on outlet side of meter, and an angle ball valve on the inlet side of the meter connection, which shall include padlock wings. Setter service line connection shall be copper horizontal compression type and be assembled to properly accommodate designated water meter and gaskets. All setter components shall be made of brass or copper. A Y McDonald 724 series, 770 series, or approved equivalent.

4.07 SAMPLING STATIONS

- A. Sampling Stations shall have 3 ft of cover, with a 3/4" FIP inlet, and a 3/4" unthreaded nozzle. All stations shall be enclosed in a lockable, nonremovable, aluminum-cast housing. When opened, the station shall require no key for operation, and the water will flow in an all brass waterway. All working parts will also be made of brass and be removable from above ground with no digging. Sampling Stations shall conform to the details shown on Standard Detail D-12.
- B. A copper vent tube will enable each station to be pumped free of standing water to prevent freezing and to minimize bacteria growth. The exterior piping shall be galvanized, and exterior cover shall be painted green. The unit shall be an Eclipse No. 88 sampling station as manufactured by Kupferle Foundry, or approved equal.

4.08 INSPECTION

- A. All valves, fire hydrants, service lines, and connections shall be subject to inspection and approval by the WCWD's Inspector or the design engineer's inspector as agreed to at the pre-construction conference.
- B. All pipe trenches, hydrant connections, and valves shall be left completely uncovered for approval by the inspector before backfilling. If any portion of the water line trench is backfilled before the inspector approves the installation, the Contractor shall re-excavate the trench for inspection and re-backfill at his own expense.

4.09 VALVE MARKERS

Contractor shall furnish and install valve markers for all main line valves in accordance with Standard Detail D-20. Concrete type set at right-of-way limits with distance stamped in feet shall be acceptable.

4.10 WATER METERS

- A. New residential water meters shall be provided by the WCWD.
- B. All commercial water meters shall be manufactured by the Neptune Technology Group. Commercial water meters shall be installed within a buried vault within a minimum 15'x30' easement on private property in accordance with Standard Detail D-21.

4.11 RETAINER GLANDS

Install retainer glands at all bends, tees, valves, fire hydrant assemblies and where indicated on the plans or otherwise directed. Retainer glands shall be Megalug Series 1100 by EBAA Iron or approved equal.

4.12 CONCRETE

- A. Cast-in-place concrete used for potable water systems is designated as Class A for formed, reinforced structures and Class B for nonreinforced used such as thrust blocks and collars, concrete cradles, and other similar uses.
- B. All concrete shall have a minimum 28-day compressive strength of 3,000 psi.
- C. Concrete work shall be performed in accordance with ACI 350.
- D. Materials
 - 1. Cement shall be Portland Cement conforming to ASTM C150, Type I or Type II.
 - 2. Aggregate shall conform to all requirements of ASTM C33 for No. 57 stone for coarse aggregate and natural sand for fine aggregate. Aggregates containing gypsum or sulfates are not permitted.
 - 3. Water used for concrete mix and curing shall be clean, clear and free from oils, acids, alkalis, organic materials and other deleterious substances.

4. Concrete admixtures for air entrainment shall be in accordance with ASTM C260. Chemical admixtures of any type shall be approved by the WCWD prior to use.
 5. Reinforcing steel shall comply with ASTM A615, grade 60.
- E. Concrete Mix
1. Maximum size aggregate shall be 1 1/2".
 2. Air content shall be 4-6%.
 3. Slump shall be 3-5".

4.13 DOUBLE CHECK DETECTOR ASSEMBLY AND VAULT

Where directed by the WCWD, double check detector assemblies shall be installed within a buried vault located within a minimum 15' x 30' easement on private property in accordance with Standard Detail D-22.

4.14 DETECTION TAPE

Detection tape shall be a minimum of 2" wide, consisting of an inert, bonded layer of plastic or mylar with a metallized foil core and be highly resistant to alkalis, acids and other chemical components encountered in soils. The tape shall be colored blue and bear the imprint "CAUTION: WATER LINE BURIED BELOW".

Detection shall be buried with the printed side up 4 to 10 inches deep. If conditions require, a 3" wide detection tape may be installed up to 20 inches deep. The Contractor shall take all necessary precautions to ensure the tape is not pulled, distorted, damaged or otherwise misplaced in completing trench backfill.

END OF SECTION

SECTION 5

HIGHWAY, RAILROAD & RIVER CROSSINGS

5.01 GENERAL

- A. Work included in this section of the specifications consists of the installation of pipe and appurtenances across highway rights-of-way and railroad rights-of-way.
- B. Work performed on rights-of-way controlled by the Georgia Department of Transportation shall be done only after obtaining written permission or permits from the Department of Transportation. Work performed on railroad rights-of-way shall be done only after obtaining written permission from the railroad company.
- C. It shall be the responsibility of the Contractor to notify the Department of Transportation Field Engineer or the responsible party with the railroad before performing any work in rights-of-way controlled by or owned by these entities.
- D. All work performed in crossing highways shall be in strict accordance with the specifications published by the Georgia Department of Transportation. Work performed in crossing railroads shall be in general conformance with standards published by the American Railroad Engineering Association and with any specific requirements of the railroad owner which may be stated as a condition of the permit.

5.02 CASING

- A. All dirt road, improved road, and highway crossings shall be cased in steel pipe. Casing pipe shall be coated on the outside with Type II, Coal-Tar enamel in accordance with AWWA C203, having a yield strength f_y not less than 36,000 psi, and manufactured in conformance with the following general specifications:
 - 1. AWWA C201 "Fabricated Elect. Welded Steel Water Pipe"
 - 2. AWWA C202 "Mill-Type Steel Water Pipe"
 - 3. ASTM A53 "Welded and Seamless Steel Pipe"
- B. Pipe used for casing shall conform to the minimum sizes and wall thicknesses indicated in the Table below:

CASING PIPE

Carrier Pipe Nom. Diam., in	Casing Under Highways		Casing Under Railroads	
	Min. Inside Diam., in.	Min. Wall Thickness, in.	Min. Inside Diam., in.	Min. Wall Thickness, in.
6	16	0.250	16	0.250
8	16	0.250	18	0.250
10	18	0.250	20	0.250
12	20	0.250	22	*
16	24	0.250	30	*
18	30	0.375	30	*
24	36	0.375	36	*

* Wall thickness for casings larger than 18 inches under railroads shall be calculated by a professional engineer based on the specific loadings for each application.

- C. Pipe installed as carrier pipe inside the casing shall be placed in proper vertical and horizontal alignment using prefabricated casing spacers radially around the pipe and secured to remain firmly in place. Spacers shall be two-piece, stainless steel bands with runners as manufactured by Advance Products & Systems, Inc. or approved equal. Spacers shall be installed in accordance with manufacturer recommendations and shall be placed no greater than ten feet (10') on center longitudinally within the casing pipe. Ends of casing shall be sealed with a seamless synthetic rubber seal as manufactured by Pipeline Seal and Insulator, Inc. (PSI) or equivalent.
- D. All carrier pipe installed within casing shall have restrained joint connections. This shall be accomplished with Field-Lok gaskets or approved equal.

5.03 OPEN CUT ROAD CROSSING

- A. Pipe and casing installed by open-cut across dirt and improved roads shall be bedded in a shaped trench and backfilled with 6" layers of select backfill, with each layer being mechanically or hand tamped before placement of the following layer. Backfill shall be tamped to the full depth of the trench. Paving replacement for open-cut trenching shall be in accordance with the Pavement Patch details shown in Standard Detail D-2.
- B. Casing laid in open trench across roadway shall have a minimum cover of 48 inches under the pavement and a minimum depth of cover under ditch bottoms of 30 inches.
- C. Casing length shall be equal to the width of the pavement plus 10 ft on each side of the pavement.

