

## SECTION 5 WATER SYSTEMS

### 5.1 GENERAL

This section sets forth the general requirements for design, installation and testing of water distribution systems for potable service. Additional information can be found in Section 4 (General Conditions), Section 9 (Standard Drawings), and Section 10 (Standard Plan Notes) and Section 13 (Technical Specifications). Lee County Utilities does not guarantee flow, fire flows, nor pressure.

### 5.2 SYSTEM DESIGN

The Engineer shall comply with the design and installation requirements as specified by Lee County Utilities, the Florida Department of Environmental Protection, the Florida Department of Health, Lee County Department of Transportation, Florida Department of Transportation and any other relevant state and local regulatory agencies..

#### A. Flow Demands

Flow demands for design shall be calculated on the basis of full development as known or projected. The average daily flow for domestic use shall be calculated at the minimum rate as follows:

- Single-Family (SF) Residence = 100 gpd per capita, 2.5 persons per residence for a flow of 250 gpd per SF residence.
- Multi-Family (MF) Residence = 100 gpd per capita, 2.0 persons per residence for a flow of 200 gpd per MF residence.
- Mobile Home Park (MHP) Unit = 100 gpd per capita, 2.0 persons per unit for a flow of 200 gpd per MHP unit.
- RV Unit = 50 gpd per capita, 2 persons per unit; for a flow of 100) gpd per RV unit.
- Flow demands for commercial, industrial, and special-type developments shall be established from Florida Administrative Code FAC 64E-6 guidelines, existing records of the last year maximum three-month average, or by using the best available data.

A minimum peak day factor shall be 2.5 times the average daily value. An equivalent Residential Unit (ERU) is defined as 250 gpd.

#### B. System Size Computation

The minimum design for water distribution systems shall provide for at least 100% of the combined average day demand rate times the peak factor at 2.5 plus the required fire flow. The allowable minimum service pressure under such design conditions shall be 20 psi. Design computations shall be by the Hardy-Cross procedure, if done manually, or through the use of H2O NET Version 2.5, or other Lee County Utility approved model, if done by computer. H2O NET Version 2.5 shall be the

preferred method in all cases with Hardy-Cross only being accepted for small system analysis. All design data and computer printouts or data disks shall be subject to review and approval by Lee County Utilities. All water mains shall be sufficiently looped and in no case shall water mains be less than 8" in diameter unless specifically approved by Lee County Utilities.

#### Minimum Water Main Size.

- One and two dwelling unit developments shall be no less than 8" in diameter.
- Multifamily developments with three to six dwelling units per building shall be no less than 8" in diameter.
- Multifamily developments composed of buildings with more than six dwelling units per building and not exceeding three stories in height shall be no less than 8" in diameter.
- Multifamily developments composed of buildings with more than six units per building or more than two stories in height shall be no less than 10" in diameter.
- All commercial developments shall be no less than 10" in diameter.
- All industrial developments and all hazardous storage areas shall be no less than 12" in diameter.
- Unless specifically approved by Lee County Utilities for all dead end water mains 6" in diameter and larger a fire hydrant and fully restrained valve must be provided at the end of the main in lieu of a blow-off assembly.

#### C. Fire Flows

Fire protection and public water systems shall be independent systems, designed by a Florida Registered, Professional Engineer and constructed in accordance with county, state, and federal standards, including satisfaction of the domestic requirements established by the appropriate state agency and the fire protection requirements established by the Uniform Fire Code and the Lee County Land Development Code as amended from time to time.

#### D. Connection to Existing System

All connections to existing mains shall be made as authorized by the Owners of the existing system. Valves separating the mains being installed from existing mains shall be operated by or under the direction of Lee County Utilities. The cost of the work in making the connections shall be paid for by the Contractor. A representative of Lee County Utilities must be present at all tie-ins and wet taps.

In the event the proposed main is to be connected to a main which has one or more active services between the point of connection and the first existing line valve, a temporary plug or cap shall be installed on the new main until the pressure tests and disinfecting are complete. Upon satisfactory completion, the cap or plug shall be removed from both mains and the connection made with pipe, which has been swabbed out with a minimum of 50-PPM chlorine solution. The connection shall be made as swiftly as possible and any water in the ditch shall be kept below the level of the pipe.

In the event any existing customers will be without water while a connection is being made; the Contractor shall notify them 72 hours in advance of when the water will be turned off and when he estimates service will be resumed. These connections shall be made at night unless an alternate tie-in time is approved by Lee County Utilities. No customer shall be without water service for more than 4 hours unless specifically approved by Lee County Utilities.

E. Tapping Sleeves

Tapping sleeves used to make "wet" taps into existing mains shall be rated for 150 psi working pressure and shall be constructed entirely of stainless steel; and shall be installed with stainless steel bolts. The Contractor shall determine the outside diameter and type of the existing main before ordering the sleeve. Size on size taps will only be allowed when connecting to C900 DR 18, C900 DR 14, and all ductile iron pipes. When other types of pipelines are encountered, the proposed tap shall be at least 2 diameter inches smaller than the diameter of the existing pipeline.

F. Fire Hydrants

Fire hydrants serving one or more buildings located on private property and or behind a fence or other barrier in which 24 hour access is not provided, Lee County Utilities may require the installation of a double detector check valve assembly to be located at the right of way line. The fire hydrant(s), water main and all related appurtenances located behind the first O.S. & Y. valve of the double detector check valve assembly will be considered private. It shall be the responsibility of the property owner to adequately maintain all private facilities.

In all cases fire hydrants shall be installed so that the 4 1/2" streamer connection is no less than 18" and no more than 24" above finished grade.

Fire hydrants shall be spaced as follows:

- Hydrants for one to two dwelling unit developments shall be 800 feet apart as measured along the centerline of the street.
- Hydrants for multi-family developments with three to six dwelling units per building and not exceeding two stories in height shall be 600 feet apart measured along the centerline of the street.
- Hydrants for multi-family developments with more than six dwelling units per building or more than two stories in height shall be 400 feet apart as measured along the centerline of the street.
- Hydrants for commercial developments shall be 400 feet apart as measured along the centerline of the street.
- Hydrants for all industrial and hazardous storage areas, as defined in the Standard Building Code, shall be 300 feet apart as measured along the centerline of the street.

Hydrant barrels shall be painted AWWA Safety Yellow. They shall be designed for a working pressure of 150 psi and will conform to AWWA Standard C502, "Fire Hydrants for Ordinary Water

Works Service."

