



CITY OF WILSON, NORTH CAROLINA STANDARD SPECIFICATIONS

BACKFLOW PREVENTION CROSS CONNECTION CONTROL

PUBLIC SERVICES
WATER RESOURCES DIVISION
CITY OF WILSON
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APPROVALS

CITY

NC-DENR



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CITY OF WILSON
BACKFLOW ORDINANCE

ARTICLE II CROSS CONNECTION CONTROL

I. SECTION 44-30. INTRODUCTION

- A. The purpose of this “cross connection control ordinance” is to define the authority of the Water Distribution and Water Treatment Divisions of the Public Services Department of the City of Wilson as the water purveyor in the elimination of all cross connections within its public water supply.
- B. This Article will comply with the Federal Safe Drinking Water Act (P.L. 93/523), the North Carolina State Administrative Code (Title 10, Chapter 10, Subchapter 10-D Subparagraph .1006) and the North Carolina State Building Code (Volume II) as they pertain to cross connections with the public water supply (Ord.No. O-003-94 § 1, 1-6-94)

II. SECTION 44-31. OBJECTIVES OF ARTICLE

- A. The specific objectives of the “Cross Connection Control Ordinance” for the Water Distribution Division of the City of Wilson are as follows:
 - 1. To protect the public potable water supply of the City of Wilson against the actual or potential or potential contamination by isolating within the customer’s private water system, contaminants or pollutants which could, under adverse conditions, backflow through uncontrolled cross connections into the public water system.
 - 2. To eliminate or control existing cross connections, actual or potential, between the consumer’s in-plant potable water system(s) and non-potable or industrial piping system(s).
 - 3. To provide continuing inspection program of cross connection control which will systematically and effectively control all actual or potential cross connection that will be installed in the future. (Ord. No. O-003-94, § 1, 1-6-94)

- **No grandfather clause exists.**

III. SECTION 44-32. RESPONSIBILITIES OF THE HEALTH AGENCY, WATER PURVEYOR, CONSUMER AND CERTIFIED BACKFLOW PREVENTION ASSEMBLY TESTER.

A. RESPONSIBILITY-HEALTH AGENCY.

- 1. The North Carolina Department of Environment and Natural Resources (NCDENR) has the responsibility for promulgating and enforcing laws, rules, regulations and policies to be followed in carrying out an effective Cross Connection Control Program.
- 2. NCDENR also has a primary responsibility of insuring that the water purveyor operates the public potable water system free of actual or potential sanitary hazards, including unprotected cross connections. They have further responsibility of insuring the water purveyor provides an approved water supply at the service connection to the consumer’s water system and, further, that he requires the installation, testing, and maintenance of an approved backflow assembly on the service connection when required.

- B. Same-Water Purveyor
1. The water purveyor's (City of Wilson) responsibility begins at the source and includes all of the public water distribution system, including the service connection, and ends at the point of delivery to the consumer's water system(s). In addition, the water purveyor shall exercise reasonable vigilance to insure that consumers have taken the proper steps to protect the public potable water system. To ensure that the proper precautions are taken, The City of Wilson is required to determine the degree of hazard to the public potable water system; to determine the degree of protection required; and to ensure proper containment protection through an on-going inspection program.
 2. When it is determined that a backflow prevention assembly is required for the protection of the public system, the City shall require the consumer, at the consumer's expense, to install an approved backflow prevention assembly at each service connection, to test immediately upon installation and thereafter at a frequency as determined by the Water Distribution Division, to properly repair and maintain such assembly or assemblies and to keep adequate records of each test and subsequent maintenance and repair, including materials and/or replacement parts.
- C. Same-Consumer
1. The consumer has the primary responsibility of preventing pollutants and contaminants from entering his potable water system(s) or the public potable water system. The consumer's responsibility starts at the point of delivery from the public potable water system and includes all of his water system(s). **The consumer shall maintain accurate records of tests and repairs made to backflow prevention assemblies and provide the Water Distribution Division with copies of such records. The records shall be on forms approved by the Division's Cross Connection Coordinator and shall include the list of materials or replacement parts used. Following any repair, overhaul, re-piping or relocation of an assembly the consumer shall have it tested to insure that it is in good operational condition and will prevent backflow. A registered backflow prevention assembly tester shall make tests, maintenance and repairs of backflow prevention assemblies. A list of those who are registered to test assemblies can be obtained from the Cross Connection Control Coordinator. A licensed plumber holding a valid North Carolina P-Class I Plumbing License, or Licensed Fire Sprinkler Contractor, or utility contractors registered with the City of Wilson shall make new installations, replacements, or when bringing old installations of below ground assemblies, check valves, or straight thru piping with no required level of containment up to date to the current Backflow Installation Specifications section V.**
- D. Same-Certified Backflow Prevention Assembly Tester

1. When employed by the consumer to test, repair, overhaul or maintain backflow prevention assemblies, a backflow prevention assembly tester shall have the following responsibilities:
 - a) The tester shall be responsible for making competent inspections and for repairing or overhauling backflow prevention assemblies and making reports of such repair to the consumer and responsible authorities on forms approved by the Water Distribution Division Cross Connection Coordinator. The tester shall include the list of materials or replacement parts used. The tester shall be equipped with and be competent to use all the necessary tools, pressure gauges, site tubes and differential gauges, compensating tees, manometers and other equipment necessary to properly test, repair, and maintain backflow prevention assemblies. It will be the tester's responsibility to ensure that original manufactured parts are used in the repair of or replacement of parts in a backflow prevention assembly. It will be the tester's further responsibility not to change the design, material or operational characteristics of an assembly during repair or maintenance without prior approval of the Water Distribution Division. A registered tester shall perform the work and be responsible for the competency and accuracy of all tests and reports.
 - b) All registered backflow prevention assembly testers must obtain and employ backflow prevention assembly test equipment, which meets the University of Southern California's Foundation For Cross Connection Control and Hydraulic Research approval, and has been evaluated and/or approved by the Water Distribution Division. All test equipment shall be registered with the Water Distribution Division Cross Connection Control Coordinator.
 - c) All test equipment shall be checked for accuracy and calibrated annually at minimum by a certified calibration company approved by written consent from the testing valve manufacturer. The Water Distribution Division requires an approved differential test gauge to perform the differential test method to test the accuracy/and inside working components of approved backflow prevention assemblies used for containment and isolation within the City of Wilson's water distribution system. All registered Backflow prevention assembly testers must be re-certified every two years through an approved backflow prevention registration or certification program recognized by the City of Wilson Cross Connection Coordinator.