5.04 BORED CROSSINGS

- A. Unless specifically shown otherwise on the plans, all paved road and highway crossings shall be bored and cased with casing and carrier pipe sizes as specified on the plans.
- B. Bore pits shall be excavated in a location so as to minimize the disturbance of fences, yards, driveways, etc. Bore pits shall be kept entirely within the DOT and/or county rights-of-way unless specific written permission has been granted from the land owner and the WCWD for the excavation of a bore pit on private property.
- C. Casing shall have a depth of 4 ft under the pavement surface and a minimum of 30 inches of cover at the ditch line. Under no circumstances shall either end of the casing be more than 6 ft under the pavement surface.
- D. Following construction, the Contractor shall be responsible for backfilling and bringing to original grade any pits used for boring. Backfill placed in bore pits shall be satisfactorily compacted so as to prevent settlement. Contractor shall be responsible for dressing, shaping, and re-seeding as required to restore shoulders, ditch lines, and slopes to a condition as close as possible to the original condition before construction. The Contractor shall maintain such disturbed areas until adequate ground cover is established to stabilize slopes and ditch lines.

5.05 CUL-DE-SACS

Pipe installed under a Cul-De-Sac shall conform to the details as shown on Standard Detail D-14.

5.06 INSURANCE REQUIREMENTS

To obtain a permit for a bore under a CSX transportation railroad track, the Contractor must acquire a Comprehensive General Liability policy in accordance with the latest CSX transportation requirements.

5.07 SAFETY MATERIALS

- A. The Contractor shall be equipped with sufficient orange traffic cones, warning signs, safety vests, flags, barricades and warning lights to control and direct traffic around the work area and to provide for the safety of the workmen.
- B. All materials, equipment, and traffic control plans used shall meet the general requirements of the "Georgia Manual for Uniform Traffic Control Devices for Streets and Highways" as published by the Department of Transportation.

5.08 CREEK CROSSINGS

Crossings of minor creeks shall utilize restrained push-on joints equal to Fast-Grip pipe as manufactured by American Cast Iron Pipe Company. Crossings of major creeks shall utilize ball joint pipe equal to Flex-Lok pipe as manufactured by American Cast Iron Pipe Company or approved equal. Crossings shall be installed as shown in Standard Details D-17 and D-18. In all cases, underwater crossings shall provide a minimum of 4 feet of cover for the water main. Valves shall be installed at both ends of the water crossing in order to isolate the crossing for testing and maintenance. Sampling taps shall be installed at each end of the crossing, and permanent taps shall be made for testing and determining leaks.

5.09 MAJOR CULVERT CROSSINGS

Water lines crossing culverts greater than 36" in diameter or width shall have valves installed at both ends of the crossing in order to isolate the crossing for testing and maintenance.

END OF SECTION

SECTION 6

SYSTEM TESTING & DISINFECTING

6.01 GENERAL

- A. All branches of the new distribution system shall be disinfected by chlorination, and shall be pressure tested by the Contractor before acceptance of work by the WCWD. Disinfection of water lines and the disposal of heavily chlorinated water (following the disinfection) must be accomplished in accordance with AWWA Standard C651 (latest revision).
- B. The system shall be disinfected and tested by sections as the pipe laying work progresses. Sections which have not been disinfected shall not be tied in with previously disinfected sections of the system.
- C. The Contractor shall notify the WCWD at least 48 hours prior to disinfecting and testing of any part of the system and shall provide all necessary supplies, equipment, labor, and apparatus for conducting the tests.

6.02 LEAKAGE & PRESSURE TEST

- A. After the pipe is laid, each section of new water main between valves shall be properly flushed and then subjected to pressure and leakage tests at a test pressure of 200 pounds per square inch gauge. The duration of each pressure test shall be 2 hours. If the pressure drops during the test, repairs are to be made and the test repeated.
- B. All tests shall be performed before any part of the system is connected to the tested portion of the system, and shall, in general, conform to AWWA Standard C600 and/or AWWA C605. All results shall be witnessed by the WCWD.
- C. Pressurization – After the pipe has been laid, all newly laid pipe, or each and every valved section thereof, shall be subjected to a hydrostatic pressure of 200 psi. Each valved section of pipe shall be slowly filled with water and the specified test pressure (based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge) shall be applied using a pump connected to the pipe. Valves shall not be operated in either the opened or closed direction at differential pressures above the rated pressure. The system should be allowed to stabilize at the test pressure before conducting the hydrostatic test.
- D. Air removal – Before applying the specified test pressure, air shall be expelled completely from the section of piping under test. If permanent air vents are not located at all high points, corporation cocks shall be installed at these points to expel the air as the line is filled with water. After the air has been expelled, the corporation cocks shall be closed and the test pressure shall be applied. At the conclusion of the pressure test, the corporation cocks shall be removed and the pipe plugged or left in place as required by the ENGINEER.
- E. Examination – Any exposed pipe, fittings, valves, hydrants, and joints shall be examined carefully during the test. Any damage or defective pipe, fittings, valves, hydrants, or joints

that are discovered following pressure test shall be repaired or replaced with reliable material and the test shall be repeated until satisfactory results are obtained.

- F. Testing allowance defined – Testing allowance shall be defined as the quantity of makeup water that must be supplied into the newly laid pipe, or any valved section thereof, to maintain pressure within 5 psi of the specified test pressure after the pipe has been filled with water and the air has been expelled. Testing allowance shall not be measured by a drop in pressure in a test section over a period of time.
- G. Testing allowance – No pipe installation will be accepted if the amount of makeup water is greater than that determined by the following formula:

$$L = \frac{SD \sqrt{P}}{148,000}$$

Where L is the allowable leakage in gallons per hour; S is the test length in feet; D is the pipe diameter in inches and P is the average test pressure in pounds per square inch.

- H. Locate, remove, and replace any defective pipe, valves, fittings, or hydrants.
- I. Repeat tests until results are satisfactory to ENGINEER. CONTRACTOR shall submit to the ENGINEER written pressure test results, which shall be signed at the time of inspection by the WCWD's representative.

6.03 DISINFECTING AND SAMPLING

- A. All branches of the new distribution system shall be disinfected by chlorination, and shall be pressure tested by the Contractor before acceptance of work by the WCWD. Disinfection of all new mains in the system shall be as follows:
 - 1. Disinfection procedure shall conform to the Georgia Rules for Safe Drinking Water, Chapter 391-3-5.
 - 2. The procedure for disinfection shall be in accordance with AWWA C 651 and C 600, latest edition, and the method of application shall be the continuous Feed Method or the Slug Method. The "tablet method" of disinfection which consists of placing calcium hypochlorite granules or tablets in the water main as it is being installed and then filling the main with potable water when installation is complete is not allowed.
 - 3. After each section of piping is disinfected and flushed clear of chlorine the Contractor shall notify the WCWD to take samples for bacteriological analysis by the State Department of Natural Resources, Environmental Protection Division, Water Supply Laboratory. Copies of sample reports shall be furnished to the WCWD and the Contractor.
 - 4. Should the samples fail to be acceptable, the Contractor shall be obligated to again disinfect the system completely, flush system clear and have additional samples taken for analysis.
- B. In locations where hydrants are not available and at the request of the WCWD, the contractor shall install a 3/4" tap with two corporation stops and sufficient service tubing

for acquiring a sample. Once testing is complete, both corporation stops shall be shut off and the tubing shall be coil up inside of a meter box installed flush with the ground surface.

