SECTION 300 - DESIGN CRITERIA

301. 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 and Sewerage Authority.

302. 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.

303. WATER MAIN EXTENSION REQUIREMENTS

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

2.) 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.

3.) 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.

4.) 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.

304. 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 8", or a size equal to the existing Authority main (if 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).

305. WATER MAIN SIZES

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

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

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

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

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

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

7.) The General Manager of the C.C.W.S.A. or his designated representative has the authority to waive the above minimum fire main sizes provided the following conditions have been met:

a.) **Note on Plans** - "I have designed the water service installation for this facility in accordance with all applicable Authority standards with regards to fire flows and these conditions have been met." ** THIS NOTE IS TO BE SIGNED AND STAMPED BY THE PROFESSIONAL ENGINEER PROVIDING THE CALCULATIONS. **

b.) Provide the C.C.W.S.A. with the calculations stamped and certified as described in item "**a.)**" above.

306. FIRE PROTECTION

1.) Minimum flows in GPM with 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

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:

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

b.) S**hopping Centers, Malls, etc:** Fire hydrants shall be spaced not more than 300 feet apart so all portions of buildings can be reached by hose lays of not more than 300 feet in length.

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

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

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

f.) **Water Line Extensions Along Existing Roads/Highways:** Fire hydrants spaced not more than 1000 feet apart

g.) No installation requiring fire hydrants shall have spacing greater than 1000 feet apart as measured along the main supply line.

h.) Fire hydrants shall be required at the end of all dead-end lines such as those installed in cul-de-sacs.

i.) Fire hydrants shall be located on the back side of the right-of-way.

j.) Fire hydrants shall typically be located at all intersections.

k.) Fire hydrants shall be located at or within 200 feet of the main

entrance to the development.

8.) Fire lines shall be metered per Section 310.

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

307. SPRINKLER SYSTEMS

All in-house sprinkler systems shall have a double check detector assembly equipped with a by-pass meter assembly to monitor low flow. All in ground sprinkler systems shall have a double check backflow preventer. See Section 309.7 below.

308. 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.

309. 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 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 below final grade, four feet below the edge of the pavement, or four feet 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. All water mains located within county right-of-way shall be polywraped. (See Section 404-16)

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 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 below final grade, four feet below the edge of the pavement, or four feet 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. All water mains located within State or Federal Highways and Roads right-of-way shall be polywraped. (See Section 404-16)

3.) <u>New Streets in Subdivisions</u>

Water mains on new streets in subdivisions shall be located on the South and West sides of the streets, five feet from the back of the curb. Water mains shall be installed so that the top of the pipe is a minimum of four feet below final grade, four feet below the edge of the pavement, or four feet 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.) <u>Service Laterals</u>

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 3/4" for single residential service and 1" for double residential service. All long side services for single-family residential shall be encased in 2” P.V.C. Schedule 40 pipe. All long side services for developments other than single-family residential shall be encased in 4" P.V.C. Schedule 40 pipe. All P.V.C casings for long side services shall be a minimum of 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 the 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 3” meter is used for the development, the Developer must install 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 3” service material.

Any portion of service lateral located under pavement shall be encased in P.V.C. tubing, 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 final grade, four feet below the edge of the pavement, or four feet below the ditch paralleling the road, whichever is deepest. Permission must be granted by the Authority to vary from this requirement.

6.) Water Meters and Meter Boxes

Water meters 2” and smaller in diameter will be furnished and installed by the Authority in boxes located at the edge of the street right-of-way. Water meters larger than 2” in diameter will be furnished and installed by the Developer and set in vaults located at the edge of the street right-of-way. The Developer is responsible for all required connections and taps to the Authority’s water system, including installing the service lateral from the main to the meter box or vault (See Section 514). In certain circumstances, the Authority may negotiate with the Developer for the tap to be made by the Authority for 2” and smaller services. The Developer is to clearly mark the lot number inside of each meter box. No meter will be set until the meter set fee is paid and a building permit issued for the lot requesting service. Services shall be sized and located as shown in the Details. **All meters shall be located outside. No in-house meters are permitted.**

Two inch (2”) and smaller diameter service lines shall be connected to the water main by using a double strapped service saddle and corporation cock. Four inch (4”) and larger diameter service lines shall be connected to the water main with a tapping saddle or sleeve. (See Section 404.5)

7.) Backflow Preventers

Double check backflow preventers are required for all metered services. Backflow preventers for services 2” and smaller in diameter will be installed

by the Authority in the meter box. Backflow preventers for services larger than 2” in diameter will be furnished and installed by the Developer in a meter box or vault located behind the service meter box or vault. When a testable device is required, the test results from an approved testing lab must be provided to the Authority before the meter can be set.

