WATER SPECIFICATIONS

Revised April 2022

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W101-GENERAL REQUIREMENTS

1.) This document is subject to periodic revision to meet changing requirements for materials, fire and safety regulations, environmental regulations, etc. At the beginning of a project, users should verify that they have the latest edition.

2.) This document is intended to convey the general design and construction requirements for a typical project. It also lists specific Cherokee County Water & Sewerage Authority requirements relating to plan review, inspection, testing and acceptance of facilities. It is not intended as a substitute for site-specific engineering and construction techniques. Individual project conditions may require variances from the provisions in this document in which case such variances should be noted in the plans and other data submitted by the project design professional for the Authority's approval.

3.) The **CCWSA Standard Details Booklet** is complementary to the Specifications written herein. If the developer or designer notes any discrepancies or desires an interpretation of a specification, they should submit their question to the Authority in writing for a decision by the Authority or the Authority's representative.

4.) Failure by the Authority or the Authority's plan review representative to notice any deviations from the Authority's Standards during the plan review process does not alleviate the Developer's responsibility to adhere to the Standards.

5.) The Developer must submit five (5) paper copies of Construction Plans, plus the electronic data on CD, as outlined in these specifications, to the Authority for review.

6.) An approved set of construction plans and **CCWSA Standard Details Booklet** stamped by the Authority must be kept onsite at all times by the Contractor.

7.) The Authority shall be notified by the Developer or his contractor before construction begins, and at the various stages in construction as required by the Authority. The Authority shall be given a minimum of 4 days' advance notice before an inspection is needed. **See Section W515 regarding notifying the public about interruption of the water supply during construction.**

8.) Contractors performing utility construction must be licensed in accordance with State of Georgia law and local ordinances and approved by the Authority. They shall maintain liability insurance to the minimum requirements of the Authority. **(See CCWSA Standard Detail M-04 for a sample of the Certificate of Liability Insurance to be submitted.)** They should be completely familiar with the procedures and contract requirements associated with this type of project. Unsatisfactory work will cause a contractor to not be approved for future work.

9.) The Developer is responsible for replacing any and all water and/or sewer facilities which are damaged by the Developer and any of his Contractors and any Builder working at the project site. Water and sewer facilities include but are not limited to service lines, meters, meter boxes, valves, valve boxes, valve markers, fire hydrants, and manholes.

W102-APPROVAL BY OTHER GOVERNMENT AGENCIES

No part of the approval process is intended to relieve the Developer of the responsibility to comply with minimum standards of the Cherokee County Water & Sewerage Authority, Georgia Department of Natural Resources, EPA, EPD, NRCS, Georgia Department of Transportation, Cherokee County, U.S. Army Corps of Engineers or other appropriate regulatory agency.

W103-LIST OF COMMONLY USED TERMS

"Authority" shall mean the Cherokee County Water & Sewerage Authority.

"Contractor" shall mean the individual, firm or corporation undertaking the execution of the Work under the terms of the contract and acting through its agents and employees.

"Developer" shall mean the individual, firm or corporation financing the execution of the Work.

"Engineer" shall refer to the engineer appointed by the Authority as representatives of the Authority and to its properly authorized agents.

"General Manager" shall refer to the General Manager of the Cherokee County Water & Sewerage Authority.

"Chief Inspector" shall refer to the Chief Inspector of the Cherokee County Water & Sewerage Authority.

“Owner" shall refer to the Cherokee County Water & Sewerage Authority.

"Plans" shall refer to those drawings that show the character and scope of the work and shall include all drawings identified in the contract documents.

"Shall" and "Will" are mandatory; "May" is permissive.

"Specifications" and “Standards” shall refer to the Water Main Standards of the Cherokee County Water & Sewerage Authority.

"Work" of the contractor shall include all labor, material, equipment, skills, transportation, tools, machinery, and other equipment and things useful and necessary to complete the contract.

W104-LIST OF ACRONYMS

ASTM:	American Society for Testing and Materials
AWWA:	American Water Works Association
D.I.P.:	Ductile Iron Pipe
D.O.T.:	Georgia Department of Transportation
EPA:	United States Environmental Protection Agency
EPD:	Georgia Department of Natural Resources, Environmental Protection Division
CCWSA:	Cherokee County Water & Sewerage Authority
HDPE:	High Density Polyethylene
NRCS:	National Resource Conservation Service
OSHA:	United States Dept. of Labor, Occupational Safety and Health Administration
PVC:	Polyvinyl Chloride
RCP:	Reinforced Concrete Pipe
VCP:	Vitrified Clay Pipe

W105-APPEALS

Any requirement that is outlined in these specifications may be modified or revoked by a majority vote of the full membership of the **Cherokee County Water & Sewerage Authority Board of Directors.**

Persons wishing to file an appeal must submit a written request to the Authority prior to the Agenda date for the next Authority meeting stating the nature of the request to be made. If the request is not made prior to the Agenda date, it will be considered at the following regularly scheduled meeting of the Authority. Please contact the Authority's office for information regarding the deadline date to be included on the agenda.

W106-INSURANCE REQUIREMENTS

Cherokee County Water & Sewerage Authority

3rd Party Contractor Hold-Harmless Agreement, Insurance, Indemnity, and Additional Insured

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3rd Party Contractor

Contractor's Liability Insurance: Contractor shall maintain at its sole cost and expense such insurance as will fully protect it and Cherokee County Water & Sewerage Authority (et al), CCWSA's officials, directors, officers, employees, agents, and volunteers from incidents, accidents, and claims for bodily injury and property damage which may arise from operations under this Contract; whether such operations are performed by Contractor or by any Subcontractor directly employed or retained by either.

INDEMNITY AND INSURANCE

Commercial Insurance

1.) Workers' Compensation Insurance in compliance with the applicable Workers' Compensation Act(s) of the state(s) wherein the work is to be performed or where jurisdiction could apply in amounts required by statutes.

2.) Employer's Liability Insurance, with limits of liability of not less than $1,000,000 for each accident/disease.

3.) General Liability Insurance, including contractual liability insurance, explosion and underground collapse (XCU), product and completed operations, personal and advertising injury, damage to rented premises (each occurrence $100,000), medical expense (any one person $5,000), fire damage ($50,000), and any other type of liability for which this Contract applies with limits of liability of not less than $1,000,000 each occurrence / $1,000,000 annual aggregate. General Liability Insurance must be written on an "occurrence" form and must apply on at least a per "project" basis.

Property Insurance

The Contractor assumes sole responsibility for loss or damage to its property and hereby releases CCWSA and its officials, directors, officers, employees, agents, and volunteers from loss or damage to Contractor and its employee's tools, equipment, goods, machinery, materials, and supplies.

Conditions

The aforementioned insurance policies shall contain a provision that coverages afforded under such policies shall not expire, be canceled or altered without at least thirty (30) days prior written notice to CCWSA's Risk Management Department. Except for insurance coverages relating to Workers' Compensation and Employer's Liability, the foregoing insurance policies shall include an endorsement making Cherokee County Water & Sewerage Authority an Additional Insured under such policies and a clause that insurance is on a primary and non-contributory basis. A copy of the endorsement and clause are to be provided to CCWSA's Risk Management Department. Certificates of Insurance showing that such coverages are in force shall be filed under this Contract by the Contractor.

The Certificate(s) of Insurance shall also contain a statement as follows:

"This/These certificate(s) of insurance conform(s) to all terms and conditions (including coverage of the indemnity agreement) contained in Contract with Cherokee County Water & Sewerage Authority."

Such certificates and notices are to be sent to:

Cherokee County Water & Sewerage Authority
Attn: Risk Management Department
140 West Main Street
Canton, GA 30114

With a copy to:

Cherokee County Water & Sewerage Authority
Attn: Special Projects Department
583 Cokers Chapel Road
Ball Ground, GA 30107

Non-Limitation on Contractor's Liability

The obligations for Contractor to procure and maintain insurance shall not be construed to waive or restrict other obligations and it is understood that insurance in no way limits liability of the Contractor or limits the liability of Contractor whether or not same is covered by insurance.

The Contractor further understands and agrees that any damages, that the Cherokee County Water & Sewerage Authority deems to be a result of said contract work, whether made directly by the Contractor or a Subcontractor thereof, is the sole responsibility of the Contractor and will be repaired, replaced, or recompensed according to specifications in place at the time of discovery.

Insurance Form and Duration

All of the insurance herein specified shall be written on a form acceptable to CCWSA and shall be A.M. Best Company rated B+ 8 or better.

Indemnity

The Contractor agrees to protect, defend, indemnify, save and hold harmless Cherokee County Water & Sewerage Authority, its officials, directors, officers, employees, agents, and volunteers from and against any and all claims, demands, losses, costs, and expenses, and from and against all liability, awards, judgments, and decrees, of whatever nature for any and all damage to property of others and of the parties hereto, their officials, directors, officers, employees, agents, and volunteers, and of whatever nature for any and all injury or injuries (including death) to any person or persons including the officials, directors, agents, employees, agents, and volunteers of the party hereto, arising or in any way growing out of any of the acts or omissions whether of the Contractor, the Contractor's officials, directors, officers, employees, agents, and volunteers or of any tier of the Subcontractor, the tier's officials, officers, directors, employees, agents, and volunteers in connection with the performance of the work under this Contract.

This hold-harmless agreement must be signed and submitted to the CCWSA's Risk Management Department prior to commencement of work.

_____ _____

Contractor Date

_____ _____

CCWSA Representative Date

SECTION W200 - PLANS

W201-WATER PRESSURE FLOW TEST

1.) Flow test are required for rezoning and prior to submittal of construction plans, the flow test results will be considered valid for twelve (12) months from the date of the test. To schedule a flow test, contact the **Development Compliance Manager** at (770) 479-1813.

2.) Water pressure flow test must be run on any existing Authority water line to determine the adequacy of water supply for the project. The test shall consist of fire hydrant flow test and a twenty-four (24) hour pressure test.

Test information shall consist of:

A.) Static Pressure and Elevation of Static Gauge
B.) Recorded Flow in GPM and Residual Pressure
C.) Maximum Elevation in Development
D.) Available Flow at Maximum Elevation with 20 PSI Residual Pressure
E.) Twenty-four (24) hour pressure chart

An adequate supply of water for the proposed project must be available prior to the approval of any construction plans unless an exception is granted by the Authority.

3.) All projects which have flow test / pressure chart test results showing static pressures of less than 35 psi will require a special design study to be completed and submitted to the Authority for approval to insure that no problems will be encountered during peak demand periods. This study must be approved by the Authority before any construction plans will be approved.

4.) Flow and pressure tests will be conducted by the Authority or a representative of the Authority in the area of the proposed development. These tests shall be paid for by the Developer prior to the performance of tests at the rate then in effect as established by the Authority. This fee shall be paid by the Developer along with the initial submittal of preliminary plans as described above. **Plans shall not be stamped or approved until the flow test is completed. A copy of the flow test must be included in the construction plans.**

W202-PRELIMINARY PLAN REQUIREMENTS

The following steps apply to the approval for installation of sewer mains, manholes, force mains, lift stations and appurtenances by private developers in commercial, industrial, institutional, residential or other types of developments:

1). Preliminary plans shall include the portion of the county tax maps highlighting the land to be developed, the type of development, the number of units, the tie-in location and the general plan for water supply. The plans shall also include the name, address and telephone number of the Developer or his representative. Questions relating to adequate fire protection, multiple feeds, water supply and proposed location of connection(s) should be resolved at this stage before proceeding with detailed planning. The submittal for preliminary review must include all land to be developed although the land is to be developed in several phases or units. Adequacy determinations of the existing water supply system will be made for the entire project.

2). Developer/Land Owner must submit Preliminary Plans through the CCWSA CityView Portal

(https://cityview.iharriscomputer.com/CCWSA/#/login) Project type to be "Preliminary Project". To be reviewed by the **Development Compliance Manager and Sewer Coordinator** prior to submitting the construction plans.

3). The Developer should procure a copy of the current set of **Water Specifications and CCWSA Standard Detail Booklet**. It is the Owner/Developer's responsibility to get copies made and distributed to the appropriate Contractors.

W203-PLAN REVIEW PROCESS

1.) Plan Review Schedule:
All plans shall be submitted through the CCWSA CityView portal. (https://cityview.iharriscomputer.com/CCWSA/#/login). **Plans shall not be distributed for review until all required documents have been submitted and all review fees have been paid.**

2.) Comments and markups will be available to the Developer or representative and can be viewed using our CityView portal. (https://cityview.iharriscomputer.com/CCWSA/#/login).

3.) After the revisions have been made, the Developer must submit the revised plans using our CityView portal (https://cityview.iharriscomputer.com/CCWSA/#/login) as outlined in these specifications to the Authority for review. Re-submittals will be reviewed by CCWSA staff and once all revisions have been addressed plans will then be sent to the reviewing engineer for final approval.

4.) If all of the required revisions have been properly made, the Authority can then approve with "Stamped Plans" (approved) being available and can be viewed using our CityView portal (https://cityview.iharriscomputer.com/CCWSA/#/login) for viewing or printing, as outlined in these specifications.

5.) The Developer shall forward a copy of all county and state permits to the Authority's Construction Department before the Authority's Construction Permit is issued to the Developer.

6.) Developer shall arrange for the preconstruction meeting with the Chief Inspector.

7.) When the project is complete, the Developer shall submit As-Builts for review per Section W606. After the approval of the As-Builts, the final plat shall then be submitted for review. **Only after As-Builts have been approved and Maintenance Bond posted, will the final plat be signed.** After recording, a PDF of the recorded final plat shall be submitted through the CCWSA CityView portal. (https://cityview.iharriscomputer.com/CCWSA/#/login) before any water meters are released to the project.

8.) SUBMITTAL OF REVISED PLANS: All construction plans submitted for review of revisions requested by the Authority must list each revised item with a cloud around the revised area on the plan sheet and must identify which reviewing authority requested the revision.

W204-CONSTRUCTION PLANS

1.) **The Developer must submit all plans through the CCWSA CityView portal. (https://cityview.iharriscomputer.com/CCWSA/#/login). Project type set to "Construction-Water & Sewer, Construction-Water, Construction-Sewer or Construction-Lift Station". *"These plans must carry the stamp of a registered professional engineer or registered land surveyor."*** At this time the Developer will also pay the plan review fee for water system additions. If this amount is sufficient to cover the Engineer's hourly fee for the complete plan review, no further amount will be charged to the Developer. If the water plans are such that the Engineer's fee exceeds the review fee minimum, the Developer will be invoiced for the additional costs at the Engineer's hourly rate. This additional fee must be paid prior to the scheduling of the preconstruction conference. Consult the Authority regarding the amount of this fee. **Fees are subject to increase at any time.**

2.) All plans for water projects shall bear a suitable title showing the name of the project, the name of the sewer basin, and show the scale in feet, the north arrow, date, the name of the design professional, the design professional's signature and his registration stamp. All design professionals preparing construction plans and specifications must be registered in the State of Georgia as a professional engineer or a registered land surveyor. If the project requires a water line extension of more than five hundred feet (500') to reach the project, a registered professional engineer must design and stamp the line extension. The cover sheet shall include the Owners/Developer's name, address, telephone number, and email, plus the design professional's name, address, telephone number, and email. The cover sheet shall also include the funding source if state or federally funded, and a detailed project location map. The cover sheet shall also show the numbers of the tax map and parcel in bold letters.