E. Same-Backflow Prevention Advisory Board

1. A Backflow Prevention Advisory Board can be established to review issues or complaints raised by customers of the Water Distribution Division, and/or by plumbing contractors, that wish to appeal a requirement as set forth in this Ordinance. The Advisory Board will also review appeals made by registered tester, to the Water Distribution Division, regarding registered testers, revocation or Suspension of the privilege to test assemblies in the City of Wilson.
2. The decision(s) and/or recommendations of the Advisory Board will be taken into consideration by the Water Distribution Division if appeals are carried to that level. All final decisions shall be made by the Water Distribution Manager and Water Distribution Operator in Responsible Charge (ORC) and Cross Connection Coordinator.
3. The advisory board will consist of a minimum of five members. To include one representative of the City Plumbing Inspections Division, one representative for the Plumbing Contractor's Association, or Lawn Irrigation Contractors, or Fire Sprinkler Contractors, one representative from the Wilson County Health Department, one representative from the Water Distribution Division and one representative from the Fire Department.
4. The Advisory Board may recommend the need for revisions, modifications, or amendments to this Ordinance as well as recommending maximum rates for the testing of backflow prevention assemblies.
 - (Ord. No. O-003-94, § 1,1-6-94)

IV. SECTION 44-33. DEFINITIONS

- A. The Following words and phrases, when used in this chapter, shall have the meanings respectively ascribed to them in this section:
 1. Air-gap separation
 - a) A physical separation between the free flowing discharge end of a potable water supply pipeline and an open and non-pressure receiving vessel. An "approved air-gap separation" shall be at least double the diameter of the supply pipe measured vertically above the overflow rim of the receiving vessel; in no case less than (1) inch (2.54 cm).
 2. Approved
 - a) The term "approved" as herein used in reference to a water supply, means a water supply that has been approved by NCDENR.
 - b) The term "approved" as herein used in reference to air-gap separation, a pressure vacuum breaker, and a double check valve assembly, a double check detector assembly a reduced pressure principle backflow prevention assembly. A reduced pressure principle detector assembly or other backflow prevention assemblies or methods shall mean an approval by the Water Distribution Division.
 3. Backflow

- a) The undesirable reversal of flow of water or mixtures of water and other liquids, gases or other substances into the distribution pipes of the potable supply of water from any source other than its intended source.
4. Backflow Prevention Assembly, Approved:
- a) An assembly used for containment purposes that has been investigated and approved by the Water Distribution Division and has been shown to meet the design and performance standards of the Foundation for Cross Connection Control and Hydraulic Research of the University of Southern California. The approval of backflow prevention assemblies by the Water Distribution Division is based on a favorable report from an approved testing laboratory, recommending such approval. (To be approved, an assembly must be readily accessible for in-line testing and maintenance.)
 - b) Also means an assembly used for isolation purposes that has been shown to meet the design and performance standards of the American Society of Sanitary Engineers (ASSE), the American Water Works Association (AWWA), or the Foundation for Cross Connection Control and Hydraulic Research of the University of Southern California.
5. Backflow Prevention Assembly, Unapproved
- a) An assembly that has been investigated by the Water Distribution Division and has been determined to be unacceptable for installation within the City's water system. Consideration for disapproval and removal from the "approved List" shall be based upon the following criteria:
 - (1) Due to poor performance standards;
 - (2) Lack of or un-availability of repair parts; and/or,
 - (3) Poor service or response from assembly's factory representative(s).
6. Backflow Prevention Assembly, Type
- a) Any effective assembly used to prevent backflow into a potable water system. The type of assembly used should be based on the degree of hazard, either existing or potential (as defined herein.) The types are: [\(REFER TO BACKFLOW PREVENTION ASSEMBLY SPECIFICATIONS SECTION AND DIAGRAMS\)](#)
 - (1) Double Check Valve Assembly;
 - (2) Double Check Detector Assembly (Fire System);
 - (3) Pressure Vacuum Breaker;
 - (4) Reduced Pressure Principle Assembly;
 - (5) Reduced Pressure Principle Detector Assembly (Fire System);
 - (6) Atmospheric (non pressure) vacuum breaker;
 - (7) **Hose bibb atmospheric vacuum breaker.**

7. Backflow Prevention Assembly Tester
 - a) A person who has proven his/her competency to the satisfaction of the Water Distribution Division. Each person who is certified to make competent tests, or to repair, overhaul, and make reports on a backflow prevention assembly shall be knowledgeable of applicable laws, rules, and regulations, and must hold a certificate of completion from an acceptable training program in the testing and repair of backflow prevention assemblies. All certified backflow prevention assembly testers must be re-certified every Two Years through an approved backflow prevention-testing program.
8. Back-Pressure Backflow
 - a) The reversal of flow caused by superior pressure in an owner's private water system over that of the public potable water supply.
9. Back-Siphonage Backflow
 - a) The flow of water or other liquids, mixtures, or substances into the distribution pipes of a potable water supply system from any source other than its intended source caused by the sudden reduction of pressure in the potable supply system.
10. Check Valve Approved
 - a) A check valve that is drip-tight in the normal direction of flow. The check valve shall permit no leakage in a direction reverse to the normal flow. The closure element (e.g. clapper, poppet, or other design) shall be internally loaded to promote rapid and positive closure. An approved check valve is only one component of an approved backflow prevention assembly; i.e. pressure vacuum breaker, double check valve assembly, or reduced pressure principle assembly.
11. Consumer/Customer
 - a) Any person, firm, or corporation using or receiving water from the City of Wilson Water Distribution System.
12. Consumer's Potable Water System
 - a) The portion of the privately owned potable water system lying between the point of delivery and point of use. This system will include all pipes, conduits, tanks, receptacles, fixtures, equipment, and appurtenances used to produce, convey, store, or use potable water.
13. Consumer's Water System
 - a) Includes any water system located on the consumer's premises. Whether supplied by public potable water or an auxiliary water supply. The system or systems may be either a potable water system or an industrial piping system.

14. Containment
 - a) Preventing the impairment of the potable water supply by installing an approved backflow prevention assembly at the service connection.
15. Contamination
 - a) Impairment of the quality of water, which creates an actual hazard to the public health through poisoning or through the spread of disease by sewage, industrial fluids, or waste.
16. Cross connection
 - a) 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 fluid, gas, or substance other than the intended potable water with which the system is supplied. By-pass 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.
17. Cross Connection Point
 - a) The specific point or location in a consumers potable water system where a cross connection exists.
18. Double Check Valve Assembly
 - a) An assembly composed of two (2) independently operating, approved check valves, with tightly closing shut-off valves attached at each end of the assembly and fitted with properly located test cocks. This assembly shall only be used to protect against a non-health hazard (i.e., pollutant).
19. Double Check Detector Assembly
 - a) A specially designed assembly composed of a line-size approved double check valve assembly with a specific bypass water meter and a meter-sized approved double check valve assembly. The meter shall register accurately for only very low rates of flow and shall show a registration for all rates of flow. This assembly shall only be used to protect against a non-health hazard (i.e. pollutant).
20. Enclosure
 - a) Any structure to prevent from freezing and have the ASSE 1060 stamp of approval.
21. Hazard, Degree of
 - a) From the evaluation of conditions within a system which can be classified as either "pollution" (non-health) or a "contamination" (health) hazard.
22. Hazard, Health

