ARTICLE VI. CROSS-CONNECTION/BACKFLOW PROTECTION

Sec. 18-161. General.

(a) The intention of this chapter is to define the authority of the town as the water purveyor in the elimination of all hazards, both actual and potential, to the portable waster [potable water] within the town's public water supply system.
(b) This chapter will comply with Federal Safe Drinking Water Act (Pub. L. 93-523), the North Carolina Administrative Code (title 10, chapter 10, subchapter 10-D, subparagraph, 1006), and the North Carolina Building Code (volume II) as they pertain to cross-connections with the public water supply system and will apply the principle that the degree of protection should be commensurate with the degree of the hazard or potential hazard to the public water supply system.
(Ord. No. 435, 12-5-06)

Sec. 18-162. Purpose.

The purpose of this chapter for the department of public utilities of the town is as follows:
(a) Protect the public potable water supply of the town against actual or potential contamination (i.e., cross-connections, backflow, backsiphonage) by isolating and containing, within the consumer's premises or private property, contamination or pollution that has occurred or may occur because of some uncontrolled (i.e., undiscovered or unauthorized) cross-connection on the consumer's premises or private property back into the public water supply.
(b) Eliminate or control existing cross-connections, both actual and potential, (backflow, backsiphonage or any other source of water or process water used for any purpose whatsoever) which might jeopardize the potability of the public water supply system of the town.
(c) Establish and maintain a continuing program of cross-connection control and inspection which will systematically and effectively prevent the contamination or pollution, either actual or potential, of all potable water systems connected to the town's public water supply system.
(d) Control cross-connections (i.e., backflow and backsiphonage) through cooperation between the town and the town's customers (consumers). Responsibilities and duties of each will beset forth in this chapter and their applicable regulations.
(Ord. No. 435, 12-5-06)

Sec. 18-163. Responsibilities.

The director of the department of public utilities, hereinafter referred to as director, will be responsible for the protection of the public potable water distribution system from contamination or pollution due to the backflow or backsiphonage of contaminants or pollution through the water service connection. If, in the judgment of the director, or his duly appointed representative, an approved backflow prevention assembly is required (at the consumer's water service connection: or, within the consumer's private water system) for the safety of the water system, the director, or his duly appointed representative, shall give notice, in writing, to the customer (consumer) to install such approved back flow prevention assemblies at specified locations on his premises. The customer shall install, within a period of time defined in this chapter, such approved backflow prevention

assemblies at the customer's own expense. Failure, refusal, or inability on the part of the customer to install, have tested, and maintain such assemblies, shall constitute grounds for enforcement (such as stipulated penalties, disconnection of water service, and the like) until such requirements have been satisfactorily met. The director or his duly appointed representative shall administer enforcement of this chapter.
(Ord. No. 435, 12-5-06)

Sec. 18-164. Definitions.

Air gap (separation). A physical separation between the free-flowing discharge and of a potable water supply pipeline and an open or non pressure receiving vessel. An approving air gap, shall be at least double the diameter of the supply pipe measured vertically above the overflow rim of the vessel, but in no case less than one (1) inch (2.54 cm).

Approved.

(1) As herein used in reference to a water supply, it shall mean a water supply that has been approved by the North Carolina Department of Environment, Health, and Natural Resources, Division of Environment Health, Public Water Supply Section.

(2) As herein used in reference to an air gap, a double check valve assembly, a reduced pressure backflow prevention assembly or other backflow prevention assemblies or methods, it shall mean an approval by the town.

Atmospheric vacuum breaker (AVB) (approved) . A backflow prevention assembly used to prevent backsiphonage, which is designed so as not to be subject to static line pressure.

Auxiliary water supply . Any water supply on or available to the premises other than the purveyor's (Town of Smithfield) approved public water supply, will be considered as an auxiliary water supply. These auxiliary waters may include, but are not limited to, water from another purveyor's public potable water supply or any natural source such as well, spring, river, stream, pond, lake, and the like, or used waters or industrial fluids. These waters may be contaminated or polluted or they may be objectionable and constitute an unacceptable water source over which the water purveyor does not have sanitary control.

Backflow . The undesirable reversal of flow of waters or mixtures of water and other liquids, gases, or other substances into the distribution lines of the potable supply of water from any source. See also terms backpressure and backsiphonage.