END OF SECTION

SECTION 7

EROSION CONTROL

7.01 GENERAL

The Contractor is responsible for providing all materials & labor necessary to meet the erosion control requirements as detailed on the plans and/or as specified by the Engineer.

7.02 MONITORING

Discharges of storm-water runoff from disturbed areas shall be controlled to the extent that turbidity of the storm-water runoff shall not exceed 50 nephelometric turbidity units higher than the turbidity level of the receiving stream immediately upstream from the storm-water runoff discharge at the time of such discharge. The turbidity of the receiving site shall not exceed 60 nephelometric turbidity units higher than the turbidity level of the receiving stream immediately upstream from the construction site. Downstream turbidity measurements may be taken by the Georgia Dept. of Natural Resources without warning at any time.

Contractor shall be responsible for following the requirements of the Georgia Department of Natural Resources Environmental Protection Division "Authorization to Discharge Under the National Pollutant Discharge Elimination System Storm Water Discharges Associated with Construction Activity". In general, the contractor will be responsible for developing a Comprehensive Monitoring Plan (CMP), filing a Notice of Intent (NOI) to discharge, and monitoring no more than one outfall (simultaneously) and reporting this monitoring data to EPD. The contractor shall use an automated sampler for monitoring to ensure the samples are taken at the correct time intervals. Payment for this monitoring shall be as set forth in the bid schedule.

7.03 SILT FENCE

- A. Silt Fence shall be placed as shown on the drawings and/or as directed by the Engineer before construction begins.
- B. The Silt Fence shall be constructed of woven polypropylene with a maximum opening size equivalent to a #50 U.S. Standard Sieve, a maximum permittivity of 0.4 sec^{-1} , and a trapezoidal tear strength of 50 pounds. The fabric shall have a minimum width of 3 ft with 6 inches buried upon installation for a net installed height of 2'-6".
- C. The installation shall be as shown in Standard Detail D-15. When the accumulated silt covers the silt fence to the point that only 12 inches of fabric is showing the accumulated silt shall be removed and placed back in the construction area.

7.04 ROCK CHECK DAMS

- A. Rock Check Dams shall be installed in ditches, as shown on drawings or as directed by the Engineer before construction begins.
- B. Rock Check Dams shall be constructed using well-graded riprap or 1.5" diameter clean gravel and river rock and installed as shown on the details in Standard Detail D-16.

7.05 GRASSING

- A. Temporary seeding in disturbed areas shall be rye grass distributed at a rate of 170 lbs/acre. Permanent Grassing in disturbed areas shall be tall fescue. Fescue seeds shall be distributed at the rate of 50 lbs/acre.
- B. Prior to spreading the seeds, 6-12-12 shall be applied at a rate of 1,500 lbs/acre and shall be thoroughly worked into the top 4" of the soil by means of scarifying or tilling.
- C. Disturbed area shall be mulched immediately after seeding with mulch hay at a rate of 2.5 tons per acre.
- D. Contractor shall be responsible for maintaining all seeded areas including mowing, watering, and reseeding defective areas until a satisfactory stand of grass is accomplished and final acceptance of the work by the WCWD is obtained. Areas showing evidence of settlement or erosion shall be rebuilt and reseeded as required.

END OF SECTION

SECTION 8

LIFT STATIONS & FORCE MAINS

8.01 GENERAL

- A. Flooding: Wastewater pumping station structures and electrical and mechanical equipment shall be protected from physical damage from a 100-year flood event. Wastewater pumping stations should remain fully operational and accessible during the 25-year flood. Regulations of federal, state, and local agencies regarding floodplain obstructions shall be considered.
- B. Accessibility and Security: The pumping station shall be readily accessible by maintenance vehicles during all weather conditions. The facility should be located off the traffic way of streets and alleys. It is required that security fencing and access hatches with locks be provided. Security fence shall be 6' chain link with 3 strands of barb wire at top with 3' pedestrian gate and 12' vehicle gate.
- C. Grit: Where it is necessary to pump wastewater prior to grit removal, the design of the wet well and pump station piping shall receive special consideration to avoid operational problems from the accumulation of grit.
- D. Safety: Adequate provision shall be made to effectively protect maintenance personnel from hazards. Equipment for confined space entry in accordance with OSHA, state and local requirements shall be provided for all wastewater pumping stations.

8.02 DESIGN

The following items should be given consideration in the design of wastewater pumping stations:

- A. Type: Wastewater pumping stations shall be either submersible or suction lift.
- B. Structure:
 - 1. Separation: Dry wells, including their superstructure, shall be completely separated from the wet well. Common walls must be gas tight.
 - 2. Equipment Removal: Provision shall be made to facilitate removing pumps, motors, and other mechanical and electrical equipment. A permanent lifting device shall be provided at every station.
 - 3. Buoyancy: Buoyancy calculations shall be submitted to WCWD along with initial design. If calculation show problems related to buoyancy, corrective measures must be provided for prior to approval.
 - 4. Construction Materials: Materials shall be selected that are appropriate under conditions of exposure to hydrogen sulfide and other corrosive gases, greases, oils and other constituents frequently present in wastewater. This is particularly important in the selection of metals and paints. Contact between dissimilar metals should be avoided or other provisions made to minimize galvanic action.

C. Pumps:

1. Multiple Units: Multiple pumps shall be provided. Where only two units are provided, they shall be of the same size. Units shall have capacity such that, with any unit out of service, the remaining units will have capacity to handle the design peak hourly flow. All pumps should be tested by the manufacturer. These tests should include a hydrostatic test and an operating test. Proof of testing shall be provided to WCWD.
2. Protection Against Clogging: Pumps handling sanitary wastewater from 18" or larger diameter sewers shall be preceded by readily accessible bar racks to protect the pumps from clogging or damage. Bar racks should have clear openings of 1-inch for manually cleaned racks. Where a bar rack is provided, a mechanical hoist shall also be provided. Where the size of the installation warrants, mechanically cleaned and/or duplicate bar racks shall be provided.
3. Pump Openings: Pumps handling raw wastewater shall be capable of passing spheres at least 3 inches in diameter. Pump suction and discharge openings shall be at least 4 inches in diameter.
4. Priming: The pump shall be placed so that under normal operating conditions it will operate under a positive suction head, except as specified in Section 8.03.
5. Electrical Equipment: Electrical systems and components (e.g. motors, lights, cables, conduits, switch boxes, control circuits, etc.) in raw wastewater wet wells, or in enclosed or partially enclosed spaces where hazardous concentrations of flammable gases or vapors may be present, shall comply with the National Electrical Code requirements for Class I Group D, Division 1 locations. In addition, equipment located in the wet well shall be suitable for use under corrosive conditions. Each flexible cable shall be provided with a watertight seal and separate strain relief. A fused disconnect switch located above ground shall be provided for the main power feed for all pumping stations. When such equipment is exposed to weather, it shall meet the requirements of weatherproof equipment NEMA 3R or 4. Lightning and surge protection systems should be considered. A 110-volt power receptacle to facilitate maintenance shall be provided inside the control panel for lift stations that have control panels outdoors. Ground fault interruption protection shall be provided for all outdoor outlets.
6. Intake: Each pump shall have an individual intake. Wet well and intake design should be such as to avoid turbulence near the intake and to prevent vortex formation.
7. Pumping Rates: The pumps and controls of main pumping stations, and especially pumping stations operated as part of treatment facilities, should be selected to operate at varying delivery rates. Insofar as is practicable, such stations should be designed to deliver as uniform a flow as practicable in order to minimize hydraulic surges. The station design capacity shall be based on peak hourly flow as determined in accordance with these specifications and WCWD policies, and

should be adequate to maintain a minimum velocity of 2 feet per second in the force main.