3.) The plans shall be clear and legible. They shall be drawn to a scale which will permit all necessary information to be plainly shown. **Plans shall be submitted in an "AutoCAD" drawing electronic format. Plans shall also be submitted in Adobe PDF format of the entire project.** A sheet index shall be provided, as well as a legend of symbols used. Horizontal locations shall be referenced to Georgia State Plane Coordinates (West Zone feet). Vertical locations shall be shown referenced to Mean Sea Level. Reference all horizontal locations to the NAD83/94 (latest adjustment) datum and reference all vertical locations to the NAVD88 datum. All orthometric locations shall be referenced to Geoid 99/03. All points are subject to verification by the Cherokee County Water & Sewerage Authority. **Water line locations shall be shown on plans and submitted in ASCII Text or EXCEL electronic format for each point.** The Developer shall provide ASCII or EXCEL spread sheet files for coordinate data. (Comma delimited). Each Point I.D. (Valves, Water Main, etc…) shall be show at the correct location on the printed plans. Water Mains shall be located at 50' intervals (ground and top of pipe). All fittings, tees and bends, valves, and air release valves shall also be located. All vertical locations shall be finished ground and top of pipe. The Contractor shall place a vertical piece of two inch (2") diameter P.V.C. pipe on top of the pipe at all bends, tees, fittings, valves, elevation transitions, horizontal transitions and every fifty feet (50') along the length of the water main for the purpose of enabling the surveyor/engineer to locate the water main for As-Builts. The Contractor will then be responsible for removing the vertical P.V.C. sections after the As-Built locations have been verified by the Authority. The ground, top of pipe, top of fitting and top of valve elevation of shall be located. The size and material of all pipes, valves and fittings shall be recorded.

4.) All electronic point data shall include:

- **A.)** Point ID (see CCWSA staff)
- **B.)** North coordinate
- **C.)** East coordinate
- **D.)** Ground Elevation
- **E.)** Top of Pipe, Valve or Hydrant Elevation
- **F.)** Point Description (Pipe, Fitting or Valve Type and Size)

Construction Plans shall consist of the following:

1.) Site plan showing the water layout only with project name, streets, street names, topography with contour lines at two foot (2') intervals, location map, lot layout (if subdivision) or building location (multi-family, commercial or industrial site), land lots, district and north arrow. Lot numbers shall run in consecutive order and there shall be no duplicate lot numbers within the project. Note, on the plans, if any other utilities are existing. Plan scale shall be a minimum of 1"=100'. Both the Construction Plans shall show station numbers along the alignment plus call out the specific stations of all features such as tees, crosses, fire hydrants, bends, etc. along with the Point I.D. Match lines shall be provided where necessary.

2.) In the event the subdivision is developed in phases, the final construction plans for water may be submitted in phases or units. However, at the time the first phase is submitted, the engineer will submit one copy of the preliminary layout of the entire water system. This layout will show all lines required to serve any lots to be developed. The site plans for each phase or unit shall contain a location drawing showing the relationship of the phase or unit to the total project and to the surrounding streets and water mains.

3.) Construction Plans Shall Show:

- **A.)** Proposed pipe materials, sizes, lengths and alignment.
- **B.)** Proposed service lateral locations.
- **C.)** Location, type and size of water valves and air release valves (to be installed at highest points of system).
- **D.)** Thrust blocks where used.
- **E.)** Fire hydrant locations.
- **F.)** Water system materials.
- **G.)** Location and sizes of existing water lines surrounding project, with nearest line valve in each direction from proposed connection.
- **H.)** Detail of connection to existing water lines.
- **I.)** Proposed meter sizes and locations.
- **J.)** Detailed plan of fire line meters, detector meters, compound meters, backflow preventers, etc. if applicable.
- **K.)** Any other items incidental to the proposed system.
- **L.)** Details of special water line installations such as stream crossings, elevated lines on piers, bridges, pipe bedding, special highway crossings, railroad crossings, etc.
- **M.)** Show all right-of-way widths, easement widths and pavement widths.
- **N.)** Plan and profile sheets shall be prepared with a horizontal scale of 1"=50' and a vertical scale of 1"=10'. These scales also apply to any profile view of sanitary sewers.
- **O.)** Bench marks and control points shall be shown on the plan sheets. Horizontal and vertical coordinate data shall be provided for each bench mark and control point. The vertical datum used shall be the elevation above mean sea level.
- **P.)** A sheet index shall be provided, as well as a legend of symbols used.
- **Q.)** All construction plans submitted for review of revisions requested by the Authority must list each revised item with a cloud around the revised area on the plan sheet and must identify which reviewing authority requested the revision.

PROTECTION OF UTILITIES

Each plan sheet should include a note stating "The Contractor must call the Utilities Protection Center "Call Before You Dig" telephone number (1-800-282-7411) four days before starting any excavation. Each set of plans shall include a reproduction of **CCWSA Standard Detail M-05** in the **CCWSA Standard Details Booklet.**

W205-EROSION AND SEDIMENTATION

The provisions of the Erosion and Sedimentation Act of 1975 (O.C.G.A. 12-7-1 et seq.), as amended, shall govern all land disturbing activities as relates to construction performed. The Cherokee County Water & Sewerage Authority is not delegated enforcement powers for enforcing the provisions of the Erosion and Sediment Control Act of 1975.

The Georgia Soil and Water Conservation Commission has taken provisions of ACT 599 and published a **MANUAL FOR EROSION AND SEDIMENT CONTROL IN GEORGIA**, 2000 Edition (or any more current edition as they are published). Sewer construction plans and specifications shall include appropriate segments of this manual. Developers, Engineers, Design Professionals and Contractors performing work in Cherokee County are responsible for acquiring a copy and using the best practical methods contained therein to control the erosion and sedimentation of the construction site in conformance with the intent of ACT 599. Copies may be purchased from the Georgia Soil And Water Conservation Commission, P.O. Box 8024, Athens, Georgia 30603. For additional information, call the Commission at 706-542-3065.

The erosion control plan must be approved by Cherokee County Engineering and the Natural Resource Conservation Service (N.R.C.S.). As stated in Section 102.5, the approval of the plan included in the N.R.C.S. Report of Technical Review must be attached to the initial submittal of construction plans.

W206-PLAN APPROVAL

No work shall begin until plan approval is received from the Authority. The CCWSA General Manager or his designated representative shall have final approval of the preliminary plans, construction plans and final plans. If a discrepancy occurs between the approved plans and the Water Main Standards, the Standards shall be the superseding document. The General Manager of the Authority or his designated representative may modify or cause to be modified any plans that he believes are in the best interest and future integrity of the Authority.

W207-REVISIONS TO APPROVED PLANS

When any deviations from approved plans are proposed, the Chief Inspector shall be notified for authorization. Revised plans should be submitted as soon as possible to the Chief Inspector. Minor changes not affecting water system operation may be allowed in the field during construction by the Chief Inspector. The Chief Inspector shall have authority as to what constitutes a minor or major change. As-Built drawings and the required electronic data shall be submitted through the CCWSA CityView portal. (https://cityview.iharriscomputer.com/CCWSA/#/login) at the completion of construction.

Any section or unit must be built in accordance with the plans. If the Developer decides to phase a section off, a new set of plans showing the phase change will have to be resubmitted and approved.

W208-APPROVAL BY OTHER GOVERNMENT AGENCIES

1.) No part of the plan approval process is intended to relieve the Developer of the responsibility to comply with the minimum standards of the Georgia Department of Natural Resources, EPA, EPD, NRCS, Georgia D.O.T., Cherokee County Engineering or Department, U.S. Army Corps of Engineers or other appropriate regulatory agency.

2.) Generally speaking, the following documents should be provided to the Authority with the plans, and should also be sent to the proper agency claiming jurisdiction:

A.) An approved Erosion and Sedimentation Control Plan (Note, a Land Disturbing Activity Permit and a Grading Permit must be acquired by the Developer prior to beginning construction). Include with this plan the Natural Resource Conservation Service Report of Technical Review approving the erosion control measures.

B.) A letter stating that none of the sewers, services, or other utilities associated with the project are constructed on or proposed to be constructed on a solid waste landfill, according to the records of the County Roads and Bridges Department.

C.) A copy of the Comprehensive Monitoring Plan that complies with the EPD's NPDES Storm Water Monitoring Permit regarding storm water discharge.

3.) The submittals listed above are not intended to be an all-inclusive list of submittals needed to adhere to all of the government agencies having jurisdiction over construction on a project. It is up to the Developer to inform himself and adhere to the development regulations of the respective governing agencies.

W209-RELOCATION OF EXISTING WATER AND SEWER FACILITIES

All existing water or sewer facilities that have to be relocated, as might occur at roadway entrances, easements, elevation changes, etc., will be relocated by the Developer's Contractor at the Developer's expense. The Authority will inspect all such work prior to acceptance.

W210-EASEMENT ACQUISITION AND UTILITY ENCROACHMENT PERMITS

1.) It shall be the responsibility of the Developer to obtain any off-site easements required to connect the project to the existing water system. Easements will be conveyed to the Cherokee County Water & Sewerage Authority for all facilities which are to be conveyed to the Authority. This process must be started early enough to allow construction of the water mains before any building construction is to begin. No building permits, water meter or sewer tap applications shall be issued until off-site water mains and sewers have been constructed and accepted. This condition shall override any provision for speed up of house starts such as furnishing a bond to guarantee completion of the streets and other appurtenances. A Utility Easement agreement in the **CCWSA Standard Details Booklet**.

2.) All easements shall allow adequate room to construct the water main and appurtenances. Permanent easements shall be a minimum of twenty feet (20') wide. Wider easements shall be required where water lines are deeper than normal. The maximum cross-slope of the permanent easement shall be ten percent (10%).

3.) Easement drawings shall be prepared for work outside the development prior to approval of the water system plans. The drawings shall be of a size suitable for legal recording and shall be prepared by a Registered Land Surveyor. The drawing must be clear and legible for printing. The drawing shall be at a reasonable scale and shall not be a reduced copy of the plan sheet. The drawing will show property lines, the name of property owners with the length

of line encroaching on each property owner, size of line, width of permanent and construction easement, scale of drawing, north arrow, land lot and district numbers, and a tie to the nearest land lot corner. Any streets or other existing easements shall also be shown. Easement agreements referencing these drawings shall be prepared and attached to the drawings, signed by the current property owner(s), notarized, witnessed and originals delivered to the Authority's G.I.S. Department for recording.

4.) All easements shall be subject to a title search, by a CCWSA designated attorney, for each easement, at the developer's expense. All title search fees shall be paid prior to approval of As-Builts or signing of final plat

W211-STREET LIGHT SPECIFICATIONS

In order to ensure adequate illumination of the public right-of-way and in order to promote safety and security, CCWSA's Board of Directors has adopted and approved a Street Light Policy. This specification outlines CCWSA Street Light Policy for installation and operation standards. These standards and specifications are to be implemented by developers, residents, and lot owners when street lights are being considered for a residential, commercial, industrial, institutional or municipal area. The steps to obtain street lights for existing areas is outlined within the CCWSA Board Policy book. The specifications contained here apply to new and existing development areas.

Developers must submit a final street light layout prepared by the power company which will be providing service, showing the exact location of street lights within the developed area. This drawing must be approved by the Authority prior to the purchase of any water meter within that developed area. Fixtures and standard poles installed or used must be approved by the Authority and the power utility that will be responsible for the maintenance of the fixtures. Additionally, the following specifications apply to all street light installations depending on property designation (i.e. Commercial or Residential).

1.) Lighting fixtures installed within the public right-of-way to be operated for the purpose of street illumination shall comply with these standards. The minimum average horizontal foot-candle illumination level by roadway classification shall be as followed:

Roadway Classification	Commercial Area	Intermediate Area	Residential Area
Major	**1.2**	**0.9**	**0.6**
Collector	**0.8**	**0.6**	**0.4**
Local or Residential	**0.6**	**0.5**	**0.3**

The uniformity of illumination shall be such that the point of lowest illumination shall have at least one-third of the average horizontal foot-candle required illumination level, except that on local or residential streets, where it may be no less than one-sixth of this average.

2.) The fixtures shall be mounted a minimum of sixteen (16) feet above the ground and shall have appropriate arm length to place the light over the street, if applicable, or post top installation with acorn or traditional "town & country" light covers.

3.) No arm shall be less than two and one-half feet (2.5) long.

4.) One (1) light shall be located at each street intersection within the developed area.

5.) Other lighting fixtures to be installed within, or outside, of public right-of-way, for whatever purpose, shall be installed or operated in such a manner as to prevent glare from being a hazard, or to prevent glare from interrupting normal use of the public right-of-way.

6.) Roadway or street lighting or fixtures installed within the public right-of-way as “security lights” or for the purpose of lighting areas other than the public streets shall be oriented in such a manner to ensure that the lateral light distribution pattern is parallel to the street and the vertical light distribution at the initial light source is perpendicular to the street so as to protect the users of the street from objectionable glare. The approval of the Authority and the power utility maintaining the fixtures must be obtained prior to installation.

7.) Questions about fixtures, posts, or lumens should be addressed in the plan review process when the street light layout is submitted.

SECTION W300 – WATER MAIN DESIGN CRITERIA

W301-GENERAL

The criteria listed herein is not intended to cover all aspects of design, but rather to mention the basic guidelines and those particulars that are required by the Cherokee County Water & Sewerage Authority.

W302-WATER SUPPLY (ALL WATER SUPPLY SYSTEMS)

Residential water supply for domestic use shall be in accordance with the following table and provide a minimum pressure of twenty (20) psi:

INSTANTANEOUS WATER DEMANDS FOR RESIDENTIAL AREAS

TOTAL NUMBER OF RESIDENCES OR UNITS SERVED	GPM PER RESIDENCE	TOTAL NUMBER OF RESIDENCES OR UNITS SERVED	GPM PER RESIDENT
5	8.0	90	2.1
10	5.0	100	2.0
20	4.3	150	1.6
30	3.8	200	1.3
40	3.4	300	1.2
50	3.0	400	0.9
60	2.7	500	0.8
70	2.5	750	0.7
80	2.2	1,000	0.6

Exceptions may be made when deemed necessary by the Authority. Demand for other than residential to be determined for each specific development.

Residential developments that exceed 150 lots shall have an additional water connection to the existing C.C.W.S.A. water system at each additional entrance.

W303-WATER MAIN EXTENSION REQUIREMENTS

All specifications required by the Authority and by the Georgia Department of Natural Resources must be met by the Developer.

Developers are required to extend all mains along their entire property frontage if the existing main is adjacent to the proposed development. The size of the main will be set in accordance with Section 304.

If an existing main must be extended to serve a particular development, the Developer will be required to pay all of the initial costs, including but not limited to contract prices, testing fees, engineering fees, etc.

In certain circumstances, the Authority may require a larger pipe size to be installed than is required by these standards, and the cost of this over sizing may be funded by the Authority. The developer may be required to pay all of the initial costs. If the purpose of the over sizing is to improve service to existing customers or part of the Authority's master plan for a network of large mains to transfer water around the County, the Authority may enter into negotiations with

the Developer to provide funding for the betterment.