Backflow prevention assembly (approved) . An assembly or means designed to prevent backflow into the potable water supply system. These assemblies shall be investigated and approved by the town and will have been shown to meet or exceed the design and performance standards of the American Society of Sanitary Engineers (ASSE), the American Water Works Association (AWWA), and/or the Foundation for Cross-Connection Control and Hydraulic Research of the University of Southern California (FCCCHR-USC). The approval of backflow prevention assemblies bythe department of public utilities is based on a favorable report by an approved testing laboratory (i.e., FCCCHR-USC, Underwriters Laboratory, Factory Mutual, and like), recommending such an approval. The following are approved methods for backflow prevention:

(1) Air gap.

(2) Reduced pressure principle backflow prevention assembly (RP or RPZ), and

(3) Double check valve backflow prevention assembly (DCVA).

Backflow prevention assembly technician (certified) . A person that has proven his/her competency to the satisfaction of the town. Any person that is certified to make competent tests, or to repair, overhaul and make reports on backflow prevention assemblies shall be knowledgeable of applicable laws, rules, and regulation; shall be a licensed plumber or have had at least two (2) years' experience under a licensed plumber or plumbing contractor, or have equivalent qualifications acceptable to the town; and must hold a certificate of completion from an acceptable training program (i.e., NC AWWA) in the testing, repair, and reporting of backflow prevention assemblies.
Backpressure . Backflow caused by a pump, elevated tank, boiler, or other means that could create pressure within the system greater than the supply pressure.
Backsiphonage. A reversal of the normal direction of flow in the lines due to a negative pressure (vacuum) being created in the supply line with the backflow source subject to atmospheric pressure.
Consumer's potable water system. That portion of the privately-owned potable water system located between the point of delivery (service connection) and the point of use. This system will include, but is not limited to: all pipes, conduits, tanks, receptacles, fixtures, equipment, and appurtenances, used to produce, convey, store, or use portable water.
Consumer's water system. Any water system located on the consumer's premises, whether supplied by a public potable water or an auxiliary water supply. The system or systems may be either a potable water system or an industrial piping system.
Contamination. An impairment of the quality of the water which creates an actual hazard to the public health through poisoning or through the spread of disease by sewage, industrial fluids, waste, and the like.
Customer or *consumer.* Any person, firm or corporation using or receiving water from the town.
Cross-connection. Any unprotected actual or potential connection or structural arrangement between a public or a consumer's potable water system and any other source or system through which it is possible to introduce into any part of the potable system any used water, industrial fluids, gas, or substance other than the intended potable water with which the system is supplied. Bypass arrangements, jumper connections, removable sections, swivel or changeover devices and other temporary or permanent devices through which or because of which backflow can or may occur are considered to be cross-connections.
(1) The term direct cross-connection shall mean a cross-connection which is subject to both backsiphonage and backpressure.
(2) The term indirect cross-connection shall mean a cross-connection, which is subject to backsiphonage only.
Cross-connection (controlled). A connection between a potable water system and a nonpotable water system with an approved backflow prevention assembly properly installed and maintained so that it will continuously afford the protection commensurate with the degree of hazard.
Cross-connection controlled by containment. The term service protection shall mean the appropriate type or method of backflow protection at the service connection, commensurate with the degree of hazard within the consumer's potable water system.

Double check valve assembly (approved) (DCVA). Any assembly composed of two (2) independently acting, approved check valves, including tightly closing shutoff valves located at each end of the assembly and suitable connections for testing the water of each check valve.

Hazard, degree of. Either a pollutional (nonhealth) or contamination (health) hazard and which is derived from the evaluation of conditions within a system.

(1) *Health*-- An actual or potential threat of contamination of a physical or toxic nature to the public potable water system or the consumer's potable water system that would be a danger to health.

(2) *Plumbing*-- An internal or plumbing-type cross-connection in a consumer's potable water system that may be either a pollutional or a contamination-type hazard. This includes, but is not limited to, cross-connection to toilets, sinks, lavatories, wash trays and lawn-sprinkling systems. Plumbing-type cross-connections can be located in many types of structures including homes, apartment houses, hotels, and commercial or industrial establishments. Such a connection, if permitted to exist, must be properly protected by anappropriate type of backflow prevention assembly.