- a) 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 to such a degree that there would be a danger to health.
23. Hazard, Non-Health
- a) An actual or potential threat to the physical properties of the public or the consumer's potable water system or a contamination that would have a protracted effect on the quality of the potable water system. A non-health hazard is one that, if introduced into the public water supply system could be a nuisance to water customers, but would not adversely affect human health.
24. Hazard, Plumbing
- a) An internal or plumbing type cross connection on a consumer's potable water system that may be either a pollution or a contamination type hazard. This includes but is not limited to cross connections to toilets, sinks, lavatories, wash trays, domestic washing machines and lawn irrigation 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 an appropriate type of backflow prevention assembly.
25. Hazard, Pollution
- a) 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 a 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.
26. Hazard, System
- a) An actual or potential threat or severe danger to the physical properties of the public or the consumer's potable water system or of a pollution or contamination which could have a protracted effect on the quality of the potable water in the system.
27. Health Agency
- a) North Carolina Department of Environment and Natural Resources (NCDENR).
28. Industrial Fluids
- a) Any form or concentration of fluid, solutions, Gases or solids which may be chemically and/or biologically, contaminated or polluted, such as would constitute a health, system,

pollution or plumbing hazard if introduced into an approved water supply. Such fluids include, but are not limited to: process waters; chemicals in fluid form; acids and alkalis; oils, gases, greases, carbonated water, carbonated gases, gases; contaminated natural waters (i.e., wells. Streams. Rivers. Irrigation canals or systems).

29. Industrial Piping, System, Consumer's
 - a) Any system used by the consumer for transmission, confinement or storage of any fluid, solid or gaseous substance other than an approved water supply. Such a system would include all pipes, conduits, tanks, receptacles, fixtures, equipment, and appurtenances used to produce, convey or store substances, which are or may be polluted or contaminated.
30. Isolation
 - a) The act of confining a localized hazard within a plumbing or distribution system by installing approved backflow prevention assemblies.
31. Laboratory, Approved Testing:
 - a) Containment Assemblies
 - (1) The Foundation for Cross Connection Control and Hydraulic Research of the University of Southern California or another laboratory having the equivalent facilities for both the laboratory and field evaluation of the assemblies.
 - b) Isolation Devices/Assemblies
 - (1) The Foundation for Cross Connection Control and Hydraulic Research of the University of Southern California or another laboratory having the equivalent facilities for both the laboratory and field evaluation of the devices/assemblies approved by the American Water Works Association (AWWA) or the American Society of Sanitary Engineers (ASSE).
32. Notification or Notice
 - a) Written correspondence from either the City of Wilson or NCDENR requiring the installation of a backflow prevention assembly.
33. Point of Delivery
 - a) Generally at the property line of the customer, adjacent to the public street where the Water Distribution Division's mains are located, or at a point on the customer's property where the meter is located. The customer shall be responsible for all water piping and control devices located on the customer's side of the point of delivery.
34. Pollution

- a) Impairment of the quality of the water to a degree which does not create an actual hazard to the public health but which does adversely and unreasonably affect the aesthetic qualities of such waters for domestic use.
35. Potable Water
- a) Water from any source which has been investigated by NCDENR and which has been approved for human consumption.
36. Public potable water system
- a) 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 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 a use.
37. Reduced Pressure Principle Backflow Prevention Assembly
- a) An assembly consisting of a minimum of two (2) independently operating approved check valves, with a hydraulically operating, mechanically independent, pressure differential relief valve located between the check valves. The first check valve reduces the supply pressure a predetermined amount so that during normal flow and at cessation of normal flow, the pressure between the checks shall be less than the supply pressure. In case of leakage of either check valve, the pressure differential relief valve, by discharge to atmosphere, shall operate to maintain the pressure between the checks less than the supply pressure. The unit shall include tightly closing shut-off valves located at each end of the assembly and each assembly shall be fitted with properly located test cocks. The assembly is designed to protect against a health hazard (i.e. Contaminant).
38. Reduced Pressure Principle Detector Assembly
- a) A specially designed assembly composed of a line size approved reduced pressure principle backflow prevention assembly with a specific bypass water meter and a meter sized approved reduced pressure principle backflow prevention assembly. The meter shall register accurately for only very low rates of flow and shall show a registration for all rates of flow. This assembly shall be used to protect against health hazard (i.e. Contaminant).
39. Service Connection
- a) The terminal end of a service connection from the public potable water system i.e., where the Water Distribution

Division loses jurisdiction and sanitary control over the water at its point of delivery to the consumer's water.

40. Vacuum Breaker, Atmospheric Type (also know as the “non-pressure type vacuum breaker type”)
 - a) An assembly containing a float check, a check seat and an air inlet port. The flow of water into the body causes the float to close the air inlet port. When the flow of water stops the float falls and forms a check valve against back-siphonage and at the same time opens the air inlet port to allow air to enter and satisfy the vacuum. A shut-off valve immediately upstream shall be an integral part of the assembly. An atmospheric vacuum breaker is designed to protect against a non-health hazard (i.e. pollutant) under a back-siphonage condition only.
41. Vacuum Breaker, Pressure Type
 - a) An assembly containing all independently operating internally loaded check valves and an independently operating loaded air inlet valve located on the discharge side of the check valve. The assembly is to be equipped with properly located test cocks and tightly closing shut-off valves attached at each end of the assembly. This assembly is designed to protect against a health hazard (i.e., contaminant) under a back-siphonage condition only.
42. Water Purveyor
 - a) Owner or operator of a public potable water system, providing an approved water supply to the public.
43. Water Supply, Approved
 - a) Any public potable water supply which has been investigated and approved by NCDENR. This system must be operating under a valid health permit. In determining what constitutes an approved water supply, NCDENR Public Water Supply Section has reserved the final judgment as to its safety and potability.
44. Water Supply, Auxiliary
 - a) Any water supply on or available to the premises other than the purveyor's approved public potable water supply. These auxiliary waters may include water from another purveyor's public potable water supply, “used water”, industrial fluids or any natural source such as a well, spring, river, stream, etc. These waters may be polluted, contaminated or objectionable and constitute an unacceptable water source over which the water purveyor does not have sanitary control.
45. Water Supply, Unapproved
 - a) A water supply which has not been approved for human consumption by NCDENR Public Water Supply Section.