Controls: Control float tubes and bubbler lines should be so located as not to be unduly affected by turbulent flows entering the well or by the turbulent suction of the pumps. Provision shall be made to automatically alternate the pumps in use. Control panel shall be equipped with cycle counter.

E. Valves:

1. Discharge Line: Suitable shutoff and check valves shall be placed on the discharge line of each pump. The check valve shall be located between the shutoff valve and the pump. Check valves shall be suitable for the material being handled and shall be placed on the horizontal portion of discharge piping. Valves shall be capable of withstanding normal pressure and water hammer.
2. All shut off and check valves shall be operable from the floor level and accessible for maintenance. Outside levers are recommended on swing check valves.

F. Wet Wells:

1. Size: The design fill time and minimum pump cycle time shall be considered in sizing the wet well. The effective volume of the wet well shall be based on design average flow and a filling time not to exceed 30 minutes unless the facility is designed to provide flow equalization. The pump manufacturer's duty cycle recommendations shall be utilized in selecting the minimum cycle time. When the anticipated initial flow tributary to the pumping station is less than the design average flow, provisions should be made so that the fill time indicated is not exceeded for initial flows. When the wet well is designed for flow equalization as part of a treatment plant, provisions should be made to prevent septicity.
2. Floor Slope: The wet well floor shall have a minimum slope of 1 to 1 to the hopper bottom. The horizontal area of the hopper bottom shall be no greater than necessary for proper installation and function of the inlet.
3. Air Displacement: Covered wet wells shall have provisions for air displacement to the atmosphere, such as an inverted "j" tube or other means.

G. Safety Ventilation:

1. General: Adequate ventilation shall be provided for all pump stations. If screens or mechanical equipment requiring maintenance or inspection are located in the wet well, permanently installed ventilation is required. There shall be no interconnection between the wet well and dry well ventilation systems.
2. Air Inlets and Outlets: Dampers should not be used on exhaust or fresh air ducts. Fine screens or other obstructions in air ducts should be avoided to prevent clogging.
3. Electrical Controls: Switches for operation of ventilation equipment should be marked and located conveniently. All intermittently operated ventilation equipment shall be interconnected with the respective pit lighting system. Consideration should be given also to automatic controls where intermittent operation is used. The manual lighting/ventilation switch shall override the

automatic controls. For a two speed ventilation system with automatic switch over where gas detection equipment is installed, consideration should be given to increasing the ventilation rate automatically in response to the detection of hazardous concentrations of gases or vapors.

4. Wet Wells: Wet well ventilation may be either continuous or intermittent. Ventilation, if continuous, shall provide at least 12 complete air changes per hour; if intermittent, at least 30 complete air changes per hour. Air shall be forced into the wet well by mechanical means rather than solely exhausted from the wet well. The air change requirements shall be based on 100 percent fresh air. Portable ventilation equipment shall be provided for use at submersible pump stations and wet wells with no permanently installed ventilation equipment.
- H. Flow Measurement: Suitable devices for measuring wastewater flow shall be provided at all pumping stations. Indicating, totalizing, and recording flow measurement shall be provided at pumping stations with a 1200 gpm or greater design peak flow. Elapsed time meters used in conjunction with annual pumping rate tests may be acceptable for pump stations with a design peak hourly flow up to 1200 gpm provided sufficient metering is configured to measure the duration of individual and simultaneous pump operation.
- I. Water Supply: There shall be no physical connection between any potable water supply and a wastewater pumping station, which under any conditions might cause contamination of the potable water supply. If a potable water supply is brought into the station, it shall comply with conditions stipulated in WCWD standards and EPD regulations. In all cases, a potable water supply located at or near a wastewater pumping station shall be fitted with an approved double check backflow prevention device.

8.03 SUCTION-LIFT PUMP STATIONS

Suction-lift pumps shall meet the applicable requirements of Section 8.02.

- A. Pump Priming and Lift Requirements: Suction-lift pumps shall be of the self-priming or vacuum-priming type. Suction-lift pump stations using dynamic suction lifts exceeding the limits outlined in the following sections may be approved upon submission of factory certification of pump performance and detailed calculations indicating satisfactory performance under the proposed operating conditions. Such detailed calculations must include static suction-lift as measured from “lead pump off” elevation to centerline of pump suction, friction, and other hydraulic losses of the suction piping, vapor pressure of the liquid, altitude correction, required net positive suction head, and a safety factor of at least 6 feet.
 1. Self-Priming Pumps: Self-priming pumps shall be capable of rapid priming and repriming at the “lead pump on” elevation. Such self-priming and repriming shall be accomplished automatically under design operating conditions. Suction piping should not exceed the size of the pump suction and shall not exceed 25 feet in total length. Priming lift at the “lead pump on” elevation shall include a safety factor of at least 4 feet from the maximum allowable priming lift for the specific equipment at design operating conditions. The combined total of dynamic suction-lift at the “pump off” elevation and required net positive suction head at design operating conditions shall not exceed 22 feet.

2. Vacuum-Priming Pumps: Vacuum-priming pump stations shall be equipped with dual vacuum pumps capable of automatically and completely removing air from the suction-lift pump. The vacuum pumps shall be adequately protected from damage due to wastewater. The combined total of dynamic suction-lift at the “pump off” elevation and required net positive suction head at design operating conditions shall not exceed 22 feet.
- B. Equipment, Wet Well Access, and Valving Location: The pump equipment compartment shall be above grade or offset and shall be effectively isolated from the wet well to prevent a hazardous and corrosive sewer atmosphere from entering the equipment compartment. Wet well access shall not be through the equipment compartment and shall be at least 24 inches in diameter. Gasketed replacement plates shall be provided to cover the opening to the wet well for pump units removed for servicing. Valving shall not be located in the wet well.

8.04 SUBMERSIBLE PUMP STATIONS – SPECIAL CONSIDERATIONS

Submersible pump stations shall meet the applicable requirements under Section 8.02, except as modified in this Section.

- A. Construction: Submersible pumps and motors shall be designed specifically for raw wastewater use, including totally submerged operation during a portion of each pumping cycle and shall meet the requirements of the National Electrical Code for such units. An effective method to detect shaft seal failure or potential seal failure shall be provided.
- B. Pump Removal: Submersible pumps shall be readily removable and replaceable without dewatering the wet well or disconnecting any piping in the wet well. An appropriately sized, permanent lifting hoist shall be provided at each station.
- C. Electrical Equipment:
 1. Power Supply and Control Circuitry: Electrical supply, control, and alarm circuits shall be designed to provide strain relief and to allow disconnection from outside the wet well. Terminals and connectors shall be protected from corrosion by location outside the wet well or through use of watertight seals.
 2. Controls: The motor control center shall be located outside the wet well, be readily accessible, and be protected by a conduit seal or other appropriate measures meeting the requirements of the National Electrical Code, to prevent the atmosphere of the wet well from gaining access to the control center. The seal shall be so located that the motor may be removed and electrically disconnected without disturbing the seal. When such equipment is exposed to weather, it shall meet the requirements of weatherproof equipment NEMA 3R or 4.
 3. Power Cord: Pump motor power cords shall be designed for flexibility and serviceability under conditions of extra hard usage and shall meet the requirements of the National Electrical Code standards for flexible cords in wastewater pump stations. Ground fault interruption protection shall be used to de-energize the circuit in the event of any failure in the electrical integrity of the

cable. Power cord terminal fittings shall be corrosion-resistant and constructed in a manner to prevent the entry of moisture into the cable, shall be provided with strain relief appurtenances, and shall be designed to facilitate field connecting.