(3) *Pollutional*-- An actual or potential threat to the physical properties of the water system or the potability of the public or the consumer's potable water system but which would not constitute a health or system hazard, as defined. The maximum degree or intensity of pollution to which the potable water system could be degraded under this definition would cause a nuisance or be aesthetically objectionable or could cause minor damage to the system or its appurtenances.

(4) *System*-- An actual or potential threat of severe danger to the physical properties of the public or the consumer's potable water system or of a pollution or contamination which would have a protracted effect on the quality of the potable water in the system.

Industrial fluids. Any fluid or solution which may be chemically, biologically, or otherwise contaminated or polluted in a form or concentration which would constitute a health, system, pollutional, or plumbing hazard if introduced into an approved water supply. This may include, but is not limited to: polluted or contaminated used waters; eleven (11) types of processed water and "used water" originating from the public potable water system which may deteriorate in sanitary quality; chemicals in fluid form; plating acids andalkalis; circulated cooling waters connected to an open cooling tower and/or cooling waters that are chemically or biologically treated or stabilized with toxic substance; contaminated natural waters such as from wells, springs, streams, rivers, ponds, lakes, irrigation canals or system, and the like; oils, gases, glycerin, paraffin, caustic and acid solutions and other liquid and gaseous fluids used industrially, for other processes, or for fire fighting purposes.

Industrial piping system (consumer's). Any system used by the consumer for transmission of or to store any fluid, solid, or gaseous substance other than an approved water supply. Such a system includes, but is not limited to: all pipes, conduits, tanks, receptacles, fixtures, equipment, and appurtenances to produce, convey, or store substances which are or may be polluted or contaminated.

Laboratory testing (approved). Refers to the Foundation for Cross-Connection Control and Hydraulic Research of the University of Southern California (FCCCHR-USC) or another lab having the equivalent facilities for both the laboratory and field evaluation of the assemblies approved by the AWWA and/or APSE.

Nonpotable water. A water supply which has not been approved for human consumption by the North Carolina Department of Environment, Health, and Natural Resources, Division of Environmental Health, Public Water Supply Section.
Pollution. An impairment of the quality of the water to a degree which does not create a hazard to the public health, but which does adversely and unreasonably affect the aesthetic qualities of such waters for domestic use.
Potable water. Any public potable water supply which has been investigated and approved by North Carolina Department of Environment, Health, and Natural Resources, Division of Environmental Health, Public Water Supply Section. The system must be operating under a valid health permit. In determining what constitutes an approved water supply, the North Carolina Department of Environment, Health, and Natural Resources, Division of Environmental Health, Public Water Supply Section has final judgment as to its safety and potability.
Pressure vacuum breaker (PBV) (approved). A backflow prevention assembly suitable for continuous pressure, to be used to provide protection against backsiphonage.
Public potable water system. Any publicly- or privately-owned water system operated as a public utility, under a current health permit, to supply water for domestic purposes. This system will include all sources, facilities, and appurtenances between the source and the point of delivery (service connection) such as valves, pumps, pipes, conduits, tanks, receptacles, fixtures, equipment, and appurtenances used to produce, convey, treat, or store potable water for public consumption or use.
Purveyor water. The owner or operator of a public potable water system, providing an approved water supply to the public.
Reduced pressure principle prevention assembly (RPZ or RP) (approved). An assembly containing two (2) independently acting approved check valves together with a hydraulically operating, mechanically independent pressure differential relief valve located between the check valves and at the same time below the first check valve. The unit shall include properly located resilient seated test cocks and lightly closing resilient seated shut-off valves at each end of the assembly. This assembly is designed to protect against a nonhealth (i.e., pollutant) or a health (i.e., contaminant) hazard. This assembly shall not be used for backflow protection of sewage or reclaimed water.
Service connection. The terminal end of a service connection from the public potable water system, (i.e., where the water purveyor may lose jurisdiction and sanitary control of the water at its point of delivery to the consumer's water system). If a water meter is installed at the end of the service connection, then the service connection shall mean the downstream end of the water meter.
Unapproved water supply. A water supply that has not been approved for human consumption by the North Carolina Department of Environment, Health, and Natural Resources.
Used water. Any water supplied by a water purveyor form a public potable water system to a consumer's water system after it has passed through the service connection and is no longer under the control of the town (water purveyor).
(Ord. No. 435, 12-5-06)

Sec. 18-165. Water system.