Acceptable brands of fire hydrants are:

- Muller Centurion A-423
- Kennedy K-81A
- American Darling LCU B84B
- Clow Medallion
- U.S. Pipe Metropolitan 250 Model 94.

Refer to Section 9 for additional fire hydrant detail.

G. Hydrants (See Technical Specifications)

H. Hydrant Guard Posts/Bollards

The location of guard posts/bollards for hydrants shall be required in areas subject to traffic flow and maneuvering and approved by Lee County Utilities and the Engineer of Record. Guard posts/bollard shall be constructed of 6" diameter, Class 50, Ductile Iron Pipe 6' long buried, 3' below finished grade, filled with 2500 PSI concrete and painted AWWA safety yellow, (refer to detail in Section 9).

I. Valves and Valve Locations

Fully restrained, resilient seated gate valves shall be utilized on all water mains. For water main valves 20" or larger, a 4" valved bypass line shall be installed at all valves if deemed necessary by Lee County Utilities.

Valves shall be provided at pipe terminations, all intersecting water mains, fire hydrants, on both sides of all canal crossings, and all other locations necessary to provide an operable, easily maintained and repaired water distribution system. Maximum length of water main between valves which can be used for shutting down the line for repair work, shall not exceed 500 feet in commercial and industrial areas. The maximum length of pipe shutdown between valves,

which can be used for shutdown for repair work in residential areas, shall not exceed 1,000 feet. All valves shall be tied by stationing for easy identification by field personnel.

Fire hydrants shall be installed with a valve at the connection to the main line. If the pipeline run for the fire hydrant, (fire lines), exceeds 100', a second fully restrained valve shall be required within 5' of the hydrant base.

J. Pipe Depth

The standard minimum cover for water distribution systems shall be 30" from the top of pipe to finished grade. Should this design not be possible, alternate methods must be submitted to and approved by Lee County Utilities. Where possible, maximum cover for water mains shall not exceed 48".

K. Air Venting

Where the water main profile is such that air pockets or entrapment occur which could result in flow blockage, automatic air release valves shall be provided. Air venting capabilities shall be provided for distribution mains by appropriately placing fire hydrants or utilizing the blow-off detail shown in Section 9. At critical points on major mains automatic air release assemblies shall be installed. All dead-end water mains, whether temporary or permanent, shall be equipped with a manually operated blow-off assembly at the terminal end.

L. Joint Restraining

Pressure pipe fittings and other appurtenances requiring restraint shall install joint restraint devices, manufactured restrained joint pipe and fittings or, if approved by Lee County Utilities be braced with thrust blocks. Joint restraining systems shall be designed for the maximum pressure condition and the safe bearing load for horizontal and vertical thrust. At a minimum, the thrust restraining system shall have a working pressure equal to or greater than the pipe material maximum pressure rating. The Design Engineer in specifying all restraining devices shall determine a reasonable safety factor. All restrained fittings and joints shall be shown on the plan and profile and must be included on the record drawings. Refer to Section 9 for the minimum restraint schedule required by Lee County Utilities.

A joint restraining schedule shall be the responsibility of the Design Engineer and shall be included in the design package. The restraining schedule shall be an integral part of the package submitted for approval by Lee County Utilities and the permit agencies.

M. Electrolysis Prevention

All systems shall be designed to best avoid electrolytic action through the contact of dissimilar metals. Preventative action, if required, may consist of installing insulating or dielectric couplings between the two materials.

N. Dead End Lines

Dead end lines will not be allowed unless justified by the Engineer and specifically approved by Lee County Utilities.

O. Water Main Location

Water main extensions are to conform to the existing water main design layout. Water mains are to be installed on the same side of the road as the existing main unless otherwise approved by Lee County Utilities.

5.3 MATERIALS

A. Pipe

1. Ductile Iron Pipe

All water mains larger than 12" shall be constructed of Ductile Iron Pipe and shall be used for all vertical deflections ditch crossings, subaqueous crossings, and all paved surfaces unless otherwise approved by Lee County Utilities.

Ductile Iron Pipe shall be a minimum of Class 50 or pressure Class 250 and will be accepted in any diameter for use within the distribution system. Ductile Iron Pipe shall conform to the requirements of ANSI/AWWA C151, and shall be cement lined and conform to the requirements of ANSI Standard C104. Fittings for Ductile Iron Pipe shall conform to the requirements of ANSI/AWWA C153/A21.53 or ANSI/AWWA C110/A21.10. Mechanical and push-on joints shall conform to ANSI/AWWA C111/A21.11 and flanged joints shall conform to ANSI/AWWA 115/a21.51.

All aboveground pipe shall be painted blue. The pipe wall thickness shall not be less than that required by a working pressure of 250 psi in laying condition Type 4 "B" with 5-foot cover in conformance with ANSI Standard A21.50.

Gaskets shall be a Buna N, Neoprene, or a Nitril-based rubber product approved by the County. Gaskets shall have clean tips unless otherwise specified. Elastomeric gaskets conforming to ASTM F-477 shall also be acceptable.

2. Polyvinyl Chloride Pipe (PVC)

Unless otherwise specified and approved by Lee County Utilities, all 4" through 12" diameter PVC pipe shall be rated per AWWA, C900, DR18, Class 150. Water mains larger than 12" shall be constructed of Ductile Iron Pipe. (See Section 5.3, A.1.) All PVC pipe less than 4" in 2" diameter shall be Schedule 80 with a pressure rating of 200

psi solvent welded, including blow-off assemblies. PVC pipe will be acceptable for pipe diameters of 12" or less.

PVC pipe 4" in diameter or larger shall have provisions for expansion and contraction

provided in the joints. All joints shall be designed for push-on make-up connections. Push-on joint may be a coupling manufactured as an integral part of the pipe barrel consisting of a thickened section with an expanded bell with a groove to retain a rubber sealing ring of uniform cross section, similar and equal to John's Mannville ring-type and Ethyl Bell Ring or may be made with a separate twin gasketed coupling similar and equal to Certainteed Fluid-Type.

High Density Polyethylene (HDPE)- Lee County Utilities has the option of approving the use of HDPE up to 12" in diameter for water main crossings of roadways, ditches, canals, and environmentally sensitive lands. HDPE water mains shall have the same equivalent internal diameter and equivalent pressure class rating as the corresponding PVC pipe, unless otherwise approved by Lee County Utilities. HDPE must have at least three equally spaced horizontal blue marking stripes. For all roadway crossings a steel or DR 11 HDPE casing pipe must be provided. The Department of Transportation having jurisdiction of said road and right-of-way must grant specific approval.