- D. Valves: Valves required under Section 8.02.E shall be located in a separate valve pit. Provisions shall be made to remove or drain accumulated water from the valve pit. The valve pit may be dewatered to the wet well through a drain line with a gas and water tight valve. Check valves that are integral to the pump need not be located in a separate valve pit provided that the valve can be removed from the wet well in accordance with Section 8.04.B.

8.05 ALARM SYSTEMS/TELEMETRY

Alarm systems shall be provided for pumping stations. The alarm shall be activated in cases of power failure, sump pump failure, pump failure, unauthorized entry, or any cause of pump station malfunction. Pumping station alarms shall be telemetered to the WCWD's office during normal working hours and to the home of the responsible person(s) in charge of the lift station during off-duty hours. The telemetry equipment provided shall be compatible with the WCWD's current telemetry equipment. Telemetry equipment shall be supplied and installed by developer.

8.06 EMERGENCY OPERATION

- A. Objective: The objective of emergency operation is to prevent the discharge of raw or partially treated wastewater to any waters and to protect public health by preventing back-up of wastewater and subsequent discharge to basements, streets, and other public and private property.
- B. Emergency Pumping Capability: Emergency pumping capability is required unless on-system overflow prevention is provided by adequate storage capacity. Emergency pumping capability shall be provided by a Godwin diesel emergency backup pump.
- C. Emergency High Level Overflows: For use during possible periods of extensive power outages, mandatory power reductions, or uncontrollable emergency conditions, consideration should be given to providing a controlled, high-level wet well overflow to supplement alarm systems and emergency power generation in order to prevent backup of wastewater into basements, or other discharges which may cause severe adverse impacts on public interests, including public health and property damage. Where a high level overflow is utilized, consideration shall also be given to the installation of storage/detention tanks, or basins, which shall be made to drain to the station wet well. Where such overflows affect public water supplies or other critical water uses, the WCWD shall be contacted for the necessary treatment or storage requirements.
 - 1. Independent Utility Substations: Where independent substations are used for emergency power, each separate substation and its associated transmission lines shall be capable of starting and operating the pump station at its rated capacity.

8.07 INSTRUCTIONS AND EQUIPMENT

Wastewater pumping stations and portable equipment shall be supplied with a complete set of operational instructions, including emergency procedures, maintenance schedules, tools and such spare parts as may be necessary.

8.08 FORCE MAINS

- A. Velocity and Diameter: At design pumping rates, a cleansing velocity of at least 2 feet per second should be maintained. The minimum force main diameter for raw wastewater shall not be less than 4 inches.
- B. Air and Vacuum Relief Valve: An air relief valve shall be placed at high points in the force main to prevent air locking. Vacuum relief valves may be necessary to relieve negative pressures on force mains. The force main configuration and head conditions should be evaluated as to the need for and placement of vacuum relief valves.
- C. Termination: Force mains should enter the gravity sewer system at a point not more than 2 feet above the flow line of the receiving manhole.
- D. Pipe and Design Pressure: Pipe and joints shall be equal to water main strength materials suitable for design conditions. The force main, reaction blocking, and station piping shall be designed to withstand water hammer pressures and associated cyclic reversal of stresses that are expected with the cycling of wastewater lift stations. Surge protection chambers should be evaluated. Force mains shall be composed of C-900 DR 18 PVC pipe.
- E. Special Construction: Force main construction near streams or water works structures and at water main crossings shall meet applicable provisions of "Design of Sewers" section.
- F. Design Friction Losses:
 - 1. Friction Coefficient: Friction losses through force mains shall be based on the Hazen and Williams formula or other acceptable methods. When the Hazen and Williams formula is used, the value for "C" shall be 100 for unlined iron or steel pipe for design. For other smooth pipe materials such as PVC, polyethylene, lined ductile iron, etc., a higher "C" value not to exceed 120 may be allowed for design.
 - 2. Maximum Power Requirements: When initially installed, force mains will have a significantly higher "C" factor. The effect of the higher "C" factor should be considered in calculating maximum power requirements and duty cycle time to prevent damage to the motor.
- G. Identification: Where force mains are constructed of material, which might cause the force main to be confused with potable water mains, the force main shall be appropriately identified with detection tape printed with "Caution: Buried Sewer Line Below" or similar warning.
- H. Leakage Testing: Pressure testing shall be performed prior to acceptance of facilities by WCWD. Each portion of the new piping in the system shall be subjected to a test pressure of 200 pounds per square inch gauge. The duration of each pressure test shall be 2 hours.

If the pressure drops during the test, repairs are to be made and the test repeated. All testing shall be witnessed by a representative of the WCWD.

At the option of the WCWD, the Contractor shall perform a leakage test. The duration of each leakage test shall be 24 hours and during the test the system shall be subjected to a pressure of 100 pounds per square inch gauge or system pressure, whichever is higher.

Pipe Diameter	<u>Leakage in gallons/100 gasket joints</u>	
	@ 100 psi	@ 125 psi
4"	0.35	0.42
6"	0.75	0.90
8"	0.95	1.15
10"	1.15	1.40
12"	1.35	1.65

A twin gasket is counted as two joints. A single gasket is counted as one joint.

END OF SECTION

SECTION 9

DESIGN OF SEWERS

9.01 APPROVAL OF SEWERS

In general, the WCWD’s consulting engineer has been granted delegation by the Georgia Environmental Protection Division to approve plans for new systems, extensions to new areas, or replacement sanitary sewers. No sewers shall be combined sanitary/storm sewers.

9.02 DESIGN CAPACITY AND DESIGN FLOW

In general, sewer capacities should be designed for the estimated ultimate tributary population, except in considering parts of the systems that can be readily increased in capacity. Similarly, consideration should be given to the maximum anticipated capacity of institutions, industrial parks, etc.

9.03 DETAILS OF DESIGN AND CONSTRUCTION

- A. Minimum Size: No public gravity sewer conveying raw wastewater shall be less than 8 inches in diameter. In all cases, sewers should be sized such that they are large enough to serve the anticipated tributary area.
- B. Depth: In general, sewers should be sufficiently deep to receive wastewater from basements and to prevent freezing. Where practical, gravity sewers shall have a minimum depth of 6’ and a maximum depth of 12’. Force mains shall have a minimum cover of 4’.
- C. Buoyancy: Buoyancy of sewers shall be considered and flotation of the pipe shall be prevented with appropriate construction where high groundwater conditions are anticipated. If applicable, buoyancy calculations should be submitted to WCWD for review.
- D. Slope:
 - 1. Recommended Minimum Slopes: All sewers shall be designed and constructed to give mean velocities, when flowing full, of not less than 2.0 feet per second, based on Manning’s formula using an “n” value of 0.013. The following are the recommended minimum slopes, which should be provided; however, slopes greater than these are desirable.