W304-MINIMUM WATER MAIN SIZES

1.) Any system, whether served from an existing Authority water main or otherwise, shall have a minimum size of 8-inch pipe installed. Actual sizes may be larger depending on the size required to meet the demand of the proposed development and/or the Authority's master water plan.

2.) Where a water main extension from an existing Authority water main is required along an existing public right-of-way or future supply route, the size of pipe to be used will be either eight inch (8"), or a size equal to the existing Authority main (if eight inch 8" or larger), or the size required to meet the demand of the development, whichever pipe size is largest. In accordance with the C.C.W.S.A.'s Master Water Supply Plan, the Authority may require a larger pipe size to be installed than is required by this standard. The cost of this over sizing may be funded by the Authority, in accordance with the Line Extension Policy (Section 303).

W305-WATER MAIN SIZES

Multi-Family: Water mains to be no less than eight inch (8") in diameter.

Large Shopping Centers, Malls, etc.: Water mains to be no less than eight inch (8") in diameter.

Commercial Areas With Less Than 200,000 Sq. Ft.: Water mains to be no less than eight inch (8") in diameter.

Motels, Light Industry and Schools: Water mains to be no less than eight inch (8") in diameter.

Commercial areas with 200,000 sq. ft. or more, Heavy Industry, Large/Tall Buildings: Water mains to be no less than ten inch (10") in diameter.

Single Family: Single family residential developments shall use a minimum of eight inch (8") water mains; larger size mains dependent on demand.

W306-FIRE PROTECTION

1.) Minimum flows in GPM with Twenty (20) psi residual pressure by type of development are recommended as follows:

- **A.)** Multi-family: 750 GPM for 30 minutes
- **B.)** Shopping Centers: 750 GPM for 30 minutes
- **C.)** Motels, Light Industry and Schools: 750 GPM for 30 minutes
- **D.)** Heavy Industry, Large/Tall Buildings (Warehouses, Office Buildings, Institutional): 1000 GPM for 45 minutes
- **E.)** Residential: 500 GPM for 30 minutes

The Authority may require these recommended flow/duration quantities prior to development of property.

2.) Fire hydrants will be required as set forth in these specifications where a proposed system is to be served from an existing Authority water main or in any case where the Authority is to accept a new system for ownership and operation.

3.) Fire Protection - Hose Lay distance is defined as being measured along the route a piece of fire apparatus must travel in laying a fire hose from the fire to the fire hydrant.

4.) All plans for development must meet all applicable fire protection codes.

5.) All requirements for design criteria and material and construction specifications must be met to secure a permit from the Department of Natural Resources for construction.

6.) Spacing of fire hydrants shall be as follows:

Multi-family: Fire hydrants shall be spaced not more than five hundred feet (500') apart with additional fire hydrants located as necessary to permit all portions of buildings to be reached by hose lays of not more than three hundred feet (300') in length.

Shopping Centers, Malls, etc: Fire hydrants shall be spaced not more than three hundred feet (300') apart so all portions of buildings can be reached by hose lays of not more than three hundred feet (300') in length.

Motels, Light Industry and Schools:
Fire hydrants shall be spaced not more than five hundred feet (500') apart so all portions of buildings can be reached by hose lays of not more than three hundred feet (300') in length.

Heavy Industry, Large/Tall Buildings:
Fire hydrants shall be spaced not more than three hundred feet (300') apart so any portion of the building can be reached by hose lays of not more than three hundred feet (300') in length.

Single Family:
Single family residential developments shall have a maximum spacing of one thousand feet (1,000') between fire hydrants (five hundred feet (500') hose lay). Fire hydrants shall typically be located at all intersections and at the end of the line on all cul-de-sacs.

Water Line Extensions Along Existing Roads/Highways:

- **A.)** Fire hydrants spaced not more than one thousand feet (1,000') apart
- **B.)** No installation requiring fire hydrants shall have spacing greater than one thousand feet (1,000') apart as measured along the main supply line.
- **C.)** Fire hydrants shall be required at the end of all dead-end lines such as those installed in cul-de-sacs.
- **D.)** Fire hydrants shall be located on the back side of the right-of-way.
- **E.)** Fire hydrants shall typically be located at all intersections.
- **F.)** Fire hydrants shall be located at or within two hundred feet (200') of the main entrance to the development.

7.) Fire lines shall be metered per **Section W310**.

8.) Any vault that has a fire department connection must have a fire hydrant on the CCWSA water main side of the vault.

W307-SPRINKLER SYSTEMS

All in-ground sprinkler systems shall have a double check backflow preventer. See **Section 400.14**

W308-DISCONNECTION OF WELLS:

All wells in developments which supply water to distribution are to be disconnected. It shall be the Developer's responsibility to fill, plug, and seal the wells in such a manner which meets the requirements of the Georgia E.P.D. rules for safe drinking water.

W309-LOCATION OF WATER LINES AND FIXTURES

1.) **Existing County Roads:** On existing roads, water mains shall be located on the South and West side of the road, within five feet (5') of the edge of the right-of-way whenever possible. Water mains shall be installed so that the top of the pipe is a minimum of four feet (4') below final grade, four feet (4') below the edge of the pavement, or four feet (4') below the ditch paralleling the road, whichever is deepest. Permission must be granted by the Authority to vary from this requirement. Fire hydrants on existing roads shall be located as near to the right-of-way as practical or as required by the Cherokee County D.O.T. Fire hydrants shall be located between the water line and the right-of-way.

2.) **Existing State or Federal Highways and Roads:** On existing state or federal highways and roads, water mains shall be located on the South and West side of the road whenever possible, and within five feet (5') of the edge of the right-of-way. Water mains shall be installed so that the top of the pipe is a minimum of four feet (4') below final grade, four feet (4') below the edge of the pavement, or four feet (4') below the ditch paralleling the road, whichever is deepest. Permission must be granted by the Georgia D.O.T. and the Authority to vary from this requirement. Fire hydrants on existing state or federal roads shall be located as near to the right-of-way as practical or as required by the Georgia Department of Transportation. Fire hydrants shall be located between the water line and the right-of-way.

3.) **New Streets in Subdivisions:** Water mains on new streets in subdivisions shall be located on the South and West sides of the streets, five feet (5') from the back of the curb. Water mains shall be installed so that the top of the pipe is a minimum of four feet (4') below final grade, four feet (4') below the edge of the pavement, or four feet (4') below the ditch paralleling the road, whichever is deepest. Permission must be granted by the Authority to vary from this requirement. Fire hydrants on new streets shall be located between the water main and the right-of- way and as near to the right-of-way as practical. **The construction of the water main shall not begin until the rough grading is completed and all curbing is installed.**

4.) **Service Laterals:** 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 12 inches at the water meter location. Service line size shall be one inch (1") for single residential service and one inch (1") for double residential service. All long side services for single-family residential shall be encased in two inch (2") PVC pipe. All long side services for developments other than single-family residential shall be encased in four inch (4") P.V.C. pipe. All P.V.C casings for long side services shall be a minimum of two inch (2") in diameter. The contractor shall install the appropriate size service saddle and corporation stop at the main, service laterals and curb stops in meter boxes. For double residential services, the contractor shall provide a cut-off valve on the service on the water main side of the service tee, the service tee, all

necessary bends and the curb stops in the meter boxes. The cut-off valve on the service shall be buried without a valve box.

If a three inch (3”) meter is used for the development, the Developer must install four inch (4”) D.I.P. from the main to the meter, and then utilize a 4” x 3” reducer at the meter. The Authority will not accept three inch (3”) service material.

Any portion of service lateral located under pavement shall be encased in P.V.C. pipe, extending a minimum of 3' beyond the edge of pavement and/or sidewalk on both sides of the road. Copper tubing shall be used for all services. A "W" shall be sawed into the curb where each service tap is made for permanent location.

At all common areas within residential or other developments, the Developer shall include in the water plans a water service and meter at the edge of the street right-of- way.

5.) **Within Commercial Developments:** Water mains within commercial, multi-family, industrial, office/institutional or school developments shall be installed so that the top of the pipe is a minimum of four feet below (4’) final grade, four feet (4’) below the edge of the pavement, or four feet (4’) below the ditch paralleling the road, whichever is deepest. Permission must be granted by the Authority to vary from this requirement.

6.) **Water Valves:** Valves less than sixteen inches (16") shall be gate valves. Valves sixteen inches (16") and larger in diameter shall be butterfly valves. Water valves at intersections shall be located behind the curb or edge of pavement. As a general rule, at intersections, the number of valves shall equal the number of streets leaving the intersection. (In other words, 4 valves where two roads cross and 3 valves where one road tees into another road.) The Authority may require valves in excess of this requirement if the water system layout warrants additional valves.

The maximum spacing of line valves shall be one thousand (1,000’). The Authority may require closer spacing in high-density urban areas and subdivisions. Generally, the Authority will require a main line valve at every fire hydrant as a minimum. The required spacing shall be at the discretion of the Authority based on individual development circumstances. Unless at an intersection, line valves shall be located at fire hydrants. Concrete valve markers are required at all line valves and at the end of every dead-end line.

All fire hydrants shall be provided with a six inch (6") gate valve between the water main and the hydrant. Wherever possible, the gate valve for a hydrant shall be connected to the main by using a locked hydrant tee. Wherever possible, the Developer shall connect the gate valve to the hydrant by using a locked hydrant adapter or anchor coupling. When connections using locked hydrant fittings are not feasible, the connections shall be rodded together.

All valves shall be provided with valve boxes. Each valve box shall have a concrete collar. These collars must be a minimum of three and one half (3 1/2") thick. They shall be square and sized 24" x 24". Pre-cast collars may be used, provided that they are grouted in place to the valve box. The box is to be flush with or a maximum of one inch (1") above the finished grade. The edge of the valve box is to be one half inch (1/2") above the edge of the concrete collar.

7.) **Gate Valves and Line Plug:** A gate valve and a minimum of thirty-six linear feet (36’) of pipe shall be provided at the end of all lines for phased developments, and at locations where the water main may be extended in the future for water system improvements. The

end of the line shall be provided with a M.J. plug and a thrust collar. A valve marker will be placed directly above the plug.

8.) **Air Release Valves:** Air release valves shall be located where appropriate as determined by the design professional responsible for the water system design. All A.R.V. locations are subject to the approval of the Authority. In general, within subdivisions, A.R.V.'s are not necessary as long as services are located at the water main high points. Valve markers are required at each A. & V. assembly.

9.) **Road Crossings:** At all road crossings, the water main shall be encased in steel casing. The water main inside the casing shall be restrained with “Field Lok” or “Fast-Grip” gaskets. The ends of the casing shall be sealed with brick to secure the position of the main. Steel casings shall be sized as follows:

Water Main Diameter	Steel Casing Diameter
6”	12”
8”	12”
10”	16”
12”	18”
16”	24”
20”	30”
24”	36”

10.) **Ductile Iron Pipe:** Ductile iron pipe shall be required for all water mains, except where the General Manager approves otherwise.

11.) **Polyethylene Encasement:** Ductile iron water mains shall be provided with black polyethylene encasement whenever the water main either crosses or is in close proximity to a steel gas main. Ductile iron water mains shall be provided with black polyethylene encasement whenever the water main is installed along a county, state or federal road ways. Ductile iron pipe installed in low-lying damp areas and in areas where anode beds are known to exist shall also be provided with polyethylene encasement. The length of the encasement shall be in accordance with D.I.P.R.A. recommendations. The reviewing engineer and the Authority shall have final authority over the required length of the encasement during the plan review process.

12.) **Easements:** Water mains that are located off the right-of-way shall have a minimum twenty feet (20’) wide permanent easement. The maximum cross-slope of the permanent easement shall be ten percent (10%). See **Section W210** regarding the requirements for water line easements.

13.) **Acceleration/Deceleration Lanes:** Where applicable, if an acceleration lane or a deceleration lane is to be constructed and will cover or encroach over existing non-DIP water mains, it is the Developer's responsibility to relocate the existing main out from under the proposed pavement and the existing main with ductile iron pipe. (See **CCWSA Standard Detail W-18**)

14.) **Dams:** Sanitary sewer structures are not allowed within a dam. Utility pipelines and structures must be a minimum of thirty feet (30’) outside the toe of slope of the dam.

W310-FIRE LINE METERING REQUIREMENTS

1.) All Double Check Detector Assemblies (DCDA) and meters, as required, shall be purchased from the CCWSA. All submitted plans having fire protection shall be reviewed by the designated departments. Installation will be the responsibility of the Developer under the supervision of the Authority's inspector. Double Check Detector Assemblies shall not be permitted on single family developments. It shall be the Owner/Developers responsibility to follow the appropriate regulatory agency's requirements to determine the size of the meter and service line.

2.) All existing unapproved commercial fire service systems having private fire hydrants, hand hose connections, or sprinkler heads on private property are required to have a meter with the proper backflow device or underwriter-approved DCDA installed as part of the fire service system.

3.) Persons making applications for new commercial fire service connections with private fire hydrants, hand hose connections, or sprinkler heads will be required to have a meter with the proper backflow device or underwriter-approved DCDA installed as part of the fire service system.

4.) The Contractor shall install a curb stop that can be locked in the ON or OFF position on commercial two inch (2") and smaller DCDA connections.

5.) When unauthorized (i.e., non-firefighting) water and/or water use without prior notification and approval of the Authority is used through the detector meter, the customer will be notified and given sixty (60) days to repair the leak or flow problem. If the meter continues to show usage after the next reading cycle, the customer could be charged an illegal hook-up fee determined by the Authority. The Authority will then determine if a master meter will need to be installed. Failure to make required repairs within the allotted 60-day timeframe will result in notification to the Fire District Office and possible disconnection of fire protection water service until corrective action is taken and approved by the Authority.

6.) The detector meter on the backflow preventer will be installed and maintained by the Authority.

7.) When a DCDA is being shared, the Owner/Developer shall provide the CCWSA a written agreement from the property owner providing fire protection before any plans will be approved. All connections will be charged the monthly fire service standby charge. The property providing the fire protection device (DCDA) will be the primary account. This account will be responsible for all maintenance and repairs.

8.) The Customers requesting to downsize a meter shall provide a letter of approval from the Fire Marshall's Office having jurisdiction. Downsizing shall be approved by CCWSA prior to payment of downsizing fees by the customer to CCWSA.

9.) All domestic water supplies must be metered with a proper meter. Depending upon zoning and building setbacks, the Authority shall have the option to require the development to be master metered.

10.) Installation of detector meters or factory mutual fire line meters as required will be the responsibility of the Developer under supervision of the Authority's inspectors.

11.) The Authority shall have the right to disconnect water service to buildings whose owners fail to comply with these provisions upon proper notification. If the services of legal counsel are required to collect bills, the cost of council shall be added to the billing.

W311-WATER PUMP STATIONS

Where pump stations are required to serve a development, the Developer's design professional shall prepare and submit detailed plans, specifications and calculations for the Authority's review. Design requirements shall be discussed in the preliminary stages of plan review. Each case shall be reviewed individually, and the Authority shall retain the right to require changes to the pump station design or materials at the Authority's discretion.