### 3. Service Connections

All potable service taps shall be located in open/green areas unless specifically approved by Lee County Utilities. Any service taps that are approved within a paved area, a 2" cast iron body gate valve shall be used in lieu of a corporation stop.

Service connections shall be installed at the locations and in the manner shown on the drawings. Refer to 5.3 for approved service connection materials.

Service clamps for PVC mains shall be full-circle bearing types as shown on the details in Section 9 and double-strap tapped saddle service clamps for ductile iron mains.

Corporation stops and curb stops shall be fitted with a compression connection outlet with split-lock devices for polyethylene or copper pipe.

On curbed streets the exact location for each installed service shall be marked by etching or cutting a "W" in the concrete curb; where no curb exists or is planned, locations shall be adequately marked by a method approved by Lee County Utilities.

Service connection shall not be installed on pipeline 16" and larger unless extenuating conditions exist and said connection is approved by Lee County Utilities Director or designee.

When practical, in new residential, commercial, or/and industrial subdivisions, the corporation stop shall be located at the intersecting property line or in the center of the lot.

a. Copper Pipe Copper pipe for 3/4" to 1" service line installations shall be American

manufactured, Type K, and conform to the requirements of ASTM designation B88. Brass compression couplings with screw-clamp fittings shall be used with copper pipe.

- b. Polytubing Polyethylene Tubing Endopure PE3408 with ultra violet inhibitors and lifetime warranty, CTS Blue 3408 Polyethylene tubing or approved equal, will be acceptable in sizes from 3/4" to 2" in diameter. Tubing for service lines shall be of a type approved by the National Sanitation Foundation for use in transmitting fluids for human consumption. The tubing shall be designed for a minimum burst pressure of 630 psi for water at 23°C, and shall be manufactured in accordance with the requirements of ASTM D 3350, D2737, AWWA C901-88 and shall be blue in color.

B. Fittings (See Technical Specifications)

C. Resilient, Wedge or Gate Valves and Boxes (See Technical Specifications)

D. Gate Valves and Boxes Greater Than 20" in Diameter (See Technical Specifications)

E. Check Valves (See Technical Specifications)

F. Backflow Prevention Devices (See Technical Specifications)

G. Meter Boxes

- Meters less than 1" shall be installed in a Quazite PG1118BB12 box with Quazite PG1118WAP1 cover, or CDR WB00-1118-12 box with CDR WC00-1118-2C cover.
- Meters 1" through 2" shall be installed in a Quazite PG1730BB12 box with Quazite PG1730WAP1 cover, or CDR WB-1730-12 box with CDR WC00-1730-2C cover.
- Meters larger than 2" shall be installed above ground and approved by Lee County Utilities. Refer to Section 9 for details.

Meter boxes, which need to be replaced, shall be Quazite PG1015WAR,1 or CDR R-1017-2C. Should just the cover need to be replaced it shall be Quazite PG1730WAP1, or CDR WC00-1730-2C.

H. Concrete (See Technical Specifications)

I. Sand (See Technical Specifications)

J. Valve Boxes

Cast iron valve boxes shall be provided for all valves installed underground which do not have extended operators such as is required by the plug valves. The valve boxes shall be adjustable to fit the designated depth of each cover over the valve and shall be designed so as to prevent the

transmission of surface loads directly to the valve or piping. Valve boxes shall have an interior diameter of not less than 5". The valve boxes shall be provided with covers marked with the word "WATER". The covers shall be so constructed as to prevent tipping or rattling. Valve boxes shall be manufactured by OPELIKA FOUNDRY COMPANY, Opelika, Alabama or TYLER PIPE DIVISION, Tyler, Texas or approved equal.

K. Air Release Valves (See Technical Specifications)

L. Restraining Devices (See Technical Specifications)

- Joint restraint devices for ductile iron mechanical joint pipe and ductile iron mechanical joint fittings to ductile iron pipe shall be EBAA Iron Inc., Series 1100 Megalug (R), Star Pipe Products, L.P., or approved equal.
- Bell joint restraint devices for ductile iron push joint pipe shall be EBAA Iron Inc., Series 1700 Megalug (R) for bell restraint, Star Pipe Products L.P., or approved equal.
- Joint restraint devices for C-900, C905 PVC pipe used with ductile iron mechanical joint fittings shall be EBAA Iron Inc., Series 2000 PV, Uni-Flange 1300, Star Pipe Product, L.P., or approved equal.
- Bell joint restraint devices for PVC push joint pipe shall be EBAA Iron Inc., Series 1600 for C-900 PVC pipe, Series 2800 for bell restraint on C-905 PVC pipe or Uni-Flange Series 1300, 1360 or 1390 or ROMAC Series 600, Star Pipe Products L.P., or approved equal.
- C-900 or C-905 PVC fittings shall be restrained with EBAA Iron Inc., Series 2500 bell restraint for PVC fittings, Star Pipe Products, L.P, or an approved equal.
- Bolts and nuts shall be Ductile Iron or 300 Series Stainless Steel, T-Head type with hexagonal nuts. Bolts and nuts shall be machines through and nuts shall be tapped at right angles to a smooth bearing surface.

5.4 EXCAVATION, TRENCHING, BACKFILLING, AND RESTORATION

A. General

The provisions set forth in this Section shall be applicable to all underground water piping installations regardless of location. Special design considerations shall require approval from Lee County Utilities.