(a) The water system shall be considered as made up of two (2) parts: The town's (water purveyor) system and the consumer's system.
(b) The town is permitted as a public water supply system by the state since the town treats water from the Neuse River, a natural source (i.e., well, spring, stream, river, pond, lake, and the like). The town also purchases water from another state-permitted water purveyor, Johnson County. The town's system shall consist of a storage and distribution system including all those facilities of the water system under the complete control of the town, up to the point where the consumer's system begins (service connection).
(c) The source shall include all components of the facilities utilized in the storage and delivery of water to the town's distribution system.
(d) The distribution system shall include the network of conduits used for the delivery of water from the purchased source to the consumer's system.
(e) The consumer's system shall include those parts of the facilities beyond the termination of the town's distribution system (service connection), which are utilized in conveying potable water to point of use.
(Ord. No. 435, 12-5-06)

Sec. 18-166. Right of entry.
(a) The public utilities director (director) and his duly appointed representative from the town shall have the right to enter any building, structure, or premises during normal business hours to perform any duty imposed upon the director by this chapter. Those duties may include sampling and testing of water, or inspections and observations of all piping systems connected to the public water supply. Refusal to allow entry for these purposes shall result in enforcement action (disconnection of water services, stipulated penalties, and the like).
(b) On request from the director, the consumer shall furnish to the town any pertinent information regarding the water supply system on such property where cross-connections, either actual or potential, and backflow are deemed possible.
(c) The consumer's system should be open for inspection at all reasonable times to authorized representatives from the town to determine whether unprotected cross-connections or other structural or sanitary hazards, including violations of this chapter, exist. Refusal to allow entry for these purposes shall result in enforcement action (disconnection of water services, stipulated penalties, and the like). When such a condition becomes known, the consumer will be notified, in writing, to disconnect the unprotected cross-connections within a time period established in this chapter. The degree of protection required and the period of time required for conformance shall be commensurate with the actual or potential degree of hazard to the public potable water supply system.
(1) Cross-connection with private wells or other unapproved auxiliary water supplies require immediate disconnection of the unapproved source.
(2) Cross-connection requiring correction through: elimination, air gap separation, reduced pressure principle backflow prevention assembly (RP) or double check valve assembly (DCVA) for sizes three-fourths (3/4) inch through two (2) inches require a three-day maximum conformance period.

(3) Cross-connection requiring correction through reduced pressure principle backflow prevention assembly (RP) or double check valve assembly (DCVA) for sizes two and one-half (2 1/2) inches and larger require a sixty-day maximum conformance period. (Ord. No. 435, 12-5-06)

Sec. 18-167. Backflow assembly installation.

(a) An approved backflow prevention assembly shall be installed, in accordance with manufacturer's installation instructions, on each consumer's water system at or near the property line or immediately inside the building being served; but, in all cases, before the first branch line leading off the service line wherever the following conditions exist:

(1) In the case of premises having an auxiliary water supply which is not or may not be of safe bacteriological or chemical quality and which is not acceptable as an additional source by the department of environment, health, and natural resources, the public water system shall be protected against backflow from the premises by installing an approved backflow prevention assembly in the service line commensurate with the degree of hazard.

(2) In the case of premises on which any industrial fluids or any other objectionable substance is handled in such a manner as to create an actual or potential hazard to the public water system, the public system shall be protected against backflow from the premises by installing an approved backflow prevention assembly in the service line commensurate with the degree of hazard. This shall include the handling of process waters and waters originating from the water purveyor's system which have been subject to deterioration in quality.

(3) In the case of premises having internal cross-connections that cannot be permanently corrected or protected against, or have intricate plumbing and piping arrangements or where entry to all portions of the premises is not readily accessible for inspection purposes, making it impracticable or impossible to ascertain whether or not dangerous cross-connections exits, the public water system shall be protected against backflow from the premises by installing an approved backflow prevention assembly in the service line commensurate with the degree of hazard.