W312-WATER MAINS ON PRIVATE ROADS

The Authority will accept for ownership water mains installed along roadways that are not dedicated for public use (i.e., are without public right-of-way) if the property owners will dedicate a permanent easement to the Authority.

W313-PROTECTION OF WATER SUPPLY AND OTHER UTILITIES

1.) The Cherokee County Water & Sewerage Authority has an established Cross- Connection Program to prevent the entry of contaminants or pollutants into any area of the potable water supply through the control of cross connections. It is illegal to introduce any substance into or to have any cross connections with the potable water supply. There shall be no physical connection between a public or private potable water supply system and a sanitary sewer which would permit the passage of any sewage or polluted water into the potable water supply.

2.) Separation between Water Main and Sanitary Sewer Mains: A horizontal separation of at least ten feet (10’) is required between water mains and existing or proposed sanitary sewer mains (measured edge to edge). Should conditions prevent a separation of ten feet (10’), the lines shall be laid in separate trenches.

A.) When sewers cross under water mains, the sewer shall be laid so that the crown of the sewer shall be at least 18 inches below the invert of the water main. The two pipes shall be installed such that a full length of pipe will be centered over the crossing so that all joints will be separated as much as possible. Ductile iron pipe, SDR 26 or CCWSA approved equal shall be installed for both mains when clearance is less than two feet (2’).

B.) In the rare circumstance when the eighteen inches (18") of clearance between the water and sewer mains cannot be maintained, the DIP, SDR 26 or CCWSA approved equal mains shall be installed as described in the paragraph above with the joints as far apart as possible, plus both mains shall be placed in casing for a distance of ten feet (10’) on each side and grout each end of casing.

W314-IRRIGATION SYSTEMS REQUIREMENTS

1.) Cherokee County Water & Sewerage Authority requires all new irrigation systems, to include pressure regulators, master shut-off valves, and flow sensors that can **detect and report** high flow conditions (i.e. broken pipes and/or popped or broken sprinkler heads). Compliance with this specification must be certified by the developer through the submission of a written letter detailing the compliance measures to be installed accompanying development plan submission.

2.) Cherokee County Water & Sewerage Authority shall require all new landscape irrigation systems, equipped with an electronic controller, to have a “Rain Sensor Shut Off Switch”.

W315-MULTI-UNIT RETAIL & LIGHT INDUSTRIAL METERING REQUIREMENTS

In compliance with O.C.G.A 12-5-180.1 Cherokee County Water & Sewerage Authority requires all new multiunit retail and light industrial buildings permitted or with a pending permit application to be constructed in a manner which will permit the measurement by the owner or operator of water use by each unit. This specification will not apply to any building constructed or permitted before July 1, 2012, which is thereafter: (1) renovated; or (2) following a casualty or condemnation, renovated or rebuilt. Additionally, this specification will not apply to newly constructed multiunit office buildings and the office component of mixed use developments. The retail component of a mixed use development shall be constructed in a manner which will permit the measurement by the owner or operator of water use by each unit.

SECTION W400 - MATERIALS FOR WATER LINE CONSTRUCTION

W401-GENERAL

All materials used in the work including equipment shall be new and unused materials of a reputable U.S. Manufacturer conforming to the applicable requirements of these Specifications, and no materials shall be used in the work until they have been approved by the Authority. Any reference to a AWWA, ANSI or other such specification shall mean the latest revision published.

W402-WATER MAIN

1.) Ductile Iron Pipe

Ductile iron pipe shall be thickness Class 50 or Class 350, designed in accordance with AWWA C150-latest revision and manufactured in accordance with AWWA C151-latest revision. Ductile iron pipe shall have an outside bitumastic coating per AWWA C151-latest revision. It shall have an inside standard cement lining with bituminous seal coat per A.W.W.A. C104 - latest revision.

Joints

Except where restrained, flange, or mechanical joints are specified, straight pipe joints shall be push on, rubber gasket type such as Fastite or alternate acceptable to the Authority conforming to A.W.W.A. C111-latest revision. Pipe shall be in 18' to 20' nominal lengths with standard deflection pipe sockets. Where restrained joints are shown, the joints shall be "Flex-Ring" type as made by American Ductile Iron Pipe, TR Flex as made by U.S. Pipe or alternate acceptable to the Authority.

Where river crossing pipe is required, the pipe shall be "Flex-Lok Boltless Ball Joint Pipe" as manufactured by American Pipe or alternate acceptable to the Authority. Where specified, flanged pipe shall meet AWWA C151 specifications and be used with fittings meeting AWWA C110 or AWWA C153.

Certificates of conformance with the foregoing specifications shall be furnished with each lot of pipe supplied.

2.) Copper Tubing for Water Service Laterals

Service lateral pipe shall be copper service pipe, type K, soft temper, seamless copper tubing, conforming to ASTM B-88, latest revision. Compression joints will be used.

Service line size shall be one inch (1") for single residential service and one inch (1") for double residential service. Service line size shall be one inch (1") minimum for all other types of developments. All service lines smaller than four inches (4”) in diameter shall be copper. Service lines four inches (4”) in diameter and larger shall be ductile iron.

3.) P.V.C. Casing for Services

Long side service lines shall be bored and encased in P.V.C. pipe. PVC casing pipe used for long-side services shall be schedule 40 and a minimum of two inches (2") in diameter for residential developments and four inches (4") in diameter for all other type developments.

4.) Casing Pipe

Casing pipe, where required under the street, shall be smooth steel pipe conforming to A.S.T.M. Designation A-139, Grade B, electric fusion welded steel pipe. The pipe shall have

a minimum yield strength of 35,000 psi. The exterior and interior of the pipe shall have a bistumastic varnish coating. Minimum wall thickness: 0.250" or as required by the D.O.T. or other governing body having jurisdiction over the crossing.

5.) Ductile Iron Pipe Fittings

Fittings shall be ductile iron and furnished in accordance with AWWA C110 or AWWA C153, latest revisions, and shall be a minimum of ~~350~~ 250 psi pressure class rating. Joints shall be mechanical joint with retainer glands conforming to AWWA C111, latest revision, except where approved otherwise by the Authority. Cement mortar lining conforming to AWWA C104 or fusion-bonded epoxy coating conforming to AWWA C116 shall be furnished for fittings.

W403-FIRE HYDRANTS

All fire hydrants shall comply in all respects with Authority Standards and shall be designed and manufactured to comply with the latest revision of AWWA C502. The hydrants shall be designed for 250 pounds working pressure. The hydrants shall be of simple design, easy to operate, effectively and positively drained and protected from damage by freezing, and convenient for repairing and replacing parts.

Hydrants shall be equipped with one four and one half inch (4-1/2") diameter pumper nozzle and two (2) two and one half inch (2-1/2") diameter hose connections, which shall have threads meeting the latest requirements of the State Fire Insurance Commission. Hydrants shall have a safety flange on the barrel and a safety coupling on the valve stem to prevent damage to barrel and stem in case of traffic accident. Safety coupling shall be set two to six inches (2” to 6”) above the finish grade. Hydrants shall be Mueller Company's Super Centurian traffic model, M&H Style 129 traffic model, EJ Watermaster 5CD 250.

The connection at the base of the hydrant shall be mechanical joint with ductile iron retainer gland for six inch (6") ductile iron pipe. The valve opening shall meet the requirements of the AWWA Specifications for a five and one quarter inch (5 1/4") hydrant. The valve, valve seat and inner working parts shall be easily accessible. The height from the surface of the ground to the bottom of the hose nozzle shall be no less than two feet (2’). Each hydrant shall be neatly painted with a silver reflecting paint.

Each hydrant shall be tested to two hundred (200) psi. The first test shall be made with the valve closed. The second test shall be made with the main valve open but all nozzles closed. While the test is being carried on, the hydrant shall be subjected to a hammer test. Any hydrant showing defects by leakage, sweating, or otherwise shall be rejected. The barrel and all parts shall withstand these tests. These tests shall be made in the field after the hydrants are installed.

Leads from the main line to the fire hydrant shall use six inch (6") ductile iron pipe and shall have a six inch (6") gate valve between the main line and fire hydrant. The valve shall be connected to the main line by using a locked hydrant tee, equal to American Pipe model A-10180 or alternate acceptable to the Authority. Retainer glands or steel rods must be used to insure adequate connection of fire hydrant to valve. When the hydrant is close enough to the valve to allow its use, the hydrant shall be connected to the valve by using an anchor coupling acceptable to the Authority.

W404-VALVES AND ACCESSORIES

1.) Gate Valves

Valves sixteen inch (16") and smaller shall be gate valves. The valves shall be of non-rising stem design, and have an iron body, bronze mounted, resilient seated, meeting all requirements of AWWA C509 or AWWA C515. All interior ferrous surfaces of valves shall have a fusion-bonded epoxy coating meeting the requirements of AWWA C550. Valves shall be designed for a minimum working pressure of 250 psi and shall have two inch (2") square operating nuts, except in meter vaults where hand wheels shall be installed. Valves for pipe smaller than four inch (4”) in diameter shall have hand wheels suitable for use inside standard valve boxes. Valves shall open when turned counter-clockwise.

Valves sized two through twelve inch (2" through 12") shall be Mueller Co. A-2360 with mechanical joints or alternate acceptable to the Authority. Sixteen inch (16”) valves shall be Mueller Co. A-2361 with mechanical joints or alternate acceptable to the Authority. Mechanical joints shall be fitted with retainer glands. Where flange joints are used, flanges must meet the requirements of AWWA C115, latest revision.

2.) Butterfly Valves

Valves larger than sixteen inch (16”) in diameter shall be butterfly valves. All butterfly valves shall be bubble-tight closing at the rated pressure with flow in either direction, and shall be satisfactory for applications involving throttling service and frequent operations or operations after long periods of inactivity. Valves shall meet the full requirements of AWWA C504, latest revision, for 250 psi working pressure and shall be suitable for above ground or buried service.

All interior ferrous surfaces of valves shall have a fusion-bonded epoxy coating meeting the requirements of AWWA C550. Valve bodies shall be equipped with integrally cast mechanical joint ends meeting AWWA C111, latest revision. Mechanical joints shall be furnished with retainer glands.

Butterfly valves installed underground shall come equipped with a manual operator. This manual operator shall be of the traveling nut, self-locking type and shall be designed to hold the valve in any intermediate position between fully open and fully closed without creeping or fluttering. Operators shall be equipped with mechanical stop-limiting devices to prevent over travel of the disc in the open and closed positions.

Valves shall open when turned counter-clockwise. Operators shall be fully enclosed and designed for buried operation.

3.) Valve Boxes

Valves boxes for valves shall be approved standard cast iron adjustable shaft boxes having a minimum shaft diameter of five and one quarter inch (5-1/4"). The casing shall be coated with two coats of bitumastic paint. The lids of all boxes shall bear the word "Water" or the letter "W". Boxes shall be Vulcan Pattern VVB-4 or alternate acceptable to the Authority.

4.) Air and Vacuum Relief Valve Assemblies

The valve shall be a combination air/vacuum- double orifice automatic air release valve with two inch (2”) connection to the pipe line. The valve shall be of one-piece body design. The internal parts shall have a small orifice within tripod for small air discharge and a big orifice within bonnet of base housing for main air discharge and allow air to enter in the event of a vacuum condition.

The material of the body and the flow shall be Delrin (Poloximethylene,POM). The valve sealing is rubber made of EPDM. The valve shall have a protection cap of PE. Air and vacuum valves shall be manufactured by H-TEC or alternate acceptable to the Authority. Valves shall be a minimum of 1 inch.

Gate valves between water main and air release valve shall be bronze, solid wedge with screw connection equal to Jenkins Company Figure 370 or alternate acceptable to the Authority. Meter box shall be equal to the DFW Style D-1200 or alternate acceptable to the Authority.

5.) Tapping Sleeves

Tapping sleeves for existing water mains sized four through twelve inch (4” through 12”) in diameter for eight inch (8”) and smaller taps can be either an American Flow Control Series 2800 or a Ford Stainless Style FAST Tapping Sleeve or alternate acceptable to the Authority. The stainless steel FAST style shall only be used in cases where the normal working pressure is less than 125 PSI and the tap is eight inch (8”) in diameter or smaller. Where the normal working pressure exceeds 125 PSI or the tap is larger than eight inch (8”) in diameter, the sleeve shall be an American Flow Control Series 2800 or alternate acceptable to the Authority. Both types of sleeves shall have a flanged connection to the tapping valve.

Tapping sleeves for existing water mains sized larger than twelve inch (12”) in diameter shall be an American Flow Control Series 1004 or alternate acceptable to the Authority. The sleeve shall be mechanical joint type with a flanged connection to the tapping valve. It shall be capable of withstanding a working pressure of 250 psi for the pipe size and type shown.

6.) Tapping Valves

Tapping valves shall be American Flow Control Series 2500, mechanical joint by flanged ends, 250 psi, or alternate acceptable to the Authority.

7.) Pipe Connection Couplings

Pipe connections between new pipe and existing pipe shall be made with Dresser Style 90 long steel couplings for pipe sizes two inch (2") and below; for pipe sizes above two inch (2"), M.J. solid sleeves (long style) shall be used. Spacer rings must be used at all solid sleeve locations. A spacer ring is defined as a short section of pipe cut to fit into the gap between the two plain ends of pipe at the sleeve location. Field joints shall be made to insure permanently tight joints under all reasonable conditions of expansion, contraction, shifting, etc.

8.) Curb Stops

All metal parts of curb stops shall be made of bronze. The stops shall be Ford B43- 332W with padlock wings or alternate acceptable to the Authority for copper service pipe. The cock shall be operated with a combined cap and tee and shall open when turned counter-clock wise. The stop shall be compression joint inlet with meter swivel nut outlet.

9.) Service Line Couplings

Service line pipe couplings shall be compression style Ford C44 or alternate acceptable to the Authority. Branch connection shall be 1" x 3/4" x 3/4" Ford Y44-243 or alternate acceptable to the Authority. A cut-off valve (such as a Ford B44-444 Curb Stop) shall be installed on the water main side (the 1” side) of the wye and shall be buried without a valve box.

Female compression adapters shall be a Mueller-H-15451 or alternate acceptable to the Authority.

Male compression adapters shall be a Mueller-H-15428 or alternate acceptable to the Authority.

10.) Corporation Stops

Corporation stops shall have AWWA tapered threaded inlet and compression joint outlet connection for copper service pipe. All metal parts of the stop assembly shall be made of bronze. The stop shall be operated with a tee head and shall open when turned counter-clockwise. Corporation stops for copper service line pipe outlets shall be Ford FB1000 or alternate acceptable to the Authority.

11.) Electric Conductive Wire

Where PVC pipe is allowed to be installed, electric conductive wire shall be placed in the trench one foot (1') above the pipe. The tracer wire shall be 12 gauge, plastic coated copper wire suitable for this purpose. Foil tape will not be acceptable.

12.) Meter Boxes for Single Family Residential (Subdivisions)

Meter boxes shall be the "Rome" type of meter box as manufactured by Russell Foundry and Mfg. Co. in Alabama and shall be of cast iron, oval shape and have minimum inside dimensions of 19 inches by 10 inches and shall be at least 11 ½ inches deep. Lids shall fit snugly. Lids shall be banded together with a steel strapping and painted with black asphaltic paint before shipping. The combined weight of the box and lid shall be not less than 60 lbs. All residential meters shall be equipped with a Touch Read Pit Lid Register compatible with the Authority's meter reading equipment.