46. Used Water

- a) Any water supplied by a water purveyor from a public water system to a consumer's water system after it has passed through the point of delivery and is no longer under the control of the water purveyor. (Ord. No. O-003-94, § 1, 1-6-94)

V. SECTION 44-34. RIGHT OF ENTRY

- A. Authorized representative(s) from the Water Distribution Division shall have the right to enter, upon presentation of proper credentials and identification, any building, structure or premises during normal business hours to perform any duty imposed by this Article. Those duties shall include, but are not limited to, sampling and testing water, and/or inspections and observations of all piping systems connected to the public water supply.
- B. Where a user has security measures in force which would require proper identification and clearance before entry into their premises, the user shall make necessary arrangements with the security guards so that upon presentation of suitable identification, Water Distribution Division personnel will be permitted to enter, without delay, for the purposes of performing their specific responsibilities. Refusal to allow entry for these purposes may result in discontinuance of water service.
- C. Upon request, the consumer shall furnish to the Water Distribution Division any pertinent information regarding the water supply system on such property where cross connections and backflow are deemed possible. (Ord. No. O-003-94, § 1, 1-6-94)

VI. SECTION 44-35. ELIMINATION OF CROSS CONNECTIONS

A. DEGREE OF HAZARD

- 1. When cross connections are found to exist, the owner, his agent, occupant or tenant will be notified in writing to disconnect the same within the time limit established by the Water Distribution Division. Degree of protection required and maximum time allowed for compliance is based upon the potential degree of hazard to the public water supply system. The maximum time limits are as follows:
- 2. Cross connections with private wells or other unapproved auxiliary supplies of water: immediate disconnection of unapproved source.
- 3. All facilities which pose a health hazard to the potable water
- 4. System must have a containment assembly in the form of a reduce pressure principle backflow prevention assembly within sixty (60) days.
- 5. All industrial and commercial facilities not identified as a "health hazard" shall be considered non-health hazard facilities. All non-health hazard facilities must install, as a minimum containment assembly, a double check valve assembly within ninety (90) days.
- 6. If, in the judgment of the Water Distribution Division, an imminent health hazard exists, water service to the building or premises

where a cross connection exists shall be terminated unless an air gap is immediately provided, or the cross connection is immediately eliminated.

7. Water mains, served by the City of Wilson but not maintained by the Water Distribution Division, will be considered cross connections, with degree of hazard to be determined by the Water Distribution Division. Minimum protection by a double check valve assembly (DCVA) shall be required.
8. In the event that the Water Distribution Division Cross Connection Control Coordinator does not have sufficient access to every portion of a private water system (i.e. classified research and development facilities; federal government property) to allow a complete evaluation of the degree of hazard associated with such private water systems, an approved reduced pressure principle assembly shall be required as a minimum of protection.
9. In all such instances, the consumer shall provide the Cross Connection Control Coordinator a compliance report annually. The compliance report shall state with specificity the type of containment device installed, repair and maintenance reports, test, procedures, date and results, and all other information requested by the Cross Connection Coordinator.
10. No person shall fill special use tanks or tankers containing pesticides, fertilizers, other toxic chemicals or their residues from the public water system except at a location equipped with an air gap or an approved reduced pressure principle backflow prevention assembly properly installed on the public water supply. (Ord. No. O-003-94, § 1, 1-6-94)

B. DEGREE OF HAZARD ADD ONS

1. All backflow assemblies that are not installed to the specifications set forth in the installation specifications shall be brought up to code upon notification. Assemblies installed below ground with out the proper drain size shall be considered cross connections and brought up to date to present standards. (Drain sizes shall be two times the fire service supply or two times the service connection, Drain also shall drain by gravity to sunlight.)
2. All services outlined by this ordinance that do not have containment assemblies installed shall install assemblies by the time restrictions outlined.
3. **THERE ARE NO GRANDFATHER CLAUSES THAT EXIST FOR BACKFLOW ASSEMBLY INSTALLATION.**

VII. SECTION 44-36. INSTALLATION OF ASSEMBLIES

- A. All backflow prevention assemblies shall be installed in accordance with the specifications furnished by the Water Distribution Division and/or the manufacturer's installation instructions.

- B. All backflow prevention assemblies shall be installed according to the requirements outlined in the Backflow Assembly Installation Specification and the Backflow Ordinance Drawings.
- C. All new construction plans and specifications, when required by the North Carolina Building Code and NCDENR, shall be made available to the Water Distribution Division for review and approval, and to determine the degree of hazard.
- D. Ownership, testing, and maintenance of the assembly shall be the responsibility of the customer.
- E. **Revised Section 44-36 Installation of Assemblies-Part E.**
 - 1. All double check valve assemblies shall be installed above ground in freeze proof enclosures.
 - 2. Assemblies below ground installed prior to 1994, that do not have working gravity drains and drains that are not two times the supply size of the water service supplying assemblies, shall be raised and placed in a freeze proof enclosure.
 - 3. All assemblies with no gravity drains that do not drain to sunlight shall be considered potential cross connections and raised above ground and placed in a freeze proof enclosure.
 - 4. All assemblies below ground that fail the annual test and are considered in a nuisance installation and are considered probable cause of a potential cross connection shall be raised above ground and placed in a freeze proof enclosure.
 - 5. Assembly owners are responsible for the environment that assemblies are installed in. Assembly owners are responsible for supplemental heat when assemblies are endangered of freezing.
 - 6. Installation drawings shall be submitted to the Water Distribution Division, before prior installation for upgrades to be approved from the City Engineer and the Cross Connection Coordinator.
 - 7. Reduced pressure principle assemblies must be installed in a horizontal position and in a location in which no portion of the assembly can become submerged under any circumstances pit and/or below grade installations are prohibited no exceptions.
 - 8. No RPZ's shall be installed in the vertical position as a containment assemblies'.
 - 9. All existing commercial or high hazard commercial water services that are renewed shall have containment assemblies' installed at the service connection raised above ground in a freeze proof enclosure.
 - 10. All facilities that change the intended use of the water supply shall install containment assemblies.
 - 11. All existing facilities that change the name or are sold to new owners, are required to install a containment backflow assembly at the service connection on existing water services.
 - 12. Double Check valve assemblies may be installed in a vertical position with prior approval from the Water Distribution Division

Cross Connection Coordinator, provided the flow of water is in an upward direction. Or assembly has been approved by the Southern California's Foundation for Cross Connection Control and Hydraulic Research approval for this intended use.

13. The installation of a backflow prevention assembly which is not approved must be replaced with an approved backflow prevention assembly.
14. The installer is responsible to make sure a backflow prevention assembly is working properly upon installation by the means of an approved backflow assembly test (differential test method), and is required to furnish the following information to the Water Distribution Division within fifteen (15) days from the initial start up of water service supplying assembly. After a reduced pressure principle backflow preventer (RP), double check valve assembly (DCVA), or pressure vacuum breaker (PVB), double check detector assembly (DCDA), reduced pressure principle detector assembly (RPDA) is installed and supplied with water a test form is required to be turned into the Water Distribution Division Cross Connection Coordinator.
15. ALL TEST FORMS ARE REQUIRED TO HAVE
 - a) service address where assembly is located
 - b) installation location, installation date, description of assembly's location
 - c) owner (and address, if different from service address)
 - d) date of test
 - e) tester name, tester registered test number, plumbing company represented, plumbers license number, and project permit number
 - f) type of assembly, size of assembly
 - g) manufacturer, model number. serial number of assembly
 - h) test results/report
16. When it is not possible to interrupt a water service, provisions shall be made for a parallel installation (two approved assemblies) or a second water supply with the proper containment backflow prevention assemblies. The Water Distribution Division will not accept an unprotected bypass around a backflow assembly when the assembly is in need of testing, repair, or replacement.
17. The consumer shall, upon notification, install the appropriate containment assembly not to exceed the following time frame:
 - a) Health Hazard 60 days
 - b) Non-health Hazard 90 days
18. Following installation, all RP, DCVA, PVB, DCDA, AND RPDA are required to be tested by a certified backflow prevention assembly tester within ten (10) days of initial start up.
19. Backflow installation specifications prohibit all above ground assemblies from being installed within the setback of private

property and inside buildings, set backs of more than fifty five feet will be dealt with on a case-by-case basis for irrigation services. And existing Fire Services that place raising assembly in danger of an interrupted fire protection due to a traffic hazard will be dealt with on a case-by case basis. (Ord. No. O-003-94 § 1, 1-6-94)