(b) Ownership, testing, and perpetual maintenance of the backflow prevention assemblies shall be the responsibility of the consumer. All reduced pressure principle assemblies (RP) and double check valve assemblies (DCVA) shall be installed above ground in a protective enclosure or in a drainable, below-ground pit, if above-ground installation is not determined reasonable by the town. The installer shall be responsible to ensure that the assembly is installed and working properly and shall furnish the followinginformation to the director within five (5) working days after a backflow prevention assembly is installed:

(1) Owners' name, address, phone number, and responsible contract:
(2) Assembly location (specific);
(3) Date of installation;
(4) Installer's name, address, and phone number;
(5) Installer's certification number;
(6) Type of assembly;
(7) Manufacturer;
(8) Model number;

(9) Serial number;
(10) Test results/reports.en;*
* All reduced pressure principle assemblies (RP) and double check valve assemblies (DCVA) are required to be tested following installation by a certified backflow prevention assembly technician (tester).
(c) (1) All commercial and industrial consumers, upon notification from the town, shall install or have installed an approved backflow prevention (containment) assembly, commensurate with the degree of hazard. The period allowed for this installation shall not exceed the following:
TABLE INSET:

Degree of Hazard	Time Frame, Days *2-inch service or smaller:*
Low	90
Medium	90
High	60
Service greater than 2 inches:	
Low	270
Medium	270
High	180

Commercial and industrial consumers shall also submit plans and specifications to the director for review and approval, acquire all necessary permits prior to installation, and upon satisfactory installation of approved backflow prevention assembly and appurtenances, forward a certificate of completion to the director.
(Ord. No. 435, 12-5-06)

Sec. 18-168. Type of backflow assembly.
(a) The type of backflow prevention assembly to be installed to protect the public potable water supply required by this chapter shall be commensurate with the degree of either actual or potential hazard.
(b) Any backflow prevention assembly required herein shall be a make, model, and size approved by the town. The term approved backflow assembly shall mean an assembly that has been manufactured in full conformance with the standards established by the American Water Works Association (AWWA), entitled:
AWWA/ANSI C501-92 (or most current revision) Standard for Double Check Valve Backflow Assemblies;
AWWA/ANSI C11-92 (or most current revision) Standard for Reduced Pressure Principle Backflow Prevention Assemblies;
And, have met completely the laboratory and field performance specifications of the Foundation for Cross-Connection Control and Hydraulic Research of the University of Southern California (FCCCHR-USC) established in:
Specifications of backflow prevention assemblies--Section 10 of the most current edition of the Manual of Cross-Connection Control.

(Ord. No. 435, 12-5-06)

Sec. 18-169. Testing and maintenance.

(a) It shall be the duty of the consumer at any premises where backflow prevention assemblies are installed to have a field test performed by a certified backflow prevention assembly technician (tester) upon installation and at least once per year for the life of the assembly. In instances where the director deems the hazard to be great enough he may require field tests at more frequent intervals. These tests shall be at the expense of the consumer (water user) and shall be performed by a certified technician (tester) approved by the town. It shall be the duty of the director to see that these tests are made in a timely manner.

(b) All tests must be completed on or before the anniversary date of the installed date each year. If problems are detected with the backflow prevention assemblies, it is the duty of the consumer to report these discrepancies to the director within five (5) working days of detection. These assemblies shall be repaired, overhauled, or replaced at the expense of the consumer whenever the assemblies are found to be defective. Records of such tests, repairs, overhauls, and replacements shall be kept by the consumerand made available to the town.

(c) All presently installed backflow prevention assemblies which do not meet requirements of this chapter but were approved devices for the purposes described herein at the time of the installation and which have been properly maintained, shall, except for the testing and maintenance requirements, be excluded from the requirements of this chapter as long as the director is assured that the affected backflow prevention devices assemblies will satisfactorily protect the town's water supply system. Whenever the existing device/assembly is moved from the present location or requires more than minimum maintenance, or when the director determines that the maintenance constitutes a hazard to the health, the unit shall be replaced with an approved backflow prevention assembly meeting the requirements of this chapter at the consumer's expense.

(d) When it is not possible to interrupt water service, provisions shall be made for a "parallel installation" of backflow prevention assemblies. The director will not accept an unprotected bypass around a backflow prevention assembly when the assembly is in need of testing, repair, or replacement.

(e) When repair work is required on any approved backflow prevention assembly, whether determined through testing or routine inspection by the consumer (owner) or by the town (water purveyor), these repairs shall be completed within a specified period of time commensurate with the degree of hazard at the consumer's expense. In no case shall this period of time exceed thirty (30) days.