The lid shall be of cast iron and shall be designed to rest firmly on the seat inside the box and over-hang to prevent dirt from falling into the seat. The lid shall be easily removed and replaced.

13.) Service Saddles – Double Strapped

Double strapped service saddles are required for services two and one half inches (2-1/2") and smaller in diameter and shall be Ford F202 double strap clamps suitable for use with ductile iron or PVC pipe or alternate acceptable to the Authority. (See **Section W404.5** regarding the requirements for four inches (4") and larger diameter taps.)

If a three inch (3") meter is used for the development, the Developer must install four inch (4") DIP from the main to the meter, and then utilize a 4" x 3" reducer at the meter. The Authority will not accept three inch (3") service material.

14.) Meters and Backflow Preventers

All meters shall be purchased from CCWSA. All meters two inch (2") and smaller will be installed by the authority in boxes located at the edge of the right-of-way. All meters three inch (3") and larger will be installed by the Developer under the supervision of the Authority's inspector. All meters three inch (3") and larger shall be in vaults located at the edge of the street right-of-way or proper easement shall be provided. No meter will be set until the meter set fee is paid and a building permit issued for the lot requesting service. Any services located outside of the right-of-way shall be located as shown in **CCWSA Standard Detail W-21.** All meters must register in gallons and programmed to read in thousand gallon units.

A.) All meters must be installed with at least 5 times the pipe diameter of straight pipe the same size as meter on the inlet and outlet side to permit proper calibration.

B.) All 3'' and larger meters shall be a Sensus Omni Meter or Sensus compact fire line assembly equipped with an ICE register programmed to read in thousand gallon units. Each register shall be equipped with a Touch Read Pit Lid Register compatible with the Authority's meter reading equipment.

C.) All meter installed inside vaults must be level parallel, vertical, and horizontal to the meter vault.

D.) A four-foot (4') number 57 stone gravel bed and or a positive drain shall be required underneath all vaults for drainage. All bedding must be level for proper functioning of the meter.

E.) Stand-on –pipe supports are required underneath the meter and wheel valves for support of the weight.

F.) All openings or holes in the vault will be required to be enclosed with concrete and made water tight.

15.) Polyethylene Tubing for Ductile Iron Pipe

Where required by the Authority, polyethylene encasement tubing shall be manufactured of virgin polyethylene material conforming to the requirements specified in AWWA C105, Section 4.1.1 for linear, low density polyethylene film. The polyethylene film shall have a minimum thickness of 8 mil. Black polywrap shall be used for water mains and green polywrap shall be used for sewer force mains.

16.) Valve Markers

One concrete valve marker shall be furnished and set at each line valve. The marker shall be made of 3,000 PSI concrete, and shall be four feet (4') long and four inches (4") on each side, with two #3 reinforcing bars as shown on the **CCWSA Standard Detail W-16**.

The markers shall be set an even number of feet between the center line of the valve and the center line of the aluminum disc in the top of the marker, and the distance in feet between the valve and marker shall be stamped in the marker at the time of setting.

17.) Valve Box Collars

Each valve box shall have a concrete collar. These collars must be a minimum of three and one half inches (3 1/2") thick. They shall be square and sized 24" x 24". Precast collars may be used, provided that they are grouted in place to the valve box. The box is to be flush with or a maximum of one inch (1") above the finished grade. The edge of the valve box is to be one half inch (1/2") above the edge of the concrete collar.

18.) Concrete for Thrust Blocks and Thrust Collars

Concrete for thrust blocks and thrust collars shall have a minimum compressive strength of 3,000 PSI at 28 days.

19.) Subgrade Stabilizer Stone

Stabilizer for subgrade shall be either approved crushed stone or gravel, uniformly graded from 1/4" to 3/4" in size.

20.) Retainer Glands

Retainer glands for mechanical joints shall be EBAA Mega-Lug or alternate acceptable to the Authority.

21.) Locked Fire Hydrant Tee and Adapter

Locked fire hydrant tees shall be American A-10180 or alternate acceptable to the Authority. Locked hydrant adapter (anchor coupling) shall be American A-10895 or alternate acceptable to the Authority.

22.) "Fast-Grip" Gaskets

Inside of all casings and wherever else required by the Authority, DIP water main joints shall be slip joint restrained by using American Pipe "Fast-Grip" gaskets, U. S. Pipe "Field-Lok" gaskets or alternate acceptable to the Authority.

23.) Nitrile (NBR) Gaskets

In areas where underground fuel storage tanks are located or are known to have been located and as directed by the Authority, the D.I.P. water main joints shall use American Pipe "Nitrile (NBR)" (Acrylonitrile Butadiene) gaskets or alternate acceptable to the Authority.

W405-GENERAL REQUIREMENTS

Any pipe, solder or flux used in the installation or repair of the water lines shall be lead-free. Pipes and fittings shall not contain more than 8.0% lead and solder and flux shall not contain more than 0.2% lead.

SECTION W500 - CONSTRUCTION METHODS

W501-EXCAVATION GENERAL

It is the responsibility of the General Contractor, any subcontractor, their employees, and inspectors of job sites to observe all safety regulations. Deficiencies in safety measures noted should be immediately reported to the Contractor's superintendent, so that immediate corrective measures can be taken by the Contractor. It is, however, the Contractor's responsibility to conform to all safety regulations and practices as pertain to his construction site. The Contractor shall contact the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA), Region IV, Atlanta, Georgia for any assistance needed to complying with the appropriate regulations.

All unsuitable excavated material must be properly disposed of in a manner acceptable to the Authority and in a manner that will not adversely affect the environment.

It shall be expressly understood that these Standards are for the installation of all underground water mains and appurtenances. All work shall conform to the applicable provisions of the AWWA Specifications of latest revision except as otherwise specified herein.

W502-EROSION AND SEDIMENTATION CONTROL

All erosion and sedimentation control methods shall be in compliance with the State, Federal and Local regulations, the Manual for Erosion Control in Georgia and the EPD requirements regarding the NPDES Storm Water Monitoring permit.

The Contractor shall designate one individual to be responsible for the implementation and maintenance of erosion and sedimentation controls on a 24-hour, everyday basis. The Contractor shall furnish the Authority the individual’s name, address, and 24-hour telephone number. This information shall be updated as is necessary.

W503-CLEARING AND GRUBBING

Areas for water system construction shall be cleared and grubbed. All trees, shrubs, stumps, brush, paving and other waste material must be removed from the site.

On water line extensions to the development, the road right-of-way shall be cleared to the width necessary for trenching and pipe laying operations. All stumps and roots within the trench dimensions shall be grubbed to such depths and widths as will enable the trenching to be done. The trees, brush, stumps and other debris from clearing shall be removed from the site. No trees or stumps shall be pushed beyond the right-of-way or buried nor shall any timber beyond the right-of-way damaged. The Contractor shall remove only such trees on or along the work as the Chief Inspector permits, and shall carefully protect all other trees adjacent to the work. The Contractor shall not permit excavating machinery or trucks to scrape the bark or tear the limbs from the trees, nor connect ropes or guy cables to them.

W504-TRENCH EXCAVATION

1.) It is the responsibility of those installing water mains and related appurtenances to conform to OSHA regulations, 29 CFR Part 1926, Subpart P, Paragraph 1926.650 through 1926.653 during trench excavation. OSHA publications are available to assist the Contractor in having a safe construction site (i.e. **Excavating and Trenching Operations**, 1995(Revised), OSHA 2226). Publications from OSHA can be obtained by contacting OSHA Publications Distribution, Washington, D.C. The Authority assumes no liability nor responsibility for unsafe

trench conditions.

2.) Trenches shall have a minimum width of twelve (12) inches plus the diameter of the outside of the bell of the water main and the depth thereof shall be such that the water mains shall be installed so that the top of the pipe is a minimum of four feet (4') below final grade, four feet (4') below the edge of the pavement, or four feet (4') below the ditch paralleling the road, whichever is deepest. Permission must be granted by the Authority to vary from this requirement. Maximum trench width at the top of the pipe shall not be more than the outside diameter of the bell plus two feet (2'). The sides of the trench above the pipe shall be sloped or benched as necessary to maintain stability. Minimum pipe cover shall be as shown on the approved plans.

3.) Pipe trenches shall be straight and true to grade and in the location shown on the plans. Trenches shall be dug so that the pipe can be laid to the alignment and depth required, and the trench shall be of such width and shall be braced and drained so that the workmen may work therein safely and efficiently. No chocking under the pipe will be permitted. All joints shall be as specified herein. Excavation must be made under the bell of each pipe so that the entire length of the pipe will lie uniformly on the bottom of the trench and the pipe weight shall not rest on the bells.

4.) Trenches shall be free of water during the work. Whenever water is present in the trench, it shall be removed in a manner satisfactory to the Authority and enough backfill shall be placed on the pipe to prevent floating. Any pipe that has floated shall be removed from the trench and relaid later during dry conditions. No pipe shall be laid in wet trench conditions that preclude proper bedding, or on frozen trench bottom, or when, in the opinion of the Authority, the trench conditions or the weather are unsuitable for proper installation.

The Contractor shall do all necessary pumping or bailing, build all drains and do all other work necessary at his own expense to keep the trenches clear of water during the progress of the work. No structure shall be built or pipe shall be laid in water, and water shall not be allowed to flow over or rise upon any concrete, masonry or pipe until the same has been inspected and the concrete or joint material has thoroughly set. All water pumped, bailed or otherwise removed from the trench or other excavation shall be conveyed in a proper manner to a suitable place of discharge where it will not cause injury to the public health or to public or private property or to work completed or in progress, or to the surface of the streets or cause any interference with the use of same by the public.

5.) All changes in grade shall be made gradually. At points of interference with storm sewers and cross drains on D.O.T. right-of-way, the pipe will be run under the conflicting utility unless the water main can be installed above the storm sewer while maintaining both the required one-foot (1') separation and the required cover specified in **Section W504.2** above. Where the water main crosses beneath a storm sewer, there shall be a minimum of twelve inches (12") of clearance between the main and the storm sewer.

6.) In laying pipe across water courses, the top of the water main or casing shall be a minimum of two feet (2') below the creek or river bed. Two feet (2') of cover shall be maintained over water mains crossing ditches or depressions of any kind. Railroad crossings shall be installed according to American Railway Engineering Association requirements.

7.) Where necessary, the line shall be lowered at valves so that the top of the valve stem is approximately three feet (3') below the finished grade. The trench shall be deepened to

provide a gradual approach to all low points of the line.

8.) No excavation shall be made under highways, streets, alleys or private property until satisfactory arrangements have been made with the State, City, County or owners of the property to be crossed. All excavated material shall be placed so as to not interfere with public travel on the streets and highways along which the lines are laid. All work shall be performed to cause the least possible inconvenience to the public. Adequate temporary bridges or crossings shall be constructed and maintained where required to permit uninterrupted vehicular and pedestrian traffic. Not more than one hundred feet (100') of trench shall be opened on any line in advance of pipe laying. The Chief Inspector shall have the right to limit the amount of trench open at any one time to less than one hundred feet (100') if he believes the reduced limits are necessary.

9.) All excavations shall be adequately guarded with barricades and lights in compliance with all OSHA, Cherokee County and Georgia Department of Transportation requirements so as to protect the public and workers from hazard.

10.) When possible, all crossings of paved highways or driveways shall be made by boring or jacking the pipe under the pavement and shall be done in such manner as not to damage the pavement or sub-grade, unless the casing or pipe is in solid rock, in which case the crossing shall be made by the open cut method, wet bore or by tunneling.

Wherever streets, roads, or driveways are cut, they shall be immediately backfilled and compacted after the pipe is laid and shall be maintained in first-class condition as passable at all times until repaved. Backfilling, compaction, dressing and clean-up shall be kept as close to the line laying crew as is practical, and negligence in this feature of the work will not be tolerated.

Streets, sidewalks, parkways, and other public and private property disturbed in the course of the work shall be restored to as near as original condition as possible or better in a manner satisfactory to the Authority.

11.) In excavation and backfilling and laying pipe, care must be taken not to remove or injure any water, sewer, gas or other pipes, conduits or other structures without an order from the Designer. When an obstruction is encountered, the Contractor shall notify the Designer who will have the Owners of the obstruction adjust same or make necessary changes in grade and/or alignment to avoid such obstruction. Any house connection, drains or other structures damaged by the Contractor shall be repaired immediately.

12.) All excavation shall be placed on one side of the trench, unless permission is given by the Authority to place it on both sides. Excavation materials shall be so placed as not to endanger the work and so that free access may be had at all times to all parts of the trench and to all fire hydrants or water valve boxes, etc.

13.) Excavations adjacent to existing or proposed buildings and structures, or in paved streets or alleys shall be adequately protected by the use of trench boxes, sheathing, shoring and bracing to support the sides of the excavation and to prevent cave-ins of the excavation, or the undermining or subsequent settlement of adjacent structures or pavements. Underpinning of adjacent structures shall be done when necessary to maintain structures in safe condition.

14.) Construction occurring around active sewer systems shall be done in such a way so as to prevent the passage of wastewater onto the ground. **Absolutely no wastewater shall be allowed to spill onto the ground.**

W505-ROCK EXCAVATION

Wherever rock is encountered in the excavation, it shall be removed by suitable means. Drilling and blasting operations shall be conducted with due regard for the safety of persons and property in the vicinity and in strict conformity with requirements of all ordinances, laws and regulations relative to the handling, storing and use of explosives. The Developer is fully responsible for filing for and acquiring any blasting permits which may be required by those agencies with such jurisdiction. Before blasting, the Contractor shall cover the excavation with heavy timbers and mats in such a manner as to prevent damage to persons or the adjacent property. Rock excavation near existing pipelines or other structures shall be conducted with the utmost care to avoid damage. The Contractor shall be wholly responsible for any damage resulting from blasting, and any injury or damage to structures or property shall be promptly repaired by the Contractor to the satisfaction of the Authority and property owner.

Rock in trenches shall be excavated over the horizontal limits of excavation and to depths as follows:

Size of Pipeline, Inches	Depth of Excavation Below Bottom of Pipe, Inches
4 and Less	4
4 to 6	6
8 to 18	8
18 to 30	10
Over 30	12

The space below grade for pipe lines shall then be backfilled with subgrade stabilizer or other approved bedding material and compacted.

In rock excavation, the backfill from the bottom of the trench to one foot (1') above the top of the pipe shall be finely pulverized soil, free from rocks and stones. The rest of the backfill shall not contain over fifty percent (50%) broken stone, and the maximum sized stone placed in the trench shall not exceed two inches (2") in diameter. Excess rock and fragments of rock larger than two inches (2") in diameter shall be loaded and hauled to disposal. If it is necessary, in order to comply with these specifications, selected backfill shall be borrowed and hauled to the trenches in rock excavation. Sides of the trench shall be trimmed of projecting rock that will interfere with backfilling operations. Rock excavation by blasting shall be at least seventy-five feet (75') in advance of pipe laying.