B. Materials (See Technical Specifications)

1. Sheeting and Bracing (See Technical Specifications)
2. Concrete (See Technical Specifications)

C. Workmanship (See Technical Specifications)

1. Trench Dimensions (See Technical Specifications)
2. Trench Grade (See Technical Specifications)
3. Utility Bedding (See Technical Specifications)
4. Unsuitable Material Below Trench Grade (See Technical Specifications)
5. Extra Utility Bedding Material (See Technical Specifications)
6. Excavated Material (See Technical Specifications)
7. Material Disposal (See Technical Specifications)
8. Borrow (See Technical Specifications)
9. Rock Excavation (See Technical Specifications)
10. Dewatering (See Technical Specifications)
11. Obstructions (See Technical Specifications)
12. Backfill (See Technical Specifications)
13. Protective Concrete Slab  
  
Refer to Section 9 for Details.
14. Restoration (See Technical Specifications)
15. Protection and Restoration of Property (See Technical Specifications)
16. Cleanup (See Technical Specifications)
17. Excavation Site Safety (See Technical Specifications)

## 5.5 ADDITIONAL INSTALLATION REQUIREMENTS (See Technical Specifications)

### A. Pipe

1. Inspection of Material (See Technical Specifications)
2. Pipe Cleanliness (See Technical Specifications)
3. Pipe Gradient (See Technical Specifications)
4. Pipeline Identification (See Technical Specifications)
5. Pipe Joint Deflection (See Technical Specifications)
6. Rejects (See Technical Specifications)
7. Polyvinyl Chloride Pipe (See Technical Specifications)
8. Restraining Devices Anchors (See Technical Specifications)
9. Joints (See Technical Specifications)

### B. Installing Valves and Boxes (See Technical Specifications)

### C. Installing Hydrants (See Technical Specifications)

### D. Concrete Encasement

Concrete encasement shall be constructed in accordance with details as shown in Section 9 when:

1. A waterline crosses at a depth which provides less than 18" clear distance from a sewer line. Encasement shall extend a minimum of 10-feet on each side of the point of crossing. Encase the sewer main, unless specifically approved by Lee County Utilities.
2. A waterline running parallel to a sewer line provides less than 10 feet separation. Encase the sewer main, unless specifically approved by Lee County Utilities.
3. The Engineer has ordered the line encased and specifically approved by Lee County Utilities.

The points of beginning and ending of pipe encasement shall be not more than 6" from a pipe joint to protect the pipe from cracking due to uneven settlement of its foundation or the effects of superimposed live loads.

E. Flush Out Connections

Flush out connections shall be installed on all dead end water mains at the locations and in accordance with the details shown in Section 9.

F. Casing Installations

1. General

The provisions of this section shall represent the minimum standards for the installation of casing pipe for water main pipeline.

Water mains to be placed under all Lee County Department of Transportation roadways shall be installed in a casing. The steel casing and procedures shall conform to the requirements of Lee County DOT as outlined in "Administrative Code "AC-11-12" and any supplements thereto. All work and materials shall be subject to inspection by DOT. The Department's property and surface conditions shall be restored to the original condition in keeping with the Department's specifications and standards.

In general, all underground water lines crossing all existing or proposed Lee County roadways, Florida State Highways and railroads shall be installed under these traffic ways within steel casing pipe. Specific crossing requirements shall be obtained in advance from the authority having jurisdiction.

It shall be the responsibility of the developer or engineer to submit the necessary permit documents and data to the appropriate authority and receive approval thereof.

The Contractor shall maintain traffic on the roadway and shall keep all workmen and equipment clear of the travelway during the work. All safety regulations of the Department and any permit(s) shall be complied with.

2. Casing Pipe Material and Installation

Casing pipes crossing under County roadways shall be located at suitable approved alignments in order to eliminate possible conflict with existing or future utilities and structures with a minimum 30" depth of cover between the top of the casing pipe and the surface of the roadway. Casings shall be prime steel pipe conforming to the requirements of ASTM Designation A-139. Unless otherwise approved by Lee County Utilities, the minimum casing pipe size and wall thickness shall be as shown in the

following table, for the water carrier pipe size indicated. For sizes not included therein, or for

special design considerations, approval shall be obtained from Lee County Utilities. PVC shall be an acceptable casing material for service lines.

**For PVC and DIP Pressure Carrier Pipes**

Carrier Pipe Normal Size Inches	Casing Pipe Nominal Diameter Inches	Casing Pipe Wall Thickness Inches
4	45	0.250
6	16	0.250
8	18	0.250
10	20	0.250
12	24	0.312
14	28	0.312
16	30	0.312
20	36	0.375
24	42	0.500

**HDPE Carrier Pipe**

HDPE may be used as the carrier pipe and casing pipe with approval from Lee County Utilities. The HDPE casing shall be a minimum SDR 11 and there shall be a minimum of 4” clearance between the interior of the casing pipe and the outside of the carrier pipe, unless otherwise approved by the County.

- a. For casing pipe crossings under roadways, railroads, or other installations not within the jurisdiction of Lee County, the Contractor shall comply with the regulations of said authority in regard to design, specifications and construction. State Highway casing installations shall be as specified in the FDOT, "Utility Accommodation Guide", and for railroads, the American Railway Engineering Association, Part 5, Section 5.2, "Specifications for Pipelines Conveying Nonflammable Substances", shall be applicable. However, in no case shall the minimum casing pipe diameter and wall thickness, for a specific carrier pipe size, be less than that specified above.
3. Carrier Pipe

Water main carrier pipes to be installed within the casings shall be Restrained Joint Ductile Iron, or PVC Pipe in accordance with Section 5.3 and the requirements of the installation permit. Pipe and fittings shall comply with the applicable provisions of these Standards. Special supporting of the carrier pipe within the casing shall be required with a design approved by Lee County Utilities.

Stainless steel carriers with Teflon skids, or The Booster Casing Spacers, being on center and restrained shall be the preferred method for installing the carrier pipe. Spacers shall be installed 7 feet, or less, on center. After the carrier pipe has been tested for leakage, the casing shall have the ends blocked with either a 8" wall of brick masonry with a weep hole installed near the bottom of each wall or Cascade Model CCES End Seals with stainless steel bands.

High-density polyethylene Raci casing spacers or approved equal, can be used for all size PVC pipes and on DIP pipe with diameters 12" or less. The spacers shall be of a projection type with a minimum number of projections around the circumference totaling the number of carrier pipe diameter inches. Casing spacers shall be spaced every 6.5 ft. with double spacers on each end of the casing. The casing spacers shall provide a minimum safety factor of 2 to 1 to support the service load.

#### G. Testing and Disinfection

##### 1. Flushing

All water mains shall be flushed to remove all sand and other foreign matter. The velocity of the flushing water shall be at least 1.2 m/s (4 fps). Flushing shall be terminated at the direction of the Engineer. The Contractor shall dispose of the flushing water without causing a nuisance or property damage, and meet all regulatory requirements for the protection of the environment.

##### 2. Hydrostatic Testing

The Contractor shall perform hydrostatic testing of all water distribution system as set forth in the following, and shall conduct said tests in the presence of representatives from the County and other authorized agencies, with 48 hours advance notice provided.