Minimum Allowable Slopes

Nominal Sewer Size	Minimum Slope in Feet Per 100 Feet
8”	0.50
10”	0.40
12”	0.30
15”	0.25
18”	0.20
24”	0.15

2. Minimize Solids Deposition: The pipe diameter and slope shall be selected to achieve a minimum velocity of 2.0 feet per second velocity to minimize settling problems. Oversize sewers will not be approved to justify using flatter slopes. If the proposed slope is less than the minimum slope of the smallest pipe which can accommodate the design peak hourly flow, the actual depths and velocities at minimum, average, and design maximum day and peak hourly flow for each design section of the sewer shall be calculated by the design engineer and be included with the plans.
 3. Slope Between Manholes: Sewers shall be laid with uniform slope between manholes.
 4. High Velocity Protection: Where velocities greater than 15 feet per second are attained, special provision shall be made to protect against displacement by erosion and impact.
 5. Steep Slope Protection: Sewers on 20% slopes or greater shall be anchored securely with concrete, or equal, anchors spaced as follows:
 - a. Not over 36 feet center to center on grades 20%-35%.
 - b. Not over 24 feet center to center on grades 35%-50%.
 - c. Not over 16 feet center to center on grades 50%+.
- E. Alignment: In general, sewers 24 inches or less shall be laid with straight alignment between manholes. Straight alignment shall be checked by either using a laser beam or lamping. Testing for alignment shall be performed prior to acceptance as outlined in these specifications. Curvilinear alignment of sewers larger than 24 inches may be considered on a case by case basis providing compression joints are specified and ASTM or specific pipe manufacturers' maximum allowable pipe joint deflection limits are not exceeded. Curvilinear sewers shall be limited to simple curves, which start and end at manholes. When curvilinear sewers are proposed, minimum slopes indicated in Section 8.03.D.1 must be increased accordingly to provide a recommended minimum velocity of 2.0 feet per second when flowing full.
- F. Changes in Pipe Size: When smaller sewer joins a larger one, the invert of the larger sewer should be lowered sufficiently to maintain the same energy gradient. An approximate method for securing these results is to place the 0.8 depth point of both sewers at the same elevation. Sewer extensions should be designed for projected flows even when the diameter of the receiving sewer is less than the diameter of the proposed extension at a manhole constructed in accordance with Section 8.04 with special consideration of an appropriate flow channel to minimize turbulence when there is a change in sewer size. The appropriate WCWD may require a schedule for construction of future downstream sewer relief.
- G. Materials: In general, sewers shall be composed of PVC with a minimum dimensional ratio (DR) of 26. For depths of cover over 12', ductile iron pipe shall be used. In all cases, the material selected should be adapted to local conditions, such as: character of industrial wastes, possibility of septicity, soil characteristics, exceptionally heavy external loadings, abrasion, corrosion, and similar problems.

Suitable couplings complying with ASTM specifications shall be used for joining dissimilar materials. The leakage limitations on these joints shall be in accordance with Section 8.03.1.4 and 2.03.1.5.

All sewers shall be designed to prevent damage from superimposed live, dead, and frost induced loads. Proper allowance for loads on the sewer shall be made because of soil and potential groundwater conditions, as well as the width and depth of trench. Where necessary, special bedding, haunching and initial backfill, concrete cradle, or other special construction shall be used to withstand anticipated potential superimposed loading or loss of trench wall stability. See ASTM D 2321 or ASTM C 12 when appropriate.

H. Installation:

1. Pipe Bedding: For flexible pipe, Soil classifications under the Unified Soil Classification System grouped into broad categories according to their abilities to develop an interacting soil-pipe system are listed below:

Soil Class	Group Symbol	Typical Names	Comments
I		Crushed rock	Angular, 6-40 mm
II	GW	Well graded gravels	40 mm maximum
	GP	Poorly graded gravels	
	SW	Well graded sands	
	SP	Poorly graded sands	
III	GM	Silty gravels	
	GC	Clayey gravels	
	SM	Silty sands	
	SC	Clayey sands	
IV	MH, ML	Inorganic silts	Not Recommended for bedding, haunching, or initial backfill
	CH, CL	Inorganic clays	
V	OL, OH	Organic silts and clays	Not Recommended for bedding, haunching, or initial backfill
	PT	Peat	

In general, soils classified as Types I, II, or III are suitable for pipe bedding materials. Soils classified as types IV or V are not suitable. In locations where inundation by water occurs, the Contractor shall not use poorly graded sandy materials, or any other material, which tends to flow when wet, for bedding or haunching of pipe. When satisfactory native materials are not available, the Contractor shall furnish and install suitable granular material for bedding, haunching, and initial backfilling of the pipe, in accordance with the approved drawings.

2. Trenching:

- a. The width of the trench shall be ample to allow the pipe to be laid and jointed properly and to allow the bedding and haunching to be placed and compacted to adequately support the pipe. The trench sides shall be kept as nearly vertical as possible. When wider trenches are required,

appropriate bedding and pipe shall be used. In unsupported, unstable soil the size and stiffness of the pipe, stiffness of the embedment and in situ soil depth of cover shall be considered in determining the minimum trench width necessary to adequately support the pipe.

- b. Ledge rock, boulders, and large stones shall be removed to provide a minimum clearance of 4 inches below and on each side of all pipe(s).

3. Bedding Haunching, and Initial Backfill:

- a. Bedding Classes A, B, C, or crushed stone may be used for ductile iron gravity sewer while only crushed stone as described in ASTM C 12 shall be used for all PVC gravity sewers. The fill must be carefully compacted for all rigid pipe provided the proper pipe is used with the specified bedding to support the anticipated load, based on the type of soil encountered and potential ground water conditions.
- b. For PVC pipe, a minimum of 6" of crushed stone shall be used under the pipe. Additionally, 6" of crushed stone shall be placed above the pipe as initial backfill. This will allow minimal "re-rounding" of the pipe if deflection occurs during backfill operations.
- c. Embedment materials for bedding, haunching, Classes I, II, or III, as described in ASTM D 2321, shall be used and carefully compacted for all flexible pipe provided the proper strength pipe is used with the specified bedding to support the anticipated load, based on the type soil encountered and potential groundwater conditions.
- d. All water entering the excavations or other parts of the work shall be removed until all the work has been completed. No sanitary sewer shall be used for the disposal of trench water, unless specifically approved by the engineer, and then only if the trench water does not ultimately arrive at existing pumping or wastewater treatment facilities.

4. Pipe Laying-General:

- a. Before sewer pipe is placed in position in the trench, the bottom and sides of the trench shall be carefully prepared, bedding shall be placed and compacted, and necessary bracing and sheeting shall be installed.
- b. Each piece of pipe and special fitting shall be inspected before it is placed and no defective pipe shall be laid in trench. Pipe laying shall proceed upgrade starting at the lower end of the grade and with the bells up-grade.
- c. No walking upon the completed pipe lines will be permitted until trench has been backfilled to a depth of at least 6" over the top of the pipe. Exceptions may be made at the discretion of the inspector where it is necessary to tamp the backfill around the pipe.
- d. The interior of the pipe shall be cleaned as the work progresses, of all dirt, jointing materials, and superfluous materials of every description. When

laying of pipe is stopped for any reason, the exposed end of such pipe shall be closed with a plug fitted into the pipe bell so as to prevent the entry of earth and other material, precautions being taken to prevent the flotation of pipe by runoff into to the trench.

- e. Laying of pipe may be delayed by the Inspector until trenching has progressed far enough to remove the possibility of having to change grade or alignment due to conflicts with other structures, pipe lines, or conduits.
- f. In wet, yielding, and mucky locations where pipe is in danger of sinking below grade or of floating out of grade or line, or where backfill materials are of such a fluid nature that such movement of pipe might take place during the placing of backfill, the Contractor shall install concrete cradles or similar measures to secure the pipe in place and shall then install suitable haunching and backfill material.
- g. When ordered by the Engineer, mucky and quicksand trench sub-grades shall be removed below ordinary trench depth.
- h. Pipes shall be laid free from all structures other than manholes. Any pipes entering structures underground unsupported by original earth shall be supported by non-reinforced concrete or brick and mortar masonry.
- i. No joints will be accepted which show evidence of leakage. If after backfilling and inspection, any joints are found that are allowing ground water to enter the sewer, the joints shall be uncovered and corrected.