W506-SUBGRADE AND BEDDING

1.) The bottom of the trench shall be accurately cut to grade so that the pipe will have a longitudinal bearing on undisturbed soil for the full length of the pipe, except for such distances that are necessary for bell holes.

2.) If the soil at the bottom of the trench is in such condition that it cannot be properly shaped or graded, due to the hardness of the soil and in all cases where rock or shale is encountered at sub-grade, the trench shall be refilled with suitable backfill material to the required sub-grade elevation, thoroughly tamped with mechanical tampers and shaped to fit the outside of the pipe as specified in the preceding paragraph. Wherever water is encountered in

conjunction with the additional sub-grade excavation, the backfill shall consist of sub-grade stabilizer stone.

3.) In the event that a trench is excavated below grade, the Contractor shall refill the trench to the proper grade with suitable, thoroughly compacted material. Allowable soils shall be dry course-grained soils ranging from well-graded gravel-sand mixtures with little or no fines to clayey sands and sand-clay mixtures with appreciable amounts of fines. All soil materials shall have one hundred percent (100%) passing a 1-1/2 inch sieve and a maximum of fifty five percent (55%) passing a No. 200 sieve. The maximum volume change allowable shall be fifteen percent (15%). Allowable soils shall be Class I and Class II as defined in Section 810, of the Georgia Department of Transportation Specifications for the Construction of Roads and Bridges.

4.) All gravel or crushed stone used for Class "C" bedding shall have a gradation equal to or smaller than #57 stone in order to limit the void area, and all the material must pass a 1-1/2 inch sieve. Where sand or other acceptable soil is used, it shall be spread over the trench bottom, compacted to at least ninety percent (90%) maximum density and shaped before placing the pipe; after the pipe is placed, additional material shall be compacted under the haunches and for the full trench width as described above.

W507-INSTALLATION OF WATER MAIN

1.) Pipe and accessories shall at all times be handled with care to avoid damage. Proper and suitable tools and equipment for the safe and convenient handling and laying of pipe shall be used. Whether moved by hand, skid ways or hoists, material shall not be dropped or bumped. Great care shall be taken to prevent the pipe from being damaged, particularly the cement lining on the interior of ductile iron pipe. Each joint of pipe shall be unloaded opposite or near the place where it is to be laid in the trench. All pipe shall be carefully examined for cracks and other defects. All such material that is defective in manufacture, has been damaged in transit, after delivery or in installation, shall be removed from the job site and replaced with new material.

2.) All pipe shall be laid straight, true to line and grade. Bell and coupling holes shall be dug in the trench and the pipe shall have a continuous bearing with the trench bottom between bell or coupling holes. No shimming or blocking up of the pipe shall be allowed. When the work is not going on, all pipe openings shall be securely closed by the insertion of the proper size plug and caulking so that dirt and debris will not be washed into the pipe in case of rain. The inside of the pipe shall be clean and free of trash and dirt, and if necessary a swab or brush shall be used to clean the pipe before lowering it into the trench. All pipe and fittings shall be kept clean until completion of the work.

3.) Water mains shall be joined by "push-on" joints using elastomeric gaskets to affect the pressure seal. The spigot end of the pipe and the inside of the bell shall be thoroughly cleaned and the gasket inspected to see that it is properly placed; Lubricant shall be applied to the spigot end of the pipe and it shall be inserted into the bell of the adjoining pipe to the stop mark on the pipe, and the assembly shall be made as recommended by the pipe manufacturer. Lubricant used must be non-toxic and supplied or approved for use by the pipe manufacturer.

4.) Restrained joints shall be provided where specified on the approved plans and shall be of the type specified in **Section W400** of these specifications. Assembly shall be in accordance with the manufacturer's recommendations. While the typical bedding required for water

mains is Type 3, all restrained pipe and bends shall have Type 4 bedding.

5.) Water shall not be allowed to run or stand in the trench before the trench has been backfilled. The Contractor at no time shall open up more trench than his available pumping facilities are able to dewater.

6.) Where allowed by the Authority, PVC water mains shall be installed in accordance with the requirements of ASTM D 2774, latest revision. Where PVC pipe is installed, electric conductive wire shall be placed in the trench one foot (1') above the pipe.

7.) Ductile iron water mains shall be wrapped in black polyethylene tubing where required by the Authority. Polyethylene tubing shall be installed in accordance with AWWA C105, Method A, latest revision.

8.) At changes in direction of the main and at other points shown on the plans or directed by the Engineers, the line shall be adequately blocked with concrete or restrained in some other manner approved by the Authority. The Chief Inspector shall be notified by the Contractor before blocking is placed. Prior to blocking any joint or fitting with concrete, that joint or fitting shall be wrapped with polyethylene film in such a manner that the concrete will not stick directly to the pipe but that the load bearing capacity of the blocking will not be affected.

9.) For water mains, the Contractor shall place a vertical piece of two inch (2") diameter PVC pipe on top of the pipe at all bends, fittings, valves, elevation transitions and every 50' along the length of the water main for the purpose of enabling the surveyor to determine the water main elevation for As-Builts. The Contractor will then be responsible for removing the vertical PVC sections after the as-built locations have been verified by the Authority. The PVC shall be capped by approved method to prevent trash from entering the PVC prior to the depth being measured.

W508-BACKFILLING TRENCHES

1.) Backfill material shall consist of fine, loose earth containing sufficient but not excessive moisture content for thorough compaction. Material that is too dry for adequate compaction shall receive a prior admix of sufficient water to secure adequate moisture content. Material having excessive water content shall not be placed at any time. Backfill material shall be free of large clods, stones, vegetable matter, debris, and other objectionable material. All unsuitable excavated material and excess material must be properly disposed of in a manner that will not adversely affect the environment.

After the pipe has been laid, backfilling shall be done in two (2) distinct operations. In general, all backfill beneath, around and to a depth of twelve inches (12") above the top of the pipe shall be placed by hand in four inch (4") layers for the full width of the trench and thoroughly compacted by hand with vibratory equipment. The remainder of the backfill shall be placed in six inches (6") layers and compacted to the top of the trench, either by pneumatic hand tamps, hydro-tamps, or other approved methods. Care shall be taken so that the pipe is not laterally displaced during backfilling operations. The backfill lifts shall be placed by an approved method in accordance with that hereinafter specified. Backfill materials shall be the excavated materials without bricks, stone, or corrosive materials.

2.) Backfill under permanent concrete or bituminous pavement or floors and as elsewhere specified or indicated on the plans shall be approved bank-run sand or compacted graded aggregate free from large stones and containing not more than ten percent (10%) by weight of loam or clay. This backfill shall be compacted to ninety-five percent (95%) as determined

by the Standard Proctor test from pipe bedding to one foot (1') above the pipe, and the remainder of the trench up to the concrete trench cap shall be compacted to one hundred percent (100%) as determined by the Standard Proctor test. Mechanical vibrating equipment shall be used to achieve the required compaction.

3.) Backfill under gravel or crushed stone surfaced roadways and surface treated type bituminous roadways shall be the approved suitable excavated material placed as described above for the full depth and width of the trench. Backfill shall be free from large stones and contain no more than ten percent (10%) by weight of loam or clay. This backfill shall be compacted to ninety-five percent (95%) as determined by the Standard Proctor test from pipe bedding to one foot (1') above the pipe, and the remainder of the trench shall be compacted to one hundred percent (100%) as determined by the Standard Proctor test. Mechanical vibrating equipment shall be used to achieve the required compaction.

4.) Backfill in unpaved areas shall be compacted with mechanical vibrating equipment to ninety-eight percent (98%) as determined by the Standard Proctor Test. Backfill material from pipe bedding to ground surface by shall be excavated earth free from large stones and other debris.

5.) Where sheeting is used in connection with the work, it is in no case to be withdrawn before the trench is sufficiently filled to prevent damage to banks, road surfaces, adjacent pipes, adjacent structures or property. When the removal of sheeting endangers adjoining improvements, it will be left in place.

6.) All costs of compaction testing shall be the responsibility of the Developer.

W509-THRUST RESTRAINT FOR PRESSURE LINES

1.) Reaction Blocking

A.) Underground piping laid around curves and at all unsupported changes of direction, all tees, wyes, crosses, plugs and other like fittings shall be solidly and properly blocked with high early strength concrete against solid earth to take the reaction of the main pressure and to prevent lateral movement of the pipe or fittings when under pressure. Concrete for reaction blocking shall be Class A concrete and shall have a minimum compressive strength of 3,000 psi at twenty-eight (28) days. The Contractor shall allow the concrete to set up for a minimum of four hours before backfilling. The blocking, unless otherwise shown, shall be so placed that the pipe and fitting joints will be accessible for repair.

B.) Reaction blocking shall be constructed in conformance with the **CCWSA Standard Details Booklet** for Reaction Blocking. Prior to blocking any joint or fitting with concrete, that joint or fitting shall be wrapped with polyethylene film is such a manner that the concrete will not stick directly to the fitting, but that the load bearing capacity of the blocking will not be affected.

C.) The sizing of the thrust block bearing area given in the **CCWSA Standard Details Booklet** is based on a soil strength of 2000 PSF and a water pressure of 250 PSI. The Design Professional preparing the water main design shall verify the soil conditions before the thrust block design is implemented.

2.) Retainer Glands

Mechanical joint fittings and valves on Ductile Iron Pipe shall be installed with retainer glands where specified herein.

3.) Rodding / Straps

Where blocking cannot be poured against undisturbed earth, the Contractor shall pour concrete dead men with threaded rods and/or metal straps coming out of the dead man and connecting to the valve/fitting for restraint. The rods and metal straps shall be coated with an approved bitumastic coating prior to backfilling. Vertical bends shall be restrained with threaded rods and concrete dead men as shown in the detailed drawings **(See CCWSA Standard Details Booklet)**.

4.) Restrained Joints

Where approved by the Authority, another option to using concrete blocking in restricted areas is the use of restrained joints. Restrained joints shall be provided where specified on the approved plans and shall be of the type specified in **Section W400** of these specifications. Assembly shall be in accordance with the manufacturer's recommendations. While the typical bedding required for water mains is Type 3, all restrained pipe and bends shall have Type 4 bedding.

W510-SETTING FIRE HYDRANTS

Fire hydrants shall be placed at the locations shown on the plans and installed in accordance with AWWA MI, Chapter 4. Gate valves for fire hydrants shall be connected directly to the main by means of a "Locked Hydrant Tee". All other connections between the main and the fire hydrant shall be mechanical joint with ductile iron retainer glands. Fittings shall be restrained by a "Locked Hydrant Adapter" whenever the fire hydrant is located close enough to the main to allow its use. Not less than (4) four cubic feet of No.5 or No.57 stone shall be placed around the base of the hydrants, as shown in the **CCWSA Standard Details Booklet**. Before placing the hydrants, care shall be taken to see that all foreign material is removed from within the body. The stuffing boxes shall be tightened and the hydrant valve opened and closed to see that all parts are in first class working condition. All hydrant openings shall be kept capped, except when hydrant is being worked on.

When a fire hydrant has been constructed but is not yet in service, the Contractor shall provide and attach to the fire hydrant a flag or collar indicating that the fire hydrant is not in service. Said flags or collars shall remain on the fire hydrant until it is put into service. Whenever an existing fire hydrant is taken out of service, whether temporarily or permanently, it shall be equipped with a flag or collar indicating that it is not in service. The Contractor shall provide and install flags or collars as required and shall notify the Fire Department whenever the operating status of any fire hydrant changes.

FIRE HYDRANTS SHALL NOT BE OPERATED WITH ANY TOOL EXCEPT A SPECIFICALLY DESIGNED FIRE HYDRANT WRENCH. If the Contractor observes any other contractor or person operating a fire hydrant with an unapproved fire hydrant wrench, he shall report that fact to the Authority immediately. It is the Contractor's responsibility to insure that all new facilities are maintained in new condition until final completion of the project and acceptance by the Authority. Fire hydrants with damaged operating nuts shall not be accepted.

W511-SETTING VALVES AND FITTINGS

Valves and fittings shall be placed where shown on the plans. Valves shall be set plumb, and shall have cast iron valve boxes. The valve boxes shall be placed directly over the valve and set plumb, the top of the box being brought to the surface of the ground. After the boxes are in place, earth shall be filled in the trench and thoroughly tamped around the box. After all settlement has taken place, a concrete collar shall be constructed for each valve box.

Fittings shall be properly braced to insure that they will not be blown off or broken loose under

the greatest possible working pressure. All fittings shall be mechanical joint unless specified otherwise. In situations where there is insufficient undisturbed earth to act as a bearing surface or where otherwise directed by the Authority, fittings shall be restrained by the use of threaded rods or other method acceptable to the Authority. Line valves shall be supported and restrained by concrete blocking and threaded rods as shown in the **CCWSA Standard Details Booklet**.

Valve stem extensions shall be installed where the valve operating nut is more than three feet (3') below the finished grade. The valve stem extension shall be of sufficient length to place its operating nut at a depth between two and three feet (2' & 3') below finished grade.

W512-MARKING LOCATION OF VALVES AND THE END OF THE MAIN

1.) Concrete valve markers shall be set for main line water valves with an even number of feet between the center line of the valve and the center line of the aluminum disc in the top of the marker, and the distance in feet between the valve and marker shall be stamped in the marker at the time of setting.

2.) A concrete valve marker shall be placed directly over the end of any water main stubbed out for future use or any dead end main. The letters "EOL" shall be cast into the top of the marker or stamped into the aluminum disc in the top of the marker.

W513-PLACING OF STEEL CASING PIPE

1.) Casing pipe shall be installed at the locations required by the Authority. Unless directed otherwise, the installation procedure shall be the dry bore method. The hole is to be mechanically bored and cased through the soil by a cutting head on a continuous auger mounted inside the casing pipe. The installation of the casing and boring of the hole shall be done simultaneously by jacking. Lengths of casing are to be full circumference butt-welded to the preceding section installed. Excavation material will be removed and placed at the top of the working pit.

2.) Jacks for forcing the casing pipe through the roadbed shall have a jacking head constructed in such a manner as to apply uniform pressure around the ring of the pipe. The casing to be jacked shall be set on guides, braced together, to properly support the section of the pipe and direct it to the proper line and grade. In general, roadbed material shall be excavated just ahead of the pipe, the excavated material removed through the pipe, and the pipe then forced through the roadbed into the excavated space.

3.) Where pipe is required to be installed under railroads, highways, streets or other facilities by jacking or boring methods, construction shall be done in a manner that will not interfere with the operation of the facility, and shall not weaken the roadbed or structure.

4.) The use of water or other fluids in connection with the boring operation will be permitted only to the extent necessary to lubricate cuttings. Jetting will not be permitted.

5.) The diameter of the excavation shall conform to the outside diameter and circumference of the casing pipe as closely as practicable. Any voids which develop during the installation operation shall be pressure grouted.

6.) The casing shall be jacked from the low or downstream end. At each end of the casing pipe the void between the carrier pipe and casing shall be sealed with brick and mortar. Any pipe damaged in jacking operations shall be removed, and replaced by the Contractor at their

expense.

7.) After the steel casing pipe has been installed, the DIP carrier pipe shall be installed in the casing pipe. Care shall be exercised at all times to protect the coating and lining of this pipe and to maintain tight, full-seated joints in the carrier pipe. Where the carrier pipe is 24" in diameter or less, joint gaskets shall be "Field-Lok" gaskets or approved equal inside of the casing.