Piping and appurtenances to be tested shall be within sections between valves unless alternate methods have received prior approval from the County. Testing shall not proceed until concrete thrust blocks are in place and cured, or other restraining devices installed. All piping shall be thoroughly cleaned and flushed prior to testing to clear the lines of all foreign matter. While the piping is being filled with water, care shall be exercised to permit the escape of air from extremities of the test section, with additional release cocks provided if required.

Hydrostatic testing shall be performed with a sustained pressure for a minimum of two (2) hours at 150 psi pressure or 2-1/2 times working pressure, whichever is higher, unless otherwise approved by Lee County Utilities, for a period of not less than two (2) hours.

Testing and passing results shall be in accordance with the applicable provisions as set forth in the most recent edition of AWWA Standard C600. The allowable rate

of leakage shall be less than the number of gallons per hour determined by the following formula:

$$L = \frac{SD(P)^{0.5}}{133,200}$$

L = Allowable leakage in gallons per hour;

S = Length of pipe tested in feet;

D = Nominal diameter of the pipe in inches;

P = Average test pressure maintained during the leakage  
test in pounds per square inch

For 150 psi,  $L = (9.195 \text{ EE-}5)SD$

The testing procedure shall include the continued application of the specified pressure to the test system, for the two (2) hour period, by way of a pump taking supply from a container suitable for measuring water loss. The amount of loss shall be determined by measuring the volume displaced from said container.

Should the test fail, necessary repairs shall be accomplished by the Contractor and the test repeated until results are within the established limits. The Contractor shall furnish the necessary labor, water, pumps, and gauges at specified location and number and all other items required to conduct the required water distribution system testing and perform necessary repairs.

### 3. Disinfection

Following acceptable pressure testing, the Contractor shall disinfect all sections of the water distribution system and receive approval thereof from the appropriate agencies, prior to placing in service. Advance notice of 24 hours shall be provided to the County before disinfecting procedures start. The disinfection shall be accomplished in accordance with the applicable provisions of AWWA Standard C601, "Disinfecting Water Main" and all appropriate approval agencies.

The disinfecting agent shall be free chlorine in aqueous solution with sustained concentration for 12 hours or more of not less than 50 parts per million. Chlorine may be derived from Chlorine gas, or 70% (high-test) calcium hypochlorite (HTH or Perchloron, or equal). Administration may be by any of the several methods described in AWWA Standard C601 as proposed by the Contractor and approved by the Engineer. Proposals as to method must be made prior to commencement of the disinfection process.

Following contact with chlorine solution, the system shall be thoroughly flushed out. Samples

shall then be taken using sterile containers obtained from the County Health

Department. Samples shall be taken by the Contractor and delivered by him to the County Health Department or approved laboratory for analysis.

If samples do not demonstrate satisfactory results, the disinfection procedure shall be repeated until two series of satisfactory samples are obtained, the period between such series of samples to be a minimum of 24 hours.

## 5.6 CROSS CONNECTION CONTROL POLICY

All projects must be designed to comply with the Lee County Utility Cross Connection Control Ordinance as amended from time to time.

### A. Goal

The purpose of Lee County Utilities Cross Connection Control Policy is to prevent contaminants and pollutants from entering the water distribution system. The program is intended to prevent water that has passed beyond the public water system and into private systems of customers, from re-entering the public distribution system and being subsequently delivered to other customers. The program aim is to protect Lee County Utilities and its customers from contaminants which could harm the quality and safety of the community water supply through backflow and/or cross connection.

In order to have an effective Cross Connection Control Policy, input and cooperation must be available between Lee County Utilities and the customer, but must also include the Division of Codes and Building Services' plumbing official, who has primary responsibility over the customer's water system including new construction, alterations and repairs. The Public Health Officer (Florida Department of Health) has the responsibility of insuring that the water purveyor operates the public potable water system free of actual or potential sanitary hazards, including unprotected cross connections.

### B. Definitions

#### 1. Air Gap (AG)

A physical separation between the free-flowing discharge end of a potable water supply pipeline and an open or non-pressure receiving vessel. An approved Air Gap separation shall be a distance of at least two (2) times the diameter of the supply pipe measured vertically above the top rim of the vessel - with a minimum distance of 3 inches.

2. Auxiliary Water Supply

Any water supply on or available to the premises other than the purveyor's public water supply. Auxiliary water is divided into 2 Categories:

- a Health Hazard - Pond, Canal, River, and Well Water or Industrial Fluid that may be contaminated and is not tested.
- b Non-Health Hazard - Water supplied by other water purveyors over which Lee County Utilities has no sanitary control and re-use water that is under Public Health Dept. control.

3. Atmospheric Vacuum Breaker (AVB)

Consists of a float check, a check seat, and an inlet port, which prevents back siphonage by creating an atmospheric vent when there is a negative pressure in the water system.

4. Back Pressure

Means a pressure higher than the supply pressure caused by a pump, multi-storied building, or other means which may cause backflow.

5. Back Siphonage

Means a form of backflow due to a negative or sub-atmospheric pressure within a water system.

6. Backflow

Means the flow of water or other liquids, mixtures or substances into the distribution pipes of a potable supply of water from a source other than its intended source.

7. Backflow Prevention Device

Means a device or means to prevent backflow as described in the current Department of Lee County Utilities Operations Manual Backflow Prevention Device Standards.

8. Certified Tester

A Backflow Prevention Device Technician having completed a Lee County Utilities approved training and certification program for the testing and repair of backflow prevention devices.

9. Cross-Connection

Means a connection or potential connection between any part of a potable water system and any other water supply systems, sewer drain, conduit, pool, storage reservoir, plumbing fixture or other device which contains or may contain contaminated or polluted water, sewage or liquid of unknown or unsafe quality capable of back flowing into the public water system. Bypass arrangements, jumper connections, swivel or changeable devices, hoses and other temporary or permanent devices through which or because of which backflow or backsiphonage could occur.

10. Cross Connection Control

Means the enforcement of an Ordinance or other legal statement regulating cross-connections.

11. Customer

Means any person, firm or corporation, or government entity, using or receiving water from Lee County Utilities potable water system.

12. Double Detector Check Valve (DDCV)

A double check valve in an unmetered main supply line, usually a fireline, with a smaller parallel flow detection line consisting of a meter and a double check having less pressure drop than the main device.

13. Double Check Valve Assembly (DCVA)

A DCVA consists of two internally loaded check valves, either spring loaded or weighted, installed as a unit between two resilient- seated shut off valves with properly located resilient-seated test cocks. This assembly shall only be used to protect against a non-health type hazard.