The type of device for backflow prevention shall be determined by the Cross-Connection Control Coordinator. Backflow prevention measures shall be in compliance with the Authority’s Cross-Connection Control Program (See Appendix).

8.) Water Valves

Valves 16" and smaller shall be gate valves. Valves larger than 16” 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 1,000 feet. 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 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 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 1" above the finished grade. The edge of the valve box is to be 1/2" above the edge of the concrete collar.

9.) Gate Valves and Line Plug

A gate valve and a minimum of 36 linear feet 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.

10.) 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.

11.) 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”

12.) Ductile Iron Pipe

Ductile iron pipe shall be required for all water mains, except where the General Manager approves otherwise.

13.) 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.

14.) Easements

Water mains that are located off the right-of-way shall have a minimum 20 feet wide permanent easement. The maximum cross-slope of the permanent easement shall be 10%. See Section 204 regarding the requirements for water line easements.

15.) 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-D.I.P. water mains, it is the Developer's responsibility to relocate the existing main out from under the proposed pavement and replace the existing main with ductile iron pipe.

16.) Separation between Water Main and Sanitary Sewer

A horizontal separation of at least 10 feet is required between water mains and existing or proposed sanitary sewer mains (measured edge to edge). Where water mains cross existing or proposed sewer lines, 18" vertical separation is required between the two mains (measured edge to edge). At crossings, a full joint of D.I.P. water main is to be centered on the sewer main so that both joints are as far away from the sewer line as possible.

310. FIRE LINE METERING REQUIREMENTS

1.) All existing un-metered fire service systems having private fire hydrants, hand hose connections, or sprinkler heads on private property are required to have an underwriter approved detector meter or a factory mutual fire line meter installed.

2.) Persons making applications for new fire service connections with private fire hydrants, hand hose connections, or sprinkler heads will be required to have an underwriter approved detector meter or a factory mutual fire line meter installed as a part of the fire service system.

3.) If the normal usage of the development is such that the service meter

required to serve the development is larger than 2", the Authority shall require that the Developer install an 8” or larger compound meter and vault to serve both the normal usage and the fire line needs of the development. If the normal usage of the development is such that a 2" meter or smaller can be used to serve the development, the Developer will be allowed to use a 2" or smaller meter for the normal usage and a detector meter assembly on the fire line.

4.) When unauthorized water is used through a detector meter in three or more billing periods in one calendar year, it shall be replaced with a factory mutual fire line meter. Unauthorized use of water is defined as non-fire fighting water and/or water use without prior notification and approval of the Authority.

The regular monthly fire service standby charge shall be continued for fire service installations having a detector or factory mutual fire line meter. The water that is measured by the detector meter will be billed at five times the normal water charge. If the services of legal council are required to collect bills, the cost of council shall be added to the billing.

5.) The detector meters on the backflow preventers shall be Sensus ¾” meters equipped with a Touch Read Pit Lid Register compatible with the Authority’s meter reading equipment.

6.) All domestic water supplies must be metered with a proper meter.

7.) 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.

8.) The Authority shall have the right to cut off water service to buildings whose owners refuse to comply with these provisions upon proper notification of sixty (60) days.

311. 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.

312. 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.

313. PROTECTION OF WATER SUPPLY AND OTHER UTILITIES

1.) The Cherokee County Water and Sewerage Authority has an established Cross-Connection Program (See Appendix) 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.) Relation to Sanitary Sewer Mains

Whenever possible, water mains should be laid at least 10 feet horizontally from any existing or proposed sanitary sewer main. Should conditions prevent a separation of 10 feet, the lines shall be laid in separate trenches. In either case, the elevation of the invert of the water main shall be at least 12 inches above the crown of the sewer. These distances are measured edge to edge.

When water mains cross over sewer mains, the water main shall be laid so that the invert of the water main shall be at least 18" above the crown of the sewer. 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 shall be installed for both mains.

In the rare circumstance when the 18" clearance between the water and sewer mains cannot be maintained, the D.I.P. mains shall be installed as described in the paragraph above with the joints as far apart as possible, plus both mains shall be wrapped in polyethylene tubing and then encased in concrete for a distance of 10 feet on both sides of the crossing.