VIII. SECTION 44-37. TESTING AND REPAIR OF ASSEMBLIES

- A. Testing of backflow prevention assemblies shall be made by a registered backflow prevention assembly tester at the customer's expense. Such tests are to be conducted upon installation and at regular intervals. Residential irrigation assemblies are required to be tested once every two years. All other assemblies are required to be tested annually. Test due dates start from the sending date of test due letter. A record of all testing and repairs is to be retained by the customer. Copies of the records must be provided to the City of Wilson Water Distribution Division Cross Connection Coordinator **WITHIN TEN DAYS** after the completion of any testing and/or repair work.
- B. Assembly owners are normally given thirty days between first test due letter and second test due letter. Owners are normally given twenty days between second test due letter and shut – off service letter. Assembly owners are given five days to turn in a test report after the sending date of shut-off notice because of failed response for test due annual reports. Upon the sending of the shut off notice expiration date water service shall be stopped with no prior notice.
- C. Any time repairs to backflow prevention assemblies are deemed necessary, whether through annual required testing or routine inspection by the owner or by the Water Distribution Division, these repairs must be completed within a specified time in accordance with the degree of hazard. In no case shall this time period exceed 21 days:
 - 1. Health Hazard Facilities 14 days
 - 2. Non-Health Hazard Facilities 21 days
- D. All backflow prevention assemblies with test cocks are required to be tested with a minimum frequency of once per year as determined by the Water Distribution Division Cross Connection Coordinator. Testing requires a water shutdown usually lasting Thirty (30) min. to one (1) Hour. For facilities that require an uninterrupted supply of water, and when it is not possible to provide water service from two (2) separate meters, provisions shall be made for a parallel installation of backflow prevention assemblies.
- E. All certified backflow prevention assembly testers must obtain and employ backflow prevention assembly test equipment that meets the University of Southern California's Foundation for Cross Connection Control and Hydraulic Research approval. All test equipment shall be registered with the Water Distribution Division. All test equipment shall be checked for accuracy annually at a minimum), calibrated, and certified to the Water Distribution Division as to such accuracy/calibration employing a calibration method acceptable to the Water Distribution Division.

- F. It shall be unlawful for any customer or Registered tester to submit any record to the Water Distribution Division is knowingly false or incomplete in any material respect. It shall be unlawful for any customer or Registered tester to knowingly fail to submit to the Water Distribution Division any record that is required by this Ordinance. Such violations shall result in enforcement actions outlined in Section 44-41 of this Ordinance.

IX. SECTION 44-38. FACILITIES REQUIRING PROTECTION

- A. Approved backflow prevention assemblies shall be installed on the service connection to any premises that the Water Distribution Division has identified as having a potential for backflow.
- B. The following types of facilities or services have been identified by the Water Distribution Division as having a potential for backflow of non-potable water into the public water supply system. Therefore, an approved backflow prevention assembly shall be required on all such services according to the degree of hazard present. Other types of facilities or services not listed below may also be required to install approved backflow prevention assemblies if determined necessary in the sole discretion of the Cross Connection Control Coordinator.
- C. As a minimum requirement, all commercial services will be required to install a DC Check Valve Assembly, unless otherwise listed below. (UNIVERSAL PLUMBING CODE DOES NOT RECOGNIZE DCVA AFTER JULY 7, 2002).
 - 1. Aircraft and Missile Plants: RP
 - 2. Automotive Service Stations, Dealerships, etc.
 - a) No Health Hazard: DCVA
 - b) Health Hazard: RP
 - 3. Automotive Plants: RP
 - 4. Auxiliary Water Systems:
 - a) Approved Public/Private Water Supply: **RPZ BACKFLOW ASSEMBLY**
 - b) Unapproved Public/Private Water Supply: AG
 - c) Used Water and Industrial fluids: RP
 - d) Potable water services Residential and Commercial that have access to the re-use water supply: RP on the potable water service no exceptions. Homes that have re-use water shall install RP on the domestic service at the domestic meter. Commercial facilities that have re-use water shall install an RP on the domestic water service.
 - e) No fire service should inter connect the re-use water system and the domestic water system. Domestic supplied fire systems and re-use fire systems located on the same property shall provide an RP on the Potable Domestic Fire Service.
 - 5. Bakeries
 - a) No Health Hazard: RP
 - b) Health Hazard: RP

6. Beauty Shops/Barber Shops
 - a) No Health Hazard: RP
 - b) Health Hazard: RP
7. Beverage Bottling Plants: RP
8. Breweries: RP
9. All Buildings, Hotels, Apartment Houses, Public and Private Buildings, or other(s) structures having cross connections.
 - a) (Under five stories) No Health Hazard: RPZ
 - b) (Five stories and Over Five Stories) (Basement counts as first floor by this ordinance) Health Hazard: RP
 - c) (Over five stories) All: RP
10. Canneries, packing houses, and rendering plants: RP
11. Chemical plants - Manufacturing, processing, compounding or treatment: RP
12. Chemically contaminated water systems: RP
13. Commercial car-wash facilities: RP
 - a) Mobile car-wash Hydrant Meter with RPZ backflow assembly
14. Commercial greenhouses: RP
15. Commercial sales establishments, department stores, malls, etc.)
 - a) No Health Hazard: RP
 - b) Health Hazard: RP
16. Concrete/asphalt plants: RP
17. Dairies and cold storage plants: RP
18. Dye works: RP
19. Film laboratories: RP
20. Fire systems:
 - a) $\frac{3}{4}$ " (inch) to 2" (inch)
 - (1) No Health Hazard: DCDA
 - (2) Health Hazard: Booster Pumps, Foam, Antifreeze Solution, etc.) RPDA
 - b) 2 $\frac{1}{2}$ " to 10" or larger
 - (1) No Health Hazard: DCDA
 - (2) Health Hazard: Booster Pumps, Foam, Antifreeze Solution, Fire Department Connection (FDC), or Siamese connection, etc. RPDA
21. Hospitals, medical buildings, sanitariums, morgues, mortuaries, autopsy facilities, nursing and convalescent homes, medical clinics, funeral facilities and veterinary hospitals: RP
22. Laundries
 - a) No Health Hazard; RPZ
 - b) Health Hazard: (i.e., Dry Cleaners) RP
23. Lawn irrigation systems split taps or dedicated irrigation services
 - a) No Health Hazard: RPZ
 - b) Health Hazard: (Booster Pumps, Chemical Systems) RP
24. Metal manufacturing, cleaning, processing, and fabricating plants: RP