(Ord. No. 435, 12-5-06)

Sec. 18-170. Categorical facilities.

(a) Approved backflow prevention assemblies shall be installed on the service connection to any premises that the town has identified as having a potential for backflow, including, but not limited to:

(1) Automotive plants.

(2) Automotive service stations.

(3) Auxiliary water system.

(a) Private water supply.
(b) "Used water" and "industrial fluids".
(4) Beauty shops.
(5) Beverage bottling plants.
(6) Buildings (hotels, motels, apartments, public and private buildings or other structures having unprotected cross-connections).
(7) Canneries, packing houses, and rendering plants.
(8) Chemical plants (manufacturing processing, and compounding or treatment).
(9) Chemically contaminated water systems.
(10) Commercial car washing facilities.
(11) Dairies and cold storage plants.
(12) Buildings of five (5) or more stories above ground level.
(13) Film laboratories.
(14) Commercial laboratories.
(15) Fire sprinkler systems.
(16) Hospitals, medical buildings, sanitariums, morgues, mortuaries, autopsy facilities, funeral homes, nursing and convalescent homes, and clinics.
(17) Irrigation systems (lawn, commercial, and the like).
(18) Laundries and dye works.
(19) Metal manufacturing, cleaning, processing, and fabricating plants.
(20) Oil and gas production, storage or transmission properties.
(21) Paper and product plants.
(22) Plastic molding facilities.
(23) Weaving, spinning operations.
(24) Pharmaceutical manufacturing.
(25) Painting and staining operations related to finished woods and metals.
(26) Electroplating processes.
(27) Power plants.
(28) Radioactive materials or substances (plants or facilities handling)
(29) Restricted, classified, or other closed facilities.
(30) Rubber plants (natural and synthetic).
(31) Sand and gravel plants.
(32) Schools and day care centers.
(33) Wastewater treatment and storm drainage facilities.
(34) Other premises specified by the director, or his duly appointed representative, when the cause can be shown that a potential cross-connection hazard not enumerated in the above list exists.
(b) All backflow prevention assemblies and installations shall be subject to approval and inspection by the town.
(Ord. No. 435, 12-5-06)

Sec. 18-171. Connection to unapproved water supplies.
No person shall connect, or cause to be connected, any supply of water not approved by the state to the public potable water supplied by the town. Any such connection allowed by the town must be in conformance with the backflow prevention requirements set forth in this chapter.

(Ord. No. 435, 12-5-06)

Sec. 18-172. Fire protection systems.

(a) All connections to fire sprinkler systems hereinafter connected with the public water supply system shall be protected with an approved backflow prevention assembly (i.e., double check valve detector assembly, and the like) in conformance with specific standards established by the American Water Works Association (AWWA) (most current revision) and the National Fire Prevention Association (NFPA) (most current revision). All fire systems using toxic additives or booster pumping facilities shall be required tobe protected with an approved reduced pressure principle assembly (RP) at the main.

(b) Except for an eminent health hazard as defined herein, as determined by the director, or his duly appointed representative, of the town, any fire sprinkler system connected with the public potable water system of the town on or before the effective date of this chapter, shall have twenty-four (24) months to get into conformance with the provisions of this chapter.

(Ord. No. 435, 12-5-06)

Sec. 18-173. Enforcement.

(a) When any installment is found not to be in compliance with this chapter, the consumer shall be notified, in writing, with regards to the corrective action required and a specified periods of time (see section 18-166) to achieve compliance.

(b) Any installation which remains in noncompliance after notice is given and the time prescribed in section 18-166, will be considered in violation of this chapter and will realize the potential for disconnection of water services until compliance is achieved. In addition, any person who shall continue any violation beyond the time limit provided for in the aforementioned notice of violation (NOV) and section 18-166 shall be guilty of a misdemeanor, and on conviction thereof shall be fined in the amount not toexceed fifty dollars ($50.00) for each violation. Each day in which any violation continues shall be deemed a separate offense.

(c) Enforcement of this program shall be administered by the director or his duly appointed representative.

(d) The director is authorized to make all necessary and reasonable rules and policies with respect to the enforcement of this chapter.

(Ord. No. 435, 12-5-06)