14. Dual Check Valve (DCV)

A backflow prevention device containing two check valves that are removable for maintenance and cleaning. Used for low hazard residential protection.

15. Hazard, Degree of

Means derived from an evaluation of the risk to public health and the adverse effect of the hazard upon the public water system.

16. Health Hazard

A cross connection or potential cross connection involving any substance that could, if introduced in the potable water supply, cause death, illness, spread disease or have probability of causing such effects. A contaminate.

17. Hose Bib Vacuum Breaker (HBVB)

Small devices used on hose faucets and sink outlets. Consists of a spring-loaded check valve that allows the device to vent to atmosphere when water is turned off.

18. Non-health Hazard

A cross connection or potential cross connection involving any substance that generally would not be a health hazard but would constitute a nuisance or be aesthetically objectionable, if introduced into the public water system. A pollutant.

19. Plumbing Official

Lee County Division of Codes and Building Services Code Enforcement Official.

20. Pressure Vacuum Breaker (PVB)

A PVB assembly consists of an independently operating internally loaded check valve, an air inlet valve located on the discharge side of the check valve, with resilient-seated test cocks and resilient-seated shut off valves at each end of the assembly designed to prevent back siphonage. The PVB may not be subjected to back pressure.

21. Reduced Pressure Principle Assembly (RP)

The RP assembly consists of two independently acting check valves together with a hydraulically operating, mechanically independent pressure differential relief valve located between the check valves and below the first check valve. These units are located between two resilient-seated shut off valves and are equipped with properly located resilient-seated test cocks. Assembly is to be used for High Hazard Protection.

22. Service Connection

Means the terminal end of service from the public potable water at the meter installation, which shall include the backflow prevention device when such device is installed adjacent to the water meter. That is, it is that point where the water purveyor loses jurisdiction and sanitary control over the water at its delivery to the consumer.

23. Water, Nonpotable

Means water which is not safe for human consumption, or which is of questionable potability.

24. Water, Potable

Means water from any source which has been checked by the health department, and approved for human consumption.

25. Water Purveyor

Means the owner or operator of a public, potable water system. As used herein, the water purveyor shall be Lee County Utilities Lee County Utilities.

C. Inspections and Installations

1. General

Due to changes in equipment, methods of manufacturing and additions to plants, buildings, etc., water usage requirements undergo continual change. As a result, new cross connections may be installed and existing protection may be bypassed, removed or otherwise made ineffective. Inspection and/or re-evaluation by Lee County Utilities of the cross connection hazard and the backflow prevention device effectiveness will be required as deemed necessary by Lee County Utilities.

To ensure the best possible protection to the County water system, backflow prevention devices required by Lee County Utilities shall be installed at the point of connection to the water system unless otherwise approved by Lee County Utilities. This shall be immediately after the water meter, or at the customer's property line just after the point of connection.

Lee County Utilities Lee County Utilities will utilize the standards established in the American Water Works Association (AWWA) M-14 Manual in determining the types of facilities requiring backflow prevention and the type of device needed at each facility to protect the Lee County Utilities water distribution system. reserves the right to make unannounced visits to some premises when conducting cross connection surveys where:

As determined by Lee County Utilities, backflow prevention will be required for single-family residential customers when their property is served by an auxiliary water supply or when a cross connection or potential for a cross connection is found on the customer's property. This does not limit the authority of Lee County Utilities to inspect single family residential properties for the purpose of protecting the public water system.

2. Inspections for New Construction

New construction plans are to have a plan review followed by site inspections by the Plumbing Official to ensure conformance with the Standard Plumbing Codes.

During the pre-construction plan review meeting Lee County Utilities will detail the customer's responsibilities concerning the requirements for backflow prevention device installation. Plan review and site inspections will be performed when deemed necessary by Lee County Utilities to ensure Cross Connection Control Policy compliance.

3. Inspections for New Accounts on Existing Facilities

Upon application for water service, Lee County Utilities will initiate a site survey to determine degree of hazard and customer requirements for Lee County Utilities Cross Connection Control Policy compliance. This survey need not be a detailed inspection of the location or disposition of the water lines, but can be confined to establishing the water uses on the premises, the existence of cross connections, and the availability of auxiliary supplies. Should any devices or plumbing changes be required, a follow up inspection will be made of the same facilities at a later date.

Results of the Cross Connection Survey, summarizing the findings, will be made available to the customer. Actual or potential cross connections found will be described along with the backflow prevention device required by Lee County Utilities. The customer will be given a time limit for making the needed corrections. Time for making the corrections may vary depending on the severity of the cross connections involved and the difficulty in correcting the problems.

4. Retrofitting Facilities of Existing Customers

It is the intent of Lee County Utilities retrofitting program to have backflow prevention protection on all existing water services that, in the opinion of Lee County Utilities, possess a potential backflow hazard.

Lee County Utilities will conduct a system wide survey of its customers in an effort to identify those facilities that present the highest hazard. A prioritized list of customers will be established based of degree of hazard ranging from high to low. A customer having an auxiliary water supply or other potential health hazard at their facilities will require a backflow prevention device as determined by Lee County Utilities. The customer shall be required to purchase, install, test, and maintain these devices in accordance with Lee County Utilities standards.

When it has been determined by Lee County Utilities that a backflow prevention device is necessary due to a hazard or potential hazard to the public water supply, the customer will be notified as to the type of assembly required to meet Lee County Utilities standards. After notification by Lee County Utilities, either by verified personal contact or certified mail, the customer shall have Lee County Utilities approved backflow prevention device installed. The customer shall have one (1) year from the date of notification to comply.

It is the intent of Lee County Utilities to have an ongoing site inspection and retrofitting program for all facilities requiring backflow prevention with full implementation of the Cross Connection Control Program for existing high hazard facilities within six (6) years of the Lee County Utilities Cross Connection Control Ordinance approval date.

Any existing backflow prevention device that has been properly installed and functioning will be allowed to continue in service unless the degree of hazard is such as to supersede its effectiveness or results in an unreasonable risk to public health, as determined by Lee County Utilities. In such a case the customer must replace or upgrade the device to current Lee County Utilities standards. Acceptable devices may remain in service when Lee County Utilities testing and maintenance requirements are met.

Lee County Utilities is to provide a shared cost for the installation of a backflow prevention device on an existing water service.

Upon completion of the installation and testing of a backflow prevention device in a manner and time frame approved by Lee County Utilities on an existing water service. Lee County Utilities will rebate to the customer up to 1/2 of the cost associated with retrofitting the water service for a single backflow prevention device.