- 25. Mobile home parks:
 - a) No Health Hazard: RPZ
 - b) Health Hazard: RP
- 26. Oil and gas production, storage or transmission properties: RP
- 27. Paper and paper products plants: RP
- 28. Pest control exterminating and fumigating: RP or an Approved Air Gap (open to atmosphere)
- 29. Pressure Wash trailers: RP or an Approved Air gap (open to atmosphere)
- 30. Plating plants: RP
- 31. Printing Facility: RP
- 32. Power plants: RP
 - a) Radioactive materials or substances plants or facilities handling: RP
- 33. Restaurants:
 - a) No Health Hazard: RPZ
 - b) Health Hazard: RP
- 34. Restricted, classified, or other closed facilities: RP
- 35. Rubber plants natural or synthetic): RP
- 36. Sand and gravel plants: RP
- 37. Schools and colleges: RP
- 38. Sewage and storm drain facilities: RP
- 39. Swimming Pools:
 - a) No Health Hazard (i.e., air gap): RP
 - b) Health Hazard (i.e., direct connection): RP
 - c) Water Hose filled pools approved hose bib vacuum breaker
- 40. Waterfront facilities and industries: RP

- DCVA=Double Check Valve Assembly
- RP=Reduced Pressure Principle Assembly
- DCDA=Double Check Detector Assembly
- RPDA=Reduced Pressure Detector Assembly
- AG=Air Gap
- PVB=Pressure Vacuum Breaker

D. All assemblies and installations shall be subject to inspection and approval by the Water Distribution Division pursuant to the terms of this ordinance.

X. SECTION 44-39. CONNECTIONS WITH UNAPPROVED SOURCES OF SUPPLY

- A. No person, firm or corporation shall connect or cause to be connected any auxiliary supply of water to the water system supplied by the City of Wilson.
- B. In the event of contamination of a potable water system. The consumer shall notify the Water Distribution Division immediately in order that appropriate measures may be taken to overcome and eliminate contamination.

XI. SECTION 44-40. FIRE PROTECTION SYSTEMS

- A. All connections for fire systems connected with the public water system, two inches and smaller, shall be protected with an approved double check valve assembly as a minimum requirement. All fire systems using toxic additives or booster pumps shall be protected by an approved reduced pressure principle assembly at the main service connection.
- B. All connections for fire Systems connected with the public water system three inches and larger shall be protected with an approved double check detector assembly as a minimum requirement. All fire systems using toxic additives or booster pumps shall be protected by an approved reduced pressure principle detector assembly at the main service connection.
- C. All existing backflow prevention assemblies installed on fire sprinkler systems that do not meet Water Distribution Division specifications, or receive approval from the Cross Connection Control Coordinator, will not satisfy the requirements as set forth in this Ordinance. The consumer shall be required to install an approved double check detector assembly or reduced pressure principle detector assembly as required by this provision.
- D. **No taps, Fire Department No "upstream" branches, taps or hydrants**
 - 1. No taps, Fire Department connection points, private hydrants, or piping branches are permitted between the backflow prevention assembly and the meter. All of these must be either eliminated or re-piped to be supplied from the downstream side of the backflow assembly. For an irrigation system which is not separately metered, the City of Wilson will allow an upstream tap, provided that the owner agrees to comply with all the backflow ordinances for irrigation system requirements on the irrigation part of the private water service.
- E. **Dedicated Fire Hydrants**
 - 1. Dedicated fire hydrants on fire service lines shall only be used by the Fire Departments in the event of a fire.
 - 2. Dedicated fire hydrants shall be the property of the City of Wilson Water Distribution Division after the approved installation date.
 - 3. Dedicated fire hydrants shall only be used by the City of Wilson Fire Department.
 - 4. Dedicated fire hydrants shall supply fire mains with fire protection flows applied by the City of Wilson Fire Department that are foam and chemically free. (No fire retardant chemicals shall be added to the water used in the pumper truck to retard the fire in the Fire System that are supplied by a dedicated hydrant installed before the backflow assembly.)
 - 5. Dedicated fire hydrants are to be installed on dedicated fire service lines only. And are installed between the backflow assembly on the fire service main and the service connection on the water main.
 - a) All dedicated hydrants are to be installed in the City of Wilson right of way at a location not to exceed 75ft. from the Fire Department connection located on the freeze proof

enclosure. No set backs shall be permitted for this installation. The Fire Department connection shall be located after the number two shut off valve on the backflow assembly and shall be placed between eighteen inches and three feet from finished grade, extending to the outside wall of the enclosure. In between the FDC and the number two shut off on the backflow assembly is located a slam proof single check.

- b) Backflow installation specifications restrictions prohibit all above-ground BPA's from being installed within the setback and sideyard areas. Setbacks of 50' or more will be dealt with on a case-by-case basis.

F. Freeze Protection Requirements/Recommendations:

1. Be aware that the City of Wilson Deputy Fire Marshall has requirements which bear upon Fire Line BPA installations. Requirements that City of Wilson Cross Connection/Water Distribution Division are aware of are included below. For clarification, the appropriate Fire Department officials should be contacted.
2. Heat for Above-ground BPA's:
 - a) Heat is only required for BPA's supplying fire protection systems. However, the City of Wilson Water Distribution Division recommends that **all above ground** Backflow Assemblies be heated. Small Backflow Prevention Assemblies (3/4" to 4") are especially subject to freeze damage.
3. Heat, OS&Y Gate Valves, and Strainer Requirements/Restrictions:
 - a) Provide Heat:
 - (1) Fire Department requires that any enclosure which is not fully below-ground and which houses a BPA that supplies any type of fire protection system (even just FH's), must maintain a minimum temperature of 40 degrees Fahrenheit. All installations of assemblies that do not meet this criterion shall be brought above ground and placed in a heated enclosure.
 - b) OS&Y Gate Valves:
 - (1) OS&Y type gate valves are required on all BPA's supplying a fire protection system.
 - (2) OS&Y type gate valves are not necessary on domestic-only system BPA's - they require a much taller (more expensive) enclosure!
 - c) No Strainers:
 - (1) Although strainers reduce maintenance needs on RP's, the Fire Department does not allow strainers on BPA's supplying a fire protection system.