5. Final Backfill:

- a. Final backfill shall be of a suitable material removed from excavation except where other material is specified. Debris, frozen material, large clods or stones, organic matter, or other unstable materials shall not be used for final backfill within 2 feet of the top of the pipe.
- b. Final backfill shall be placed in such a manner as not to disturb the alignment of the pipe.

6. Deflection Test:

- a. Deflection tests shall be performed on all flexible pipe. The test shall be conducted after the final backfill has been in place approximately 30 days to permit stabilization of the soil-pipe system.
- b. No pipe shall exceed a deflection of 5 percent. If deflection exceeds 5 percent, replacement or correction shall be accomplished in accordance with requirements in these specifications.
- c. The rigid ball or mandrel used for the deflection test shall have a diameter not less than 95 percent of the base inside diameter or average inside diameter of the pipe depending on which is specified in the ASTM

Specification, including the appendix, to which the pipe is manufactured. The test shall be performed without mechanical pulling devices.

- I. Joints and Infiltration:
 1. Joint Construction:
 - a. Each joint shall be installed so that it will form a close concentric joint with adjoining pipe and so as to avoid sudden offsets or inequalities in the flow line. The inside of all bells and the outside of all spigots shall be wiped clean of all dirt, water, or other foreign matter so that their surfaces are clean and dry when the pipes are joined.
 - b. Rubber ring gasket joints for ductile iron pipe shall be installed according to the pipe manufacturer's specifications and recommendations. Extreme care shall be used in joining large diameter pipe to avoid damaging the rubber ring or displacing it from the properly seated position.
 - c. Mechanical joints on ductile iron sewers shall be installed according to the pipe manufacturer's specifications and recommendations.
 - d. After the joints have been completed, they shall be inspected by the Project Inspector before they are covered. Any leaks or defects discovered at any time after completion of the work shall be repaired immediately. All pipe in place shall be carefully protected from damage until the backfilling operations have been completed. Any pipe which has been disturbed shall be taken up, the joint cleaned and remade, and the pipe re-installed at the Contractor's expense.
 - e. Water shall not be allowed to run or stand in the trench while pipe laying is in progress or before the joints are completed or before the trench has been backfilled. The Contractor shall not at any time open up more trench than his available pumping facilities are able to dewater.
 - f. Iron Transition Couplings shown in the drawings shall be used to couple the transition between ductile iron sewer pipe and other types of sewer pipe. The required coupling will be Style FC2A Ford Iron Transition Coupling with Epoxy Coating and stainless steel nuts and bolts, manufactured by The Ford Meter Box Company, Inc., or approved equal.
 2. Service Connections: Service connections to the sewer main shall be water tight and not protrude into the sewer. If a saddle type connection is used, it shall be a device designed to join with the types of pipe, which are to be connected. All materials used to make service connections shall be compatible with each other and with the pipe materials to be joined and shall be corrosion proof. In general, service connection shall be 4" Schedule 40 PVC with glue joint fittings.
 3. Leakage Tests: Leakage tests shall be specified. This may include appropriate water or low pressure air testing. The testing methods selected should take into

consideration the range in groundwater elevations during the test and anticipated during the design life of the sewer.

4. Water (Hydrostatic) Test: The leakage exfiltration or infiltration shall not exceed 25 gallons per inch of pipe diameter per mile per day for any section of the system. An exfiltration or infiltration test shall be performed with a minimum positive head of 2 feet.
5. Air Test: The air test shall, as a minimum, conform to the test procedure described in ASTM C-828 for clay pipe, ASTM C 924 for concrete pipe, ASTM F-1417 for plastic pipe. The WCWD requires each section (between manholes) of gravity sewer installed to be tested individually at 4 psi for a minimum of 5 minutes.

Televised Inspection: The contractor shall provide a televised inspection (TV Inspection) of all gravity sewer lines prior to acceptance the WCWD. A log shall be maintained throughout the inspection and shall include such pertinent information as: Project Name, Date, size and type of pipe, length of inspection, locations of service connections and manholes and other relevant information. The test shall be performed in the presence of the WCWD's inspector and/or the WCWD's engineer. A copy of the tape created during the inspection shall be properly labeled and provided to the WCWD prior to acceptance by the WCWD.

9.04 MANHOLES

- A. Location: Manholes shall be installed:
 1. At the end of each line.
 2. At all changes in grade, size, or alignment.
 3. At all intersections.
 4. At distances not greater than 400 feet.
- B. Outside Drop: An outside drop pipe shall be provided for a sewer entering a manhole at an elevation of 36 inches or more above the manhole invert. Where the difference in elevation between the incoming sewer and the manhole invert is less than 36 inches, the invert shall be filleted to prevent solids deposition.

Drop manholes should be constructed with an outside drop connection. Inside drop connections (when necessary) shall be secured to the interior wall of the manhole and provide access for cleaning.

Due to the unequal earth pressures that would result from the backfilling operation in the vicinity of the manhole, the entire outside drop connection shall be encased in concrete.
- C. Diameter: The minimum diameter of manholes shall be 48 inches; larger diameters are preferable for large diameter sewers. A minimum access diameter of 22 inches shall be provided.
- D. Flow Channel: The flow channel straight through a manhole should be made to conform as closely as possible in shape, and slope to that of the connecting sewers. The channel

walls should be formed or shaped to the full height of the crown of the outlet sewer in such a manner to not obstruct maintenance, inspection or flow in the sewers.

When curved flow channels are specified in manholes, including branch inlets, minimum slopes indicated in Section 8.03.D.1 should be increased to maintain acceptable velocities.

- E. Bench: A bench shall be provided on each side of any manhole channel when the pipe diameter(s) are less than the manhole diameter. The bench should be sloped no less than ½" per foot (4 percent). No lateral sewer, service connection, or drop manhole pipe shall discharge onto the surface of the bench.
- F. Watertightness: Manholes shall be of the pre-cast concrete type. Manhole lift holes and grade adjustment rings shall be sealed with non-shrinking mortar or other material approved by the WCWD.

Inlet and outlet pipes shall be joined to the manhole with a gasketed flexible watertight connection or any watertight connection arrangement that allows differential settlement of the pipe and manhole wall to take place.

Watertight manhole covers are to be used wherever the manhole tops may be flooded by street runoff or high water. Locked manhole covers may be desirable in isolated easement locations or where vandalism may be a problem.

- G. Inspection and Testing: After the manhole is installed and all pipes are tied in the manhole shall be vacuum tested. When practical, this testing shall be performed prior final clean-up and or paving is complete. All pipes that enter the manhole shall be plugged and properly braced. Then the testing machine shall be installed and a vacuum of 10 inches of mercury shall be placed on the inside of the manhole. Once the 10 inches of mercury vacuum is achieved the vacuum shall be shut off and the amount of time to drop to 9 inches of mercury shall be recorded. The table below shows the allowable tolerances for vacuum testing of manholes.

If mercury reading drops from 10 inches to 9 inches in LESS than the specified time for each size class of manhole above, repairs shall be made to the leaks and the manhole shall be retested.

- H. Corrosion Protection For Manholes: Where corrosive conditions due to septicity or other causes are anticipated, consideration shall be given to providing corrosion protection on the interior of the manholes.