Lee County Utilities CUSTOMER REBATE SCHEDULE BY BACKFLOW PREVENTION DEVICE SIZE FOR EXISTING CUSTOMERS

Device Size Inches	Maximum Rebate
3/4	\$188.00
1	\$188.00
1 1/2	\$476.00
2	\$555.00
3	\$2,058.00
4	\$2,324.00
6	\$3,367.00
8	\$4,541.00

## D. Testing of Backflow Prevention Devices

### 1. General

- a As part of a complete cross connection control program, it shall be the duty of the customer at any premises where Reduced Pressure backflow assemblies (RP), Double Check Valve assemblies (DCVA), Double Detector Check Valve assemblies (DDCV) and Pressure Vacuum Breakers (PVB) are installed to have thorough inspections and operational tests made at least once a year or more often, where deemed necessary by Lee County Utilities. These inspections and tests shall be at the expense of the customer and be performed by a Lee County Utilities approved certified backflow retention device technician using proper field test procedures with calibrated test equipment. All devices failing to meet the latest performance standards set forth by the American Water Works Association (ANSI/AWWA-C510-92 & C511-92), and the American Society of Sanitary Engineers (ASSE-1013, 1015 & 1020) or the Foundation for Cross Connection Control & Hydraulic Research at the University of Southern California, shall be repaired and retested within 30 days of the last test. Devices which are found to have a history of not meeting these performance standards shall be placed on a semi-annual or quarterly testing schedule. Devices repeatedly found not to meet these Standards shall be replaced with new devices at the expense of the customer.

If routine testing indicates wear or other malfunction, the device shall be overhauled. Such an overhaul should consist of the replacement of all seats, diaphragms, gaskets which are subject to wear, and any other parts found to be worn or otherwise in questionable condition.

Any maintenance or repair as a result of testing shall be made at the expense of the customer and shall be performed by a Lee County Utilities approved certified backflow prevention technician.

- b Any customers that require an uninterrupted supply of water, Lee County Utilities will require the installation of parallel backflow prevention assemblies of equal type to allow for testing, maintenance and repair. During normal flow conditions both assemblies will remain open. During testing, one device is left open while the other is tested. Sizing of parallel assemblies will be governed by customer need. Usually the two parallel assemblies are one size smaller than the service size (e.g. two 3" devices on a 4" service line).

Lee County Utilities will not allow an unprotected bypass around a backflow prevention device when the device is in need of testing, repair or replacement.

### 2. Field Test Procedures

- a The customer will coordinate with a Lee County Utilities approved certified tester for a mutually agreeable time for the water service to be shut off during testing. Special

arrangements may have to be made so that interruption of service will not create a hardship.

- b Properly identify the backflow prevention device to be tested by checking ID tag for manufacturer, model and serial number. Inspect the device assembly for the required components:
  - (1) Approved device
  - (2) Approved shut off valves
  - (3) Properly placed test cocks
- c The field test will be made using test equipment and test procedures conforming to those outlined in the "Manual of Cross Connection Control" published by the Foundation for Cross Connection Control and Hydraulic Research - University of Southern California. All test data shall be recorded on the proper Lee County Utilities forms with copies forwarded to Lee County Utilities.

### 3. Frequency of Testing

- a It is essential that continuous pressure type backflow prevention devices (RP, DCVA, DDCV & PVB) be tested on a regular basis by a competent tester if these devices are to be relied upon. Testing and/or proper maintenance must be utilized:
  - (1) Immediately following installation.
  - (2) At least annually, and more frequently where deemed necessary by Lee County Utilities.
  - (3) Anytime devices have been disassembled for cleaning and repairs.
  - (4) Where there is indication that the device is not functioning properly. (relief valve discharging, leaking, or any suspected damage to internal or external parts).
- b Lee County Utilities will notify the customer when tests are required and shall supply the necessary test forms. Forms can be obtained from Lee County Utilities Engineering. Forms shall be completed and returned to Lee County Utilities by the date indicated.

### 4. Approved Certified Testers

Certified Backflow Prevention Device Testers must present documentation of training and submit a completed Lee County Utilities Backflow Prevention Device Tester registration form to Lee County Utilities. Testers approved by Lee County Utilities shall have demonstrated competency in testing and repair of all approved backflow prevention devices to Lee County Utilities satisfaction. Testers shall be knowledgeable of laws, rules and regulations applicable to backflow prevention devices, and have successfully completed the University of Florida Center for Training, Research and Education for Environmental Occupations (TREEO),

Florida Water and Pollution Control Operators Association (FWPCOA), or other Certification programs approved by Lee County Utilities.

A list of Lee County Utilities approved certified backflow prevention device testers will be supplied to customers upon request.

Lee County Utilities reserves the right to test any backflow prevention device at anytime as a quality control measure. Testers are required to perform accurate testing and reporting and proper repair procedures. Testers will be removed from the list of Lee County Utilities approved Backflow Prevention Device testers for failure to perform in accordance with Lee County Utilities standards or if the Backflow Prevention Device Technician Certification expires.

E. Non-compliance

In the event that the customer does not abide by the standards set forth in Lee County Utilities Cross Connection Control Policy the water purveyor reserves the right to discontinue water service immediately.

Upon written notification from Lee County Utilities the customer shall act to install or repair, and/or test the backflow prevention device within the time frame set by Lee County Utilities. Any customer water service not in compliance with the Cross Connection Control Policy at the end of the period allotted by Lee County Utilities can be terminated immediately. Service will be restored when Lee County Utilities standards are met.

F. Installers

The backflow prevention device installer's responsibility is to assure proper installation of approved devices in accordance with the manufacturer's installation instructions and those provided by Lee County Utilities Cross Connection Control Policy. The installer is also responsible for making sure the device is working properly when it is installed. All Reduced Pressure Principle Assemblies, Double Check Valve Assemblies, and Pressure Vacuum Breaker Assemblies shall be tested following installation by a Certified Backflow Backflow Prevention Device Tester approved by Lee County Utilities. The following data shall be supplied by the customer to Lee County Utilities immediately after installation:

1. Service address where device is located
2. Owner
3. Description of device's location

4. Date of installation
5. Type of device and size
6. Make, Model and serial number of device
7. Test results.

All backflow prevention device installations are to be performed in accordance with Lee County Plumbing Code criteria.