W514-CONNECTION TO THE EXISTING AUTHORITY WATER SYSTEM

1.) The developer's private contractor shall make all required connections and taps to the Authority's water system. The Authority's Inspector will supervise the tap and all associated work. The contractor shall give the Authority a minimum of (4) days' notice prior to any tap on the CCWSA'S water system.

2.) The Contractor will provide proper traffic control devices and certified personnel to direct traffic if required.

3.) All taps shall be wet taps (on pressurized water mains in service). All taps shall be made with saddles or tapping sleeves.

4.) Abandoned water mains shall be capped or plugged at each end and grout filled, if directed by CCWSA Inspector. See **CCWSA Standard Detail W-20**.

W515-INTERRUPTION OF WATER SUPPLY DURING CONSTRUCTION

No interruptions of water service will be allowed without the permission and supervision of Authority personnel. Residents and building occupants shall be informed of the date, time of cutoff and the duration of stoppage. Failure to do so will make the Contractor liable for any damages reported to the Authority's Office. Four (4) days' notice shall be prepared and given to the affected customers and must be coordinated with Authority. When it is necessary to schedule a water outage for any construction, signs must be posted at least four (4) days in advance to notify the public. In some cases, the water outage may need to be scheduled for nights or weekends to lessen the inconvenience to businesses or schools. **(See CCWSA Standard Detail W-19 for sign requirements). These signs are to be provided and installed by the Developer.**

W516-RAILROAD CROSSINGS

All railroad crossings shall conform to the requirements of the American Railway Engineering Association Manual for Railway Engineering. The Contractor shall secure permission from the railroads to schedule the work so as not to interfere with the operation of the railroads. The Contractor shall be held responsible for any delays or damages occurring to the railroads. The Contractor will furnish the railroad with such additional insurance as may be required, cost of same to be borne by the Contractor, together with the costs for flagmen, watchmen, temporary work of any nature, safety devices and any other items that may be imposed by the railroad.

All railroad crossings shall conform to the requirements of the American Railway Engineering Association Manual for Railway Engineering. The Contractor shall secure permission from the railroads to schedule the work so as not to interfere with the operation of the railroads. The Contractor shall be held responsible for any delays or damages occurring to the railroads. The Contractor will furnish the railroad with such additional insurance as may be required, cost of same to be borne by the Contractor, together with the costs for flagmen, watchmen, temporary

work of any nature, safety devices and any other items that may be imposed by the railroad.

W517-HIGHWAY CROSSINGS

1.) The Contractor shall be responsible for coordinating and scheduling all construction work in the Georgia State Highway right-of-way with the Georgia Department of Transportation.

2.) Work along and across Georgia State Highway right-of-way shall conform to Georgia D.O.T. Standard Specifications for Construction of Roads and Bridges. The Developer is required to obtain all necessary permits.

3.) Traffic control within the Georgia State Highway right-of-way shall comply with Section 107.09 of the State of Georgia D.O.T. Standard Construction Specifications, or Sections 104.05 and 107.07 of the U.S. Manual on Uniform Traffic Control Devices for Streets and Highways, latest editions.

W518-STREAM CROSSINGS

Crossing streams shall be done in compliance with the Federal, State and Local laws and permit requirements. The methods described below are subject to change due to more recent regulations implemented by the varying government agencies. The Developer is liable for knowing and complying with the most stringent regulations in force at the time of construction.

1.) The suggested method of crossing a river, stream, creek, impoundments, or wet weather ditch is with a bore under the creek or river with a minimum of two feet (2') of cover between the lowest point in the stream and the top of outside diameter of the casing. Casings and ductile iron pipe are required for all stream crossings and shall extend a minimum of twenty feet (20') beyond the vegetative buffer (State or County buffer, whichever is wider) on each side. An open cut of the stream is allowable if no endangered species are affected and if the Developer obtains permission from the various governing agencies. If the stream is open cut, concrete collars or encasement must be provided at all joints for ductile iron pipe with less than three feet (3') of cover.

2.) Design engineer is responsible for checking and designing against floatation.

3.) The stream bed and sides at the crossing site shall be protected from erosion in accordance with the **Manual For Erosion and Sediment Control In Georgia**, 2000 or most current edition.

4.) Where streams are allowed to be open cut, the construction in stream beds shall follow the following guidelines:

A.) Construction in and around stream beds must adhere to the current regulations of the Georgia EPD, the Corps of Engineers, Cherokee County and the U.S. Department of Fish and Wildlife. The design engineer and contractor are responsible for knowing and complying with these regulations. Any item published within these specifications that is in conflict with stream bed protection regulations is hereby deemed invalid, unless the specification herein is considered more stringent by the reviewing agency.

B.) Fording of live streams with construction equipment will not be permitted, unless specifically approved in writing. Unless otherwise approved in writing, mechanized equipment shall not be operated in live streams except as may be required to

construct temporary diversion structures, and temporary or permanent structures.

C.) Erosion control measures shall be installed prior to performing any stream crossings. All work should be performed when stream flows are at their lowest, and all work should be performed as quickly and safely as possible. As soon as conditions permit, the stream bed shall be cleared of all false work, debris, and other obstructions placed therein or caused by the construction operations.

D.) Erosion control measures can include, but is not limited to, the following items:

E.) Silt fencing, two rows of type C

F.) Erosion control check dams.

G.) Channel diversion through temporary storm drain pipe.

H.) Rock filter dams.

I.) River Stone in the creek bed.

J.) Geotextiles for stream bank restoration.

K.) Special vegetative installations.

The construction and installation of these various structures are detailed in the **Manual For Erosion And Sedimentation Control In Georgia** or the Georgia Department of Transportation Standards and Construction Details, both of which are available for purchase by the Contractor. All measures must be approved by the NRCS and the EPD.

W519-REPLACEMENT OF PAVEMENT

1.) General

Contractor shall fully restore and replace all pavement, curbs, gutters, sidewalks and other surface structures removed or disturbed, to a condition that is equal to or better than the original condition in a manner satisfactory to the Authority.

Contractors which are utilizing the roadway shoulders for construction are required to stabilize the earth shoulders every three days as a maximum time period. They are required to stabilize the shoulder before leaving the work area on any particular day if rain is forecast within the next 24 hours.

2.) Pavement Cuts

A.) All paved roads will be bored and cased. A bore must be attempted before consideration will be given to cutting the street.

B.) Existing roadways shall not be open cut unless permission is granted by the Georgia D.O.T., Cherokee County Engineering Department (CCED) or City. Submittal of an authorization letter from the D.O.T. or the CCED is required.

C.) One lane of traffic shall be maintained open at all times. Construction work shall be limited to time between 9 A.M. and 4 P.M.

D.) The Contractor shall furnish traffic control devices and certified personnel to direct traffic, if required.

E.) The above requirements may be altered with the written approval of the CCED in extenuating circumstances.

F.) Assuming that a road bore has been attempted and failed, or that the Developer has received permission to open cut a road, pavement replacement shall meet the current specifications as required by the City, Cherokee County or Georgia D.O.T.

G.) The Contractor shall adhere to the Georgia D.O.T. Specifications for the Installation of Safety Barricades, Section 107.09 during construction in the roadway or shoulder.

H.) Where possible, all pipe under existing paved driveways will be either free bored or installed in casing.

W520-LOCATION AND PROTECTION OF EXISTING UNDERGROUND UTILITIES

It is the responsibility of the Contractor to locate and protect all underground utilities and structures. No utility or structure is to be moved or disturbed without the approval of the utility company or the Owner of the structure. Any damage caused by waterline installation to any utility or structure shall be immediately reported to the Chief Inspector of the CCWSA and repaired at the Contractor's expense.

During construction and after the water main is operational and throughout the one-year maintenance period, the Developer will be responsible for locating all water and sewer facilities when called upon by the Utilities Protection Center or the Authority. These utilities must be marked within 72 hours of the time notified. Any water or sewer facilities cut by others will be repaired by the Developer's contractor at the Developer's expense if the lines are not located or if they are improperly located. The Developer shall provide the name and telephone number of the company providing this locate service for the Developer.

W521-CLEAN-UP

1.) The Contractor shall remove all unused material, excess rock and earth, and all other debris from the construction site as closely behind the work as practical. If the Contractor fails to maintain clean-up responsibilities as directed by the Authority's representative, the Authority may choose to use their own forces to do so, followed by an invoice to the Developer for the Authority's work.

2.) All trenches shall be backfilled and tamped before the end of each day's work.

3.) Prior to requesting the "completion of water main construction" inspection, the Contractor shall do the following:

- **A.)** Remove and dispose of in an acceptable manner all shipping timbers, shipping bands, spacers, excess materials, broken material, crates, boxes and any other material brought to the job site.
- **B.)** Repair or replace any work, trees, lawns, shrubs, fences, flower beds, drainage culverts or other property damaged by the water line construction. All items damaged beyond repair shall be replaced with the same kind of material as existed prior to the damage occurring.
- **C.)** Insure that all valves have been located and are fully open. Adjust all valve boxes to grade and pour concrete collars around all valve boxes outside paved areas.
- **D.)** Insure that fire hydrants are set to grade and that connections are open.
- **E.)** All easement areas shall be cleared of trees, stumps and other debris and left in a condition such that the easement can be maintained by bush-hog equipment.
- **F.)** All shoulders, ditches, culverts, and other areas impacted by the water main construction shall be at the proper grades and smooth in appearance.

W522-GRASSING

A uniform stand of grass or mulch for erosion protection is required over all road shoulders and water main easements prior to the Authority's acceptance of the water main. Grass shall be as defined and planted in conformity with the Temporary and Permanent Disturbed Area Stabilization of the **Manual for Erosion and Sediment Control in Georgia**, 2000 or most current edition.

Grass seed shall be selected based on the type of seed suitable to the area and season of year.

Refer to the **Manual for Erosion and Sediment Control in Georgia** for grass growing schedule, selection of grass seed, fertilizers, lime, inoculants, mulching, etc.

The Contractor shall provide water for irrigation from the nearest available metered source. The soil must be thoroughly wet to a depth that will insure germination of the seed. Water must be applied at a rate not causing runoff or erosion.

Growth and coverage on areas grassed shall be considered in reasonably close conformity with the intent of this requirement when a viable stand of grass covers at least ninety-eight percent (98%) of the total area with no bare spots exceeding one square foot (1 sq. ft.) and the ground surface is fully stabilized against erosion. The Contractor shall repeat all work, including plowing, fertilizing, watering, and seeding as necessary to produce a satisfactory stand.

The Contractor or Developer shall do all maintenance work necessary to keep all planted areas in satisfactory condition until the work is finally accepted. This shall include mowing, repairing washes that occur, reseeding, and water as required to produce a healthy and growing stand of grass. Mowing will be required to remove tall and obnoxious weeds before they go to seed.

W523-STANDARD DETAILED DRAWINGS

Installation of fire hydrants, water valves, valve boxes, meters, long side services, water lines, etc. shall be made in accordance with the **CCWSA Standard Details Booklet.**

W524-BARRICADES

The Contractor shall provide, erect and maintain all necessary barricades, suitable and sufficient red lights, danger signals and necessary precautions for the protection of the work and the safety of the public. Streets closed to traffic shall be protected by effective barricades on which shall be placed acceptable warning signs. Barricades shall extend completely across the street which is to be closed, and shall be illuminated at night by lights not farther than five feet (5') apart, and lights shall be kept burning from sunset to sunrise.

W525-FENCES

On water line extensions to the development, the Contractor shall take down fences on or crossing right-of-way for such periods of time only as are necessary to prosecute the work of clearing, grubbing, trenching, pipe laying and backfilling. Gaps made in fences shall be closed in a substantial manner at night and during any suspension of work, and, upon completion of the pipe line, fences shall be restored to as good condition as before disturbed.

W526-RIP-RAP

Where required, stone rip-rap shall be dumped and hand placed to form a compact layer. Stone rip-rap shall be placed to a thickness of not less than eight inches (8") and not more than eighteen inches (18"), to the length and width shown on the plan or as directed by the Inspector. Rip Rap shall have a geotextile underliner between the soil and the stone.

SECTION W600 – WATER LINE INSPECTION, TESTING AND ACCEPTANCE

W601-INSPECTION

1.) Inspection will be done by the Cherokee County Water and Sewerage Authority. Inspections will be scheduled as received by the Authority.

2.) The Chief Inspector shall be notified when specific inspections are required so that the inspection time can be scheduled.

3.) The contractor shall present the following when requesting a final project inspection:

A.) The size and length of all lines installed including services.
B.) A completed Project Information Form (Exhibit A) (See form at end of **Section W600**)
C.) As-built plans and electronic data prepared in accordance with the requirements set forth in **Section W606**.

4.) In no circumstances shall any buildings and plumbing fixtures be connected to the main until the main is inspected and approved by the Authority.

5.) Upon request, the contractor shall furnish the Inspector with appropriate copies of the manufacturer's certification that the materials to be used meet the materials requirements of these specifications. The Inspector may reject any materials not meeting specifications or any faulty or damaged materials. Any materials so rejected must be removed from the project immediately and must be prominently marked so that they can be spotted on this or any other project.

6.) Authorized representatives of the Cherokee County Water and Sewerage Authority, which may include appropriate county, state or federal agencies, shall have access to the site for inspection at any time.

7.) The Chief Inspector shall be notified by 8:30 A.M. of each workday when work is scheduled unless authorized otherwise.

8.) The Inspector may at any time direct that he/she be allowed to see any pipe work, bedding, fire hydrant, tee, valve or other appurtenance. If the Chief Inspector so directs, all pipe work shall be left open until the Inspector views the work. The trench may be backfilled with the approval of the Inspector if the work is not inspected by the close of the working day. No valves, fire hydrants, tees, thrust blocking or lot services shall be backfilled without the approval of the Inspector.

9.) The Contractor shall complete the project and shall have cleaned up the job site prior to requesting a final project inspection. The Chief Inspector may terminate the inspection and direct further work at any time he feels that the project is not substantially complete and ready for inspection. The Contractor shall furnish adequate personnel to check for open valves and give assistance needed by the Chief Inspector.

10.) The representative of the Chief Inspector will normally visually inspect all water lines and appurtenances for conformance to the specifications and will check the measurements shown on the As-Builts for accuracy. The representative will perform pressure and leakage tests to

insure all lines are watertight. The representative shall also supervise a disinfection test. Any of the following tests may also be required at the discretion of the Inspector:

A.) Fire Hydrant / Hammer Test (See **Section W403)**
B.) Trench compaction tests

Any defects found by these tests must be corrected before construction of the project may proceed.

11.) A punch list shall be issued for corrective work if needed. However, the Chief Inspector shall not perform the contractor's work by finding all of his problems before the project is reasonably complete.

W602-COMPACTION TESTING

All trenches shall be subject to compaction testing after backfilling and shall meet the compaction requirements set forth in **Section W508**. All trenches failing to meet compaction requirements shall be excavated and recompacted and retested. This process shall continue until a passing test is achieved. All costs of compaction testing shall be the responsibility of the Developer.