- (2) Properties with only FH's for protection (i.e. not a sprinkler system)
- d) Repipe "upstream" private FH's:
 - (1) If currently supplied from the upstream side of the proposed BPA location, The City of Wilson requires that the supply point for private hydrants be relocated to a point on the downstream side of the Backflow Prevention Assembly.
 - (2) Note: extra measures will be necessary when a fire sprinkler system is involved.
 - (3) No taps, Fire Department connection points, private hydrants, or piping branches are permitted between the Backflow Prevention Assembly and the service connection.
- 4. Chains and Locks:
 - a) Secure OS&Y gate valves in the "open" position with chains and locks.
 - b) Properties with a fire sprinkler system for protection
- 5. Tamper Switches:
 - a) The BPA's OS&Y gate valves must be outfitted with supervisory tamper switches whenever a fire sprinkler system is supplied water through the BPA. Tamper switches must be connected to an alarm system per Fire Department specs.
 - b) Plans must show routing of cable for supervisory tamper switches & connection to alarm panel!
 - c) Fire Department requires that hydraulic calculations be submitted to them prior to BPA installation on a system that supplies water to a fire sprinkler system - installation should not proceed without their approval.
 - d) Be aware that some of your "domestic" service lines may branch off internally to supply a fire sprinkler system, making Fire Department requirements applicable to the City of Wilson BPA!
- 6. Repipe "upstream" private FH's:
 - a) Just as in non-sprinkler systems, if private hydrants are currently supplied from the upstream side of the proposed BPA location, The City of Wilson requires that the supply point be relocated to a point on the downstream side of the BPA.
 - b) Note: if a hydrant functions as the "source" hydrant for the Fire Department to boost the sprinkler system's pressure, installation of an additional check valve per Fire Department specs will be necessary -before proceeding, contact the appropriate Fire Department officials for their instructions and approval.

XII. SECTION 44-41. ENFORCEMENT

- A. The owner, manager, supervisor, or person in charge of any installation found not to be in compliance with the provisions of this Ordinance shall be notified in writing of the non-compliance and given specific corrective action(s) necessary to bring the installation into compliance, the time allowed for compliance shall be in accordance with Section 44-36 and Section 44-35.
- B. The owner, manager, supervisor, or person in charge of any installation which remains in non-compliance after the time prescribed in the initial notification, as outlined in Section 44-36 and or Section 44-35 shall be considered in violation of this ordinance, and may be issued a civil citation by the Water Distribution Division. Said citation shall specify the nature of the violation and the provision(s) of this Ordinance violated, and further notify the offender that the civil penalty for said violation is as set forth in Paragraph C. below and is to be paid to the City of Wilson at the municipal building within thirty (30) days. If the penalty prescribed herein is not paid within the time allowed, the City of Wilson may initiate a civil action in the nature of a debt and recover the sums set forth in Paragraph C. below plus the cost of the action.
- C. The owner, manager, supervisor, or person in charge of any installation found to be in non-compliance beyond the time limit provided for in the aforementioned notification shall be subject to a civil penalty of up to \$1,000.00 per violation, Each day in which a violation of any provision of this Ordinance shall occur or continue shall constitute a separate and distinct offense.
- D. If, in the judgment of the Cross Connection Coordinator, it appears that any owner, manager, supervisor, or person in charge of any installation found to be in non-compliance with the provisions of this Ordinance, willfully neglects their responsibility to correct any violation, it shall result in discontinuance of water service until compliance is achieved.
- E. Failure of a customer or certified tester to submit any record required by this Ordinance, or the willful submission of falsified reports/records may result in a civil penalty of up to \$1,000.00 per violation, If a certified backflow prevention assembly tester knowingly submits falsified records to the Water Distribution Division, the Water Distribution Division shall take the necessary actions to revoke certification to test backflow prevention assemblies within the potable water system for a time period not to exceed one year. The tester will then be required to complete an approved registered tester course to acquire a new registered tester number. Falsification made to record and/or reports after becoming re-registered shall result in the permanent revocation of backflow testing certification, in addition to a civil penalty as stated herein Paragraph C.
- F. Enforcement of this program shall be administered by the Manager of the Water Distribution Division or authorized representative, being the Cross Connection Coordinator.

- G. Requests for extension of time shall be made in writing to the Cross Connection Control Coordinator. All other appeals shall be made in writing to the Backflow Prevention Advisory Board through the Water Distribution Division. Recommendations from the Backflow Prevention Advisory Board will be taken into consideration by the Water Distribution Division during the review of any appeal, (Ord. No. O-003-94 § 1, 1-6-94)

XIII. SECTION 44-42

- A. It is the intention of the City Council, and is hereby ordained that the provisions of this Ordinance shall become and be made a part of the Code of Ordinances, City of Wilson, North Carolina, and the sections of this Ordinance may be re-numbered to accomplish such intention.
- B. Severability. That if any section, sentence, clause, or phrase of this Ordinance is for any reason held to be invalid or unconstitutional by the decision of any court of competent jurisdiction, such decision shall not affect the validity of the remaining portions of this Ordinance.
- C. Effective Date. That this Ordinance shall become effective immediately upon its adoption.

DULY ADOPTED this 6th day of JUNE, 2002.


ATTEST:

Ana I. Heder, City Clerk

ATTEST:



Ana I. Heder, City Clerk



C. Bruce Rose, Mayor



CITY OF WILSON

**BACKFLOW PREVENTION ASSEMBLY
SPECIFICATIONS**

BACKFLOW PREVENTION ASSEMBLY SPECIFICATIONS

I. GENERAL REQUIREMENTS

- A. All backflow prevention assemblies must be manufactured in the USA and must be on the approved list of backflow prevention assemblies' compiled by USC-FCCC & HR, and ASSE. All assemblies shall be subject to inspection by the Cross Connection Control Coordinator and his acceptance or rejection will be final.
- B. Assemblies must be purchased as a unit that shall include the backflow prevention device, shut-off valves, unions, flanged adapters, and test cocks. All assemblies must conform to AWWA C506 (withdrawn from AWWA Standards 9.90). A detector check assembly is required for all fireline applications and meet all the following requirements USC-FCCC & HR, ASSE, and UL/FM. Questions concerning Backflow/Cross-Connection Program, call the Cross Connection Coordinator
- C. **For revision to General Requirements, call the Cross Connection Coordinator.**

II. MAIN BODY OF BACKFLOW PREVENTION DEVICE

- A. $\frac{3}{4}$ " - 2" devices must have bronze or stainless steel bodies and bonnets.
- B. 2 $\frac{1}{2}$ " - 10" devices must have bronze, stainless steel, or epoxy coated ductile iron bodies and bonnets.
- C. Epoxy coating shall be applied to all interior and exterior iron surfaces. This coating shall be a minimum of 5 to 10 mils minimum of fusion bonded epoxy or liquid epoxy. Epoxy coatings shall conform to ANSI/AWWA C550. Coatings shall confirm to the City of Wilson Water Resources Valve Specs.

III. INTERIOR PARTS OF BACKFLOW PREVENTION DEVICE

- A. All parts must be replaceable without having to remove the device from the line.
- B. All metal parts shall be bronze or stainless steel. Shut-Off Valves
- C. All assemblies shall be equipped with inlet and outlet shut-off valves.
- D. $\frac{3}{4}$ " - 2" shut-off valves shall be full port, line size, lever type, $\frac{1}{4}$ turn, bronze ball valves.
- E. 2 $\frac{1}{2}$ " - 10" shall have flanged, hand-wheel operated, resilient wedged gate valves that Open Left, Close Right. Detector check assemblies for fireline applications, shall have flanged, OS & Y operated gate valves on the main line and ball valves (as described above) on the bypass line.
- F. Note: All large body assemblies (2 $\frac{1}{2}$ " - 10") shall be fusion bonded epoxy coated ductile iron or be stainless steel. All shut off valves on large assemblies shall be fusion bonded epoxy coated and have a resilient wedge "gate". All shut off valves on small assemblies ($\frac{1}{4}$ " - 2") shall be a resilient seat **full port** quarter turn ball valve with a blow-out proof stem with a pressure rating of 400psi W.O.G. Fire line assemblies shall have OS&Y shut of valves.