Lee County Utilities may independently inspect and test any new installation at their discretion.

G. Backflow Prevention Device Standards

All backflow prevention devices, as described in "B. Definitions", approved for use by Lee County Utilities shall be in compliance with the standards set forth by one or more of the following agencies. Lee County Utilities reserves the right to state which standards apply if and when a conflict between standards exist.

AWWA - American Water Works Association

ANSI - American National Standards Institute

ASSE - American Society of Sanitary Engineers

FCCC&HR - Foundation of Cross Connection Control and Hydraulic Research -  
University of Southern California

Lee County Utilities will maintain a list of approved device manufacturers for use in Lee County Utilities potable water system.

Device specifications:

1. Air Gap (AG)

ANSI standard # A112.1.2

Good for toxic and non-toxic substances. Good for back pressure and back siphonage. Air Gap must have a minimum separation of two times the inside diameter of the water supply outlet and the flood rim level of the basin or receptacle. An Air Gap shall not be less than 3 inches.

2. Reduced Pressure Principle Assembly (RP)

ANSI/AWWA standard # C511-92

ASSE standard # 1013

FCCC&HR standards

Good for toxic and non-toxic substances. Good against back pressure and backsiphonage. Installed a minimum of 18" above ground or flood level, to maximum of 30". Must be tested annually.

3. Double Check Valve Assembly (DCVA)

ANSI/AWWA standard # C510-92

ASSE standard # 1015

FCCC&HR standards

Good for non-toxic substances only. Good for back pressure and backsiphonage. Installed a minimum of 12" above ground or flood level, to a maximum of 30". Must be tested annually.

4. Double Detector Check Valve Assembly (DDCV)

ANSI/AWWA standard # C510-92

ASSE standard # 1015

FCCC&HR standards

Used in unmetered fire line applications to detect low flow. Good for non-toxic substances only. Good for back pressure and backsiphonage. Installed a minimum of 30.5 (12") above ground or flood level, to a maximum of 30". Must be tested annually.

H. Backflow Prevention Device Standards

1. Pressure Vacuum Breaker (PVB)

ASSE standard # 1020

FCCC&HR standards

Good for toxic and non-toxic substances. Good for backsiphonage only. Can be installed under continuous pressure (control valves downstream). Base of the device must be installed a minimum of 12" above the highest outlet. Must be tested annually.

2. Dual Check Valve (DCV)

ASSE standard # 1024

For low hazard residential applications

3. Atmospheric Vacuum Breaker (AVB)

ASSE standard # 1001

FCCC&HR standards

Good for toxic and non-toxic substances. Good for backsiphonage only. No control valves downstream of device - cannot remain under continuous pressure, no more than 12 hours service per day. Base of device must be installed a minimum of 6" above highest outlet.

4. Hose Bib Vacuum Breaker (HBVB)

ASSE standard # 1011

Good for backsiphonage only. To be installed on hose threaded faucets. Not to be subjected to continuous pressure, no more than 12 hours service per day.

I. Typical Facilities Requiring Backflow Prevention Devices and Type of Devices Required

1. Facilities having the potential to contain cross connections which would, under adverse conditions, constitute a serious potential health hazard to the public water system that shall require Reduced Pressure Assemblies (RP) protection:

Auto & Truck Service Stations

Beauty Salons

Car Washes

Chemical or Biological Testing Labs

Dry Cleaners & Laundries

Film Processing Labs

Food Processing and Preparation Facilities

Hospitals

Irrigation Systems (using a health hazard auxiliary water supply)

Manufacturing Plants (using toxic substances)

Medical Clinics

Morgues

Multi-story Buildings

Pest Control Companies

Strip Malls

Super Markets

Veterinarians

2. Facilities having a potential of moderate health hazard or low health hazard situations shall require either RP or DCVA protection, as determined by site survey:

Auto Parts Stores

Barber Shops  
Beverage & Liquor Stores  
Convenient Stores (not selling gas)  
Department Stores  
Hardware Stores  
Health Clubs  
Large Church Facilities  
Lumber Yards  
Motels  
Multi-Family Structures Consisting of 3 Units or More Served by a Single Meter  
Pools & Clubhouses  
Used Car Lots  
Banks  
Office Buildings  
Small Churches  
Small Retail Outlets

3. PVB assemblies shall be used typically on irrigation systems not utilizing an auxiliary water supply and not having elevated sprinkler heads.
4. Dual Check Valves (DCV) shall be utilized at the service connections of private residences that pose a low potential health hazard.
5. Use of AVB and HBVB devices will be restricted to use on internal plumbing (lab sinks, garbage can washers, and hose bibs etc.). AVB's are not to be used for containment at the service connection.

J. Tank Trucks

Temporary cross connections are commonly created when water is drawn from the potable water system to fill tank trucks, dilute chemicals and pesticides or to rinse tanks. A properly tested Reduced Pressure Principle Device Assembly (RP) shall be installed on any portable water hauling, spraying or cleaning unit that has the capacity of connection to any potable water supply, which does not contain a built in approved Air Gap.

K. Portable Water Meters

All temporary, portable or hydrant meters furnished by Lee County Utilities shall have an approved Reduced Pressure Principle Device Assembly installed immediately downstream of the meter. These Backflow Prevention Device Assemblies will be supplied by Lee County Utilities. The contractor or customer will provide the necessary protection and physical support for the meter and backflow prevention device assembly.

No permanently installed meter shall be used for construction purposes without a proper backflow prevention device installed.

L. Fire Line Protection

All new fire lines not having an auxiliary water supply or chemical additives will require Double Detector Check Valve protection.

All new fire lines utilizing the potable water supply with an auxiliary water supply shall be required to have a Reduced Pressure Principle Detector Assembly. Lee County Utilities maintains the authority to perform site inspections as deemed necessary.

Any unacceptable backflow prevention devices on existing fire lines or those fire lines presently unprotected against backflow shall be required to comply with the above current Lee County Utilities fire line protection standards.

M. Residential Customers

Residential customers, including those in multi-family units, having auxiliary water supplies or other potential health hazards on their premises shall require backflow prevention devices, as determined by Lee County Utilities. These customers shall be required to purchase, install, test, and maintain these devices in accordance with Lee County Utilities standards.

N. Forms and Notices

Backflow Prevention Device Field Test & Maintenance Report	11.12, Page 11-33
Backflow Prevention Device Tester Registration	11.16, Page 11-41
WARNING (Thermal Water Expansion)	11.17, Page 11-42