9.05 SEWERS IN RELATION TO STREAMS

A. Location of Sewers in Streams:

1. Cover Depth: The top of all sewers entering or crossing streams shall be at a sufficient depth below the natural bottom of the stream bed to protect the sewer line. In general, the following cover requirements must be met:
 - a. One foot of cover where the sewer is located in rock.
 - b. Three feet of cover in other material.
2. Horizontal Location: Sewers located parallel to streams shall be located outside of the stream bed and sufficiently removed therefrom to provide for future possible stream widening and to prevent pollution by siltation during construction. At all times, sewer lines shall be located outside of EPD's minimum stream 50' buffer (25' on each side measured from the top of bank). In addition, if major outfall lines are proposed within 150' feet of the top of bank, a variance from EPD must be obtained prior to construction.
3. Structures: The sewer outfalls, headwalls, manholes, gate boxes or other structures shall be located so they do not interfere with the free discharge of flood flows of the stream.
4. Alignment: Sewers crossing streams should be designed to cross the stream as nearly perpendicular to the stream flow as possible and shall be free from change in grade. Sewer systems shall be designed to minimize the number of stream crossings.

B. Construction:

1. Materials: Sewers entering or crossing streams shall be constructed of ductile iron pipe with mechanical or restrained joints; otherwise they shall be constructed so they will remain watertight and free from changes in alignment or grade. Material used to backfill the trench shall be stone, coarse aggregate, washed gravel, or other materials which will not readily erode, cause siltation, damage pipe during placement, or corrode the pipe.
2. Siltation and Erosion: Construction methods that will minimize siltation and erosion shall be employed. The method of crossing shall be detailed on the construction plans submitted for approval. Disturbance of all State waters shall be done in accordance with applicable regulations including EPD and USACE regulations.

9.06 PROTECTION OF WATER SUPPLIES

When wastewater sewers are proposed in the vicinity of any water supply facilities, requirements of the WCWD should be used to confirm acceptable isolation distances in addition to the following requirements.

- A. Cross Connections Prohibited: There shall be no physical connections between a public or private potable water supply system and a sewer, or appurtenance thereto which would

permit the passage of any wastewater or polluted water into the potable supply. No water pipe shall pass through or come into contact with any part of a sewer manhole.

- B. Relation to Water Works Structures: While no general statement can be made to cover all conditions, it is generally recognized that sewers shall meet the requirements of the WCWD and Georgia EPD with respect of minimum distances from public water supply wells or other water supply sources and structures.

All existing waterworks units, such as basins, wells, or other treatment units, within 200 feet of the proposed sewer shall be shown on the plans.

Soil conditions in the vicinity of the proposed sewer within 200 feet of waterworks units shall be determined and shown on the plans.

- C. Relation to Water Mains:

1. Horizontal Separation: Sewers shall be laid at least 10 feet horizontally from any existing or proposed water main. The distance shall be measured edge to edge.

If it is impossible to obtain proper horizontal separation as described above, both the water main and sewer must be constructed of slip-on or mechanical joint pipe complying with public water supply design standards of the agency and be pressure tested to 150 psi to assure water tightness before backfilling.

2. Crossings and Vertical Separations: Sewers crossing water mains shall be laid to provide a minimum vertical distance of 18 inches between the outside of the water main and the outside of the sewer with the water main being above the sewer. The crossing shall be arranged so that the sewer joints will be equidistant and as far as possible from the water main joints.

When it is impossible to obtain proper vertical separation as stipulated above either the water main or the sewer line may be encased in a watertight carrier pipe, which extends 10 feet on both sides of the crossing, measured perpendicular to the water main. The carrier pipe shall be of materials approved by the WCWD for use in water main construction.

END OF CONSTRUCTION SPECIFICATIONS

(BLANK SHEET FOR PART III TABBED DIVIDER)

PART V. APPENDICES

Appendix A Preliminary Application for Water/Wastewater Allocations for Developments

Appendix B Standard Symbology

Appendix C Change Order

Appendix D Developer's Certification

Preliminary Application for Water/Wastewater Allocation for Developments

1. **The following information is to be completed by the applicant for the proposed development and submitted to the Director at least 10 days prior to the Board of Commissioners Meeting:**

Name of Development: _____

Date Preliminary Application Submitted to Water Department: _____

Location of Development*: _____

Name of Developer: _____ Developer's Engineer _____

Address of Developer: _____

Contact Person for Developer: _____ Contact for Engineer _____

Developer's Phone: _____ Engineer's Phone: _____

Fax: _____ Fax: _____

Development Type: Residential (Single or Multi-Family, etc.), Commercial, Industrial?: _____

Total Lots: _____ Total Tract Size in Acres: _____ # Phases (If Applicable): _____

Lots By Phase (If Applicable): _____

Potential Total Length of Water Lines in Subdivision: _____

Estimated: Peak Operating Water Demand (gpm): _____ Fire Flow Required (gpm): _____

Duration (hr): _____

Developer Representative (Signature): _____

*Attach Preliminary Plat to this form (8 1/2" x 11")

-
2. **The following is a summary of key information about this development to be completed by the Walton County Water Department:**

Highest Ground Elevation: _____ Lowest Ground Elevation: _____

Calculated Domestic Residential Pressure: _____ With Fire Flow: _____

Length to Closest Existing Water Main and Main Size: _____

Estimated Long Term Water Supply Dedicated to This Development when Fully Developed: _____ gpd

List Adjoining Properties for Potential Looping Opportunities: _____

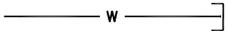
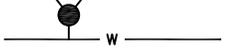
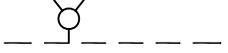
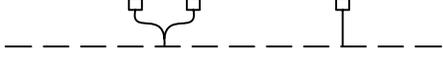
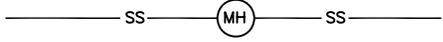
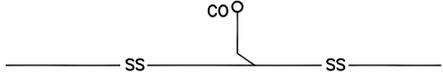
Other Comments on Preliminary Submittal: _____

-
3. **Recommended for Approval for Water Supply: () Yes () No By: _____**
Director Department Engineer

4. **Approved By Board: () Yes () No Date: _____**

Board Approved Conditions: _____

Description of Terms of Construction Cost Sharing (If Applicable): _____

PROPOSED WATER MAIN	
EXISTING WATER MAIN	
PROPOSED FORCE MAIN	
PROPOSED GRAVITY SEWER	
PROPOSED GATE VALVE	
EXISTING GATE VALVE	
DUCTILE IRON PLUG	
PROPOSED FIRE HYDRANT	
EXISTING FIRE HYDRANT	
PROPOSED TAPPING SLEEVE AND VALVE	
PROPOSED DOUBLE AND SINGLE SET SERVICE METER	
EXISTING DOUBLE AND SINGLE SET SERVICE METER	
PROPOSED SANITARY SEWER MANHOLE	
PROPOSED SEWER SERVICE LATERAL AND CLEANOUT	

STANDARD SYMBOLOGY
APPENDIX B

CHANGE ORDER

Order No: _____

Date: _____

Engineer's Plans Approval Date: _____

Name of Subdivision: _____

Developer: _____

Pipeline Contractor: _____

The following changes are hereby made to the plans "Approved for Construction":

Justification:

Approvals Required:

Walton County Water Department: _____

Approval Engineer: _____

Developer: _____

DEVELOPER'S CERTIFICATION

STATE OF GEORGIA,
COUNTY OF WALTON:

The undersigned being the owner, developer, or contractor of _____
_____ Development, being located on _____,
Walton County, Georgia, hereby certifies to the Walton County Water Department that the
undersigned has installed one or more water lines (water line) of approximately ____ feet in
length at a cost of \$_____ which unless otherwise stated in this certification is the
current fair market value of such water line.

The undersigned further certifies that said water line was wholly installed within the right-
of-way of Walton County, Georgia, or an easement granted to the Department.

The undersigned is aware that the information furnished in this certification will be
provided by the Department to its agents and employees for accounting and other related
purposes and except for such uses, shall remain confidential unless otherwise required by law.

(SEAL)

Print Name

Address

Date