IV. TEST COCKS

- A. All assemblies shall be equipped with four test cocks located as required by USC - FCCC.
 - B. All test cocks shall be lever type bronze ball valves or bronze ball valves with raised slatted operating stems.
 - C. All test cocks shall be of a resilient seated design.
 - D. The # 1 Test Cock shall be a required part of the assembly upstream of the # 1 shut off valve of an approved assembly.
- V. MISCELLANEOUS REQUIREMENTS
- A. If special tools or devices are required to repair or maintain an assembly they shall be supplied to the customer by the manufacturer at no extra cost.
 - B. An assembly will be removed from the City of Wilson approved list if it no longer meets City of Wilson specifications or fails to operate satisfactorily in the field.
 - C. City of Wilson shall be notified in writing of any changes to the design, components, materials or operation of an assembly. City of Wilson will also be notified of any failures, defects or defective material. Failure to do so will result in removal of the assembly from the City of Wilson approved list.
 - D. Any backflow prevention assembly not on the approved list may be submitted for review and approval by the City of Wilson. If an assembly was previously rejected, it shall not be submitted or resubmitted unless the design has been revised to meet City of Wilson specifications. Shop drawings and specifications of all materials must be furnished. City of Wilson Water Distribution Division.
- VI. REVISED LIST OF APPROVED ASSEMBLIES TO USE IN THE CITY OF WILSON CONTAINMENT AND ISOLATION
- A. Double Check Valve Assemblies
 - B. Reduced Pressure Principle Assemblies
 - C. Low Hazard
 - 1. Fire Sprinkler Systems Backflow Preventers
 - D. High Hazard
 - 1. Fire Sprinkler Systems Backflow Assemblies
 - E. Approved Double Check Valve Assemblies & Double Detector Check Valve Assemblies for Vertical Installation

APPROVED LIST OF BACKFLOW PREVENTION DEVICES

DOUBLE CHECK VALVE ASSEMBLIES: 3/4" – 2"

MANUFACTURER	SIZE	MODEL NUMBER
Conbraco	3/4"	40-100
	1"	40-100
	1 1/2"	40-100
	2"	40-100
Febco	3/4"	805Y
	1"	805Y
	1 1/2"	805Y
	2"	805Y
Watts	3/4"	007
	1"	007
	1 1/2"	007
	2"	007
Wilkins	3/4"	550, 950
	1"	550, 950
	1 1/2"	550, 950
	2"	550, 950

APPROVED LIST OF BACKFLOW PREVENTION DEVICES

DOUBLE CHECK VALVE ASSEMBLIES: 2 1/2" – 10"

MANUFACTURER	SIZE	MODEL NUMBER
Ames	2 1/2"	2000 SS
	3"	2000 SS
	4"	2000 SS
	6"	2000 SS
	10"	2000 SS
Conbraco	2 1/2"	40-100
	3"	40-100
	4"	40-100
	6"	40-100
	8"	40-100
	10"	40-100
Febco	2 1/2"	805 YD
	3"	805 YD
	4"	805 YD
	6"	805 YD
	8"	805 YD
	10"	805 YD
Watts	2 1/2"	709, 770
	3"	709, 770
	4"	709, 770
	6"	709, 770
	8"	709, 770
	10"	709, 770
Wilkins	2 1/2"	550, 950
	3"	550, 950
	4"	550, 950
	6"	550, 950
	8"	550, 950
	10"	550, 950

APPROVED LIST OF BACKFLOW PREVENTION DEVICES

REDUCED PRESSURE PRINCIPLE ASSEMBLIES: 3/4" - 2"

MANUFACTURER	SIZE	MODEL NUMBER
Conbraco	3/4"	40-200
	1"	40-200
	1 1/2"	40-200
	2"	40-200
Febco	3/4"	825 Y
	1"	825 Y
	1 1/2"	825 Y
	2"	825 Y
Watts	3/4"	909, 009
	1"	909, 009
	1 1/2"	909, 009
	2"	909, 009
Wilkins	3/4"	575, 975
	1"	575, 975
	1 1/2"	575, 975
	2"	575, 975

APPROVED LIST OF BACKFLOW PREVENTION DEVICES

REDUCED PRESSURE PRINCIPLE ASSEMBLIES: 2 1/2" -10"

MANUFACTURER	SIZE	MODEL NUMBER
Ames	4"	4000 RP
	6"	4000 RP
	8"	4000 RP
	10"	4000 RP
Conbraco	2 1/2"	40-200
	3"	40-200
	4"	40-200
	6"	40-200
	8"	40-200
Watts	2 1/2"	909, 009
	3"	909, 009
	4"	909, 009
	6"	909, 009
	8"	909, 009
	10"	909, 009
Wilkins	2 1/2"	575, 975
	3"	575, 975
	4"	575, 975
	6"	575, 975
	8"	575, 975
	10"	575, 975

APPROVED DEVICES FOR FIRELINE INSTALLATIONS

MANUFACTURER	SIZE	DOUBLE CHECK DETECTOR ASSEMBLIES	REDUCED PRESSURE DETECTOR ASSEMBLY
Ames	4"	3000 DCDA	4000 RP
	6"	3000 DCDA	4000 RP
	8"	3000 DCDA	4000 RP
	10"	3000 DCDA	4000 RP
Conbraco	3"	40-600	40-700
	4"	40-600	40-700
	6"	40-600	
	8"	40-600	
	10"	40-600	
Febco	3"	806 Y	825 YD
	4"	806 Y	825 YD
	6"	806 Y	825 YD
	8"	806 Y	825 YD
	10"	806 Y	825 YD
Watts	3"	709 DCDA	909 RFDA
	4"	709 DCDA	909 RFDA
	6"	709 DCDA	909 RFDA
	8"	709 DCDA	909 RFDA
	10"	709 DCDA	909 RFDA
Wilkins	3"	550 DCDA	
	4"	550 DCDA	
	6"	550 DCDA	

REVISED LIST OF APPROVED ASSEMBLIES TO USE IN
THE CITY OF WILSON
CONTAINMENT AND ISOLATION

TYPE OF PROTECTION	DEVICE/ASSEMBLY – MFG	BFP SIZE
<p>RESIDENTIAL:</p> <p>Dual Check Valves/ Resetters & Meter with Dual Check</p>	<p>Febco 810 Wilkins #700 & #705 Wilkins 950LKM & 950LF</p> <p>Watts #7 Conbraco 40-300 & 4P-300 Ford angle check Ford HHC</p> <p>Resetters & Retrosetters A.Y. McDonald 4135 (11-3) A.Y. McDonald 