W603-FIRE HYDRANT AND VALVE TESTING

All fire hydrants shall be tested per **Section W403** and flushed to check the operation of the hydrant. All valves shall be located and their operation checked. All valves shall be left fully open.

W604-WATER SYSTEM TESTING

General

All lines designed to operate under pressure shall be successfully tested. Tests of installed piping shall consist of a pressure and leakage test and a disinfection test.

All piping to be tested must satisfactorily comply with these tests before being eligible for acceptance. In general, tests shall be conducted in accordance with AWWA C600 and C651 except as otherwise herein specified.

1.) Pressure and Leakage Testing

A.) After all, piping has been placed, each section between line valves shall be tested by the Developer's Contractor in the presence of the Chief Inspector or his designated representative and tests shall be continued until all leaks have been made tight to the satisfaction of the Authority. The Contractor shall furnish all necessary meters, pumps, gauges, bulkheads, and other materials and appliances necessary to conduct the test as herein required. Every precaution must be taken to valve-off or otherwise protect control equipment in or attached to the pipe line to prevent damage thereto.

B.) Before applying the specified test pressure, all air shall be expelled from the pipe. If hydrants, blow-offs or air release valves are not available at the high places, the Contractor shall make the necessary taps at points of highest elevation before the test is made and insert plugs before the test has been completed.

C.) Prior to the pressure test, pipe laid in trenches shall be backfilled adequately to secure the pipe during the test. Any observed leakage shall require corrective measures to pipe lines and/or joints to the satisfaction of the Inspector.

D.) The Authority will furnish the necessary water for testing and disinfection of the lines; however, any water lost through breakage of lines or unnecessary or excessive

flushing of lines will be charged to the Contractor at the current residential rate. All lines shall be tested to a pressure of 1.5 times the working pressure at the lowest point of the system to be tested. Test duration shall be two (2) hours. However, test pressure shall not exceed pipe, valve and/or thrust-restraint design pressures. The Chief Inspector or his representative may require a twenty-four (24) hour test if he so desires. Test pressure shall not vary by more than ± 5 psi for the duration of the test which may require periodic pumping (in which case the added water will be counted as part of the leakage). Lines shall be tested in sections between the valves. The rate of leakage shall not exceed 13.5 gallons per 24 hours per inch diameter per mile of water main. (See Table below.)

LEAKAGE TABULATION

SIZE OF PIPE	GALLONS/HOUR/100 FT.	GALLONS/DAY/100 FT.
16"	.171	4.091
12"	.128	3.068
10"	.107	2.557
8"	.085	2.046
6"	.064	1.534

Any section of the line not meeting the above test shall have the leaks found and corrected at once and re-tested until the leakage falls within the limits specified above. Leakage testing must be witnessed and approved by the Authority.

2.) Disinfection

After leakage testing and all necessary repairs have been made, the Contractor shall flush and disinfect all potable water mains and equipment installed in strict accordance with AWWA Standard for Disinfecting Water Mains, C651, latest revision, subject to the following special conditions:

A.) The method of disinfection shall be the Continuous - Feed Method as per AWWA C651, latest revision, Section 4.4.3. Care shall be taken in filling the mains so that extrained air is drawn from the pipes at all high points so as to permit intimate contact of the disinfection agent with the entire inside surface of the pipe and appurtenances. The potable water shall be chlorinated so that after a 24 hour holding period in the main, there will be a free chlorine residual of not less than 10 mg/L at all points in the system when tested with a standard orthotolindine solution.

B.) The form of chlorine shall be a 1 percent solution made from either sodium hypochlorite or calcium hypochlorite which shall be measured and pumped into the pipeline. Water must be flowing during the feeding operation and the injection point must be located so that the flow of water will disperse the chlorine throughout the pipeline. AWWA C651 requires the injection point be located at a point not more than ten feet (10') from the point of connection to the existing water supply. The chlorine should be fed at a constant rate such that the water will have not less than 25 mg/L free chlorine. The table below gives the amount of chlorine required for each one hundred feet (100') of pipe of various diameters to produce a 25 mg/L concentration.

Chlorination Tabulation

Pipe Diameter (in.)	100% Chlorine (lb.)	1% Chlorine Solution (gal.)
6	0.030	0.36
8	0.054	0.65
10	0.085	1.02
12	0.120	1.44
16	0.217	2.60

C.) After 24 hours, the line shall be flushed until the chlorine content is not more than 2.0 parts per million. When this step is completed, the Developer will notify the Authority so as to schedule the taking of the water sample for the bacteria test. If the samples show evidence of contamination upon testing, the above procedure of disinfection shall be repeated until approved samples are obtained. No connections shall be made to the existing system until all of the samples have been tested and approved by the Chief Inspector. The Developer may be required to add additional taps for bleeding purposes at the ends of water mains or wherever necessary for taking samples.

D.) The Contractor shall de-chlorinate the highly-chlorinated water being flushed from the water main to open areas where the discharge will not damage the roadbed or adjacent property.

The chlorine residual of water being disposed may be neutralized by treating the water with one of the chemicals listed in the table below:

Chemical Required

Residual Chlorine Concentration	Sulfur Dioxide (SO_2)		Sodium Bisulfite ($NaHSO_3$)		Sodium Sulfite (Na_2SO_3)		Sodium Thiosulfate ($Na_2S_2O_3.5H_2O$)	
mg/L	lb	(kg)	lb	(kg)	lb	(kg)	lb	(kg)
1	0.8	(.36)	1.2	(.54)	1.4	(.64)	1.2	(.54)
2	1.7	(.77)	2.5	(1.13)	2.9	(1.32)	2.4	(1.09)
10	8.3	(3.76)	12.5	(5.67)	14.6	(6.62)	12.0	(5.44)
50	41.7	(18.91)	62.6	(28.39)	73.0	(33.11)	60.0	(27.22)

Amounts of chemicals required to neutralize various residual chlorine concentrations in 100,000 gal (378.5 m^3) of water.

Cherokee County Water and Sewerage Authority
Maintenance Bond/Letter of Credit
Administrative Policy and Procedures

General

- All new developments must submit to the Authority a maintenance bond or letter of credit prior to approval of the final plat for residential developments or the acceptance of the as-built drawings for all other developments.

- Once the water and sewer infrastructure is in place and approved, the Developer must submit a maintenance bond or letter of credit in a form acceptable to CCWSA staff, prior to the Authority's approval of the Final Plat or As-Built plans.

- The maintenance bond or letter of credit **amount** will be generally determined by the linear feet of water and linear feet of sewer infrastructure within the development.

- Maintenance bonds or letters of credit shall be for a period of twelve (12) months from the receipt of Final Plat approval for residential developments or acceptance of as-built drawings for all other developments.

Approval of Infrastructure for Final Plat Recording

1.) Upon the completion of the water and/or sewer construction, the Developer shall contact the CCWSA's Inspector requesting a final inspection of infrastructure.

2.) If the Authority's Inspector finds, upon inspection, that all infrastructures meet the requirements of CCWSA, he/she shall provide written notice of acceptance to the Developer.

3.) If the CCWSA's Inspector finds, upon inspection, that infrastructures do not meet the requirements of CCWSA, the Authority shall provide the Developer with written notice detailing the reasons for rejections of the infrastructure.

4.) Once the CCWSA's Inspector finds that all infrastructures meet the requirements of CCWSA, the inspector shall require the Developer to post maintenance bond or letter of credit.

5.) Once a maintenance bond or letter of credit has been posted, the Authority's Inspector will approve the Final Plat for residential developments or accept the as-built drawings for all other developments.

6.) Final plat will not be signed or as-built drawings will not be accepted until a satisfactory maintenance bond or letter of credit has been posted.

No Exceptions

Maintenance Bond/Letter of Credit Amount

1.) The maintenance bond or letter of credit amount will be determined generally by the linear footage of water line and/or the linear footage of sewer line within the development.

2.) Per foot amount will be determined by the CCWSA staff taking into account the current economic climate as well as the cost of materials, labor and fuel.

3.) The minimum maintenance bond and/or letter of credit amount required for a development shall be five thousand dollars ($5000.00) for water and five thousand dollars ($5000.00) for sewer.

Approval of Water and Sewer System for Authority Acceptance

1.) The twelve-month maintenance period will allow the CCWSA's Inspector to assure compliance with CCWSA development specifications. The developer shall be required to contact the CCWSA's Inspector in writing at the end of the nine (9) month period to initiate the CCWSA's punch list.

2.) The CCWSA's Inspector shall prepare a single punch list to the Developer affording it a 60-day period in which to make all necessary repairs. The Developer shall be required to contact the CCWSA's Inspector in writing at the end of the 60-day period after all punch list items have been completed. The CCWSA's Inspector shall have 30 days to make its final review for approval and shall notify the Developer in writing of the results of this inspection. An extension of the bond may be granted at the discretion of the CCWSA's General Manager. Developer shall pay for any additional inspections required by the Developers failure to complete punch list items prior to final approval.

3.) If any punch list items are not completed by the Developer within the specified period of time or extensions the maintenance bond or letter of credit shall be utilized to pay for the full cost of the repairs. Should the amount of the maintenance bond or letter of credit be inadequate to pay for the full cost of the repairs, CCWSA shall have the authority to collect the remaining amount from the developer.

Official Acceptance/Release of Bond or Letter of Credit

1.) At the time that the work is inspected and found free from defects, the Authority's Inspector shall provide the Developer with written "Final Approval" for the acceptance of the water and sewer infrastructure.

2.) Upon the issuance of final approval, the CCWSA shall release the Maintenance bond or letter of credit.

W605-ACCEPTANCE

Please refer to the following CCWSA Maintenance Bond/Letter of Credit Administrative Policy for the procedures related to the final approval and acceptance of water and sanitary sewer facilities:

W606-AS-BUILT RECORD DRAWINGS

At the completion of the sanitary sewer lines and when requesting the final project inspection, the Contractor shall submit As-Built plans and electronic data prepared in accordance with the following requirements:

1.) Attached to the As-Builts shall be a completed Project Information Form (Exhibit A), which includes the name of the project, the project location, the Developer's name and telephone number, the Contractor's name and telephone number, the street names, the sewer main size for each street or cross-country line, the length of each sewer main by street or segment, the pipe material used for each street or segment, the cost of the sewer facilities for each street or segment, and the work start date and work completion date for each street or segment. (A copy of a blank Project Information Form is attached at the end of **Section W600**)

2.) As-Builts shall be submitted through the CCWSA CityView portal. (https://cityview.iharriscomputer.com/CCWSA/#/login). The plans shall show all sewer information As-Built in the field and any field changes made to the approved plans. In the event that the designer does not perform the field staking, the contractor must furnish certification from a licensed engineer or surveyor attesting to the accuracy of all elevations, grades, manhole locations, and service locations. This certification and the certification of the engineer/land surveyor preparing the As-Builts must be shown on the drawings. As-Built drawings shall include a site plan, plan and profile sheets, and any supplementary drawings and shop drawings. Stationing of the sewer gravity and force main alignments, manholes and service laterals shall be required on the As-Builts as well as the construction drawings along with the Point I.D. The As-Built drawings shall meet the same requirements as the construction plans for review.

As-built plans shall be submitted in an "AutoCAD" drawing electronic format and Adobe PDF of entire project. As-built information for utility locations shall be shown on plans and submitted in ASCII text electronic format for each point.

Horizontal locations shall be referenced to Georgia State Plane Coordinates (West Zone feet). Vertical locations shall be shown referenced to Mean Sea Level. Reference all horizontal locations to the NAD83/94 (latest adjustment) datum and reference all vertical locations to the NAVD88 datum. All orthometric locations shall be referenced to Geoid 99/03. All points shall be verifiable by the Cherokee County Water & Sewerage Authority control network. All Horizontal and Vertical location shall have no translation, rotation or angle adjustment. All points are subject to verification by the Cherokee County Water & Sewerage Authority.

The information submitted electronically for water mains, including correct locations of the water main, Point I.D. of water mains at all transitions (vertical and horizontal) at (fifty feet 50' intervals along County, State or Federal road ways), fire hydrants, valves, fittings, main line taps, master meters, and fire line meters, residential meters, commercial meters shall include:

A.) Point ID (see CCWSA staff)
B.) North Coordinate
C.) East Coordinate
D.) Ground Elevation
E.) Top of Pipe, Valve or Hydrant Elevation, Point Description (Pipe, Fitting or Valve Type and Size)

The following are specific guidelines for the preparation of the printed version of the As-Built drawings:

A.) Water As-Built shall be a separate plan.
B.) No contour lines.
C.) Location of service, meter and backflow preventer shall be shown.
D.) Road right of way width or road utility easement width shall be shown on plans.
E.) The center of all fire hydrants shall be located horizontally and vertically as described above.
F.) All lots are to be numbered.
G.) Printed As-Builts are to be clear and legible.
H.) Roads and road names shall be shown on all plans.
I.) As-Built is to be in large clear print on plans.
J.) Plan sheets shall be no larger than 22" x 34".
K.) Scale no larger than 1"=20', no smaller than 1"=100' for cross-country lines and 1"=50' for congested areas.
L.) When a phase of a subdivision is completed, a location sketch of the entire development shall be shown
M.) Ground water and solid rock encountered during construction will be noted on As-Builts.
N.) Water point I.D.'s (Valve I.D., Water Main points, etc…) shall be on plans, electronic data and ASCII or EXCEL data file. All point I.D.'s shall correspond.
O.) Must show 911 address for each lot or parcel. Shall provide Excel file with addresses and corresponding lot numbers.
P.) Must show street light location. Shall provide Excel file with coordinates and point I.D.

3.) As-Built water plans for commercial, multi-family, school and industrial sites shall show the following at a minimum scale of 1"=100':

A.) Location, size and elevation of all existing and proposed water and of any easements required.
B.) Location and size of all fire mains and location of all fire hydrants.
C.) Location, size and number of dwelling units and buildings.

4.) The As-Builts must be printed from the AutoCAD files supplied to the Authority concurrently with the As-Builts. These plans shall have been corrected to show all field changes made to the approved drawings. Hand marked copies prepared by the contractor will not be accepted for As-Builts.

5.) As-Built drawings shall include the site plan, water plan sheets, and any supplementary drawings and shop drawings. Plan of fire meters or detector meters should be shown if applicable.

6.) The Authority shall have the right to withhold water meters until the As-Builts have been submitted and approved by the Authority as required.

7.) Final Plat and or Final Plans will not be approved or signed by the Authority until As-Builts, easement drawing, easement agreements and maintenance bond have been completed and submitted to the Authority.

EXHIBIT "A"
Cherokee County Water & Sewerage Authority
PROJECT INFORMATION FORM
WATER SYSTEM FACILITIES

Project Name: _____

Location: _____

Developer:_____Phone No: (___)_____- _____

Contractor:_____Phone No: (___)_____- _____

Street or Segment Name: _____

Water Main Size:__Length:_____Material:_____No. of Manholes: _____

Start Date:_/_____/_____Completion Date:_____/_____/ _____

Street or Segment Name: _____

Water Main Size:__Length:_____Material:_____No. of Manholes: _____

Start Date:_/_____/_____Completion Date:_____/_____/ _____

Street or Segment Name: _____

Water Main Size:__Length:_____Material:_____No. of Manholes: _____

Start Date:_/_____/_____Completion Date:_____/_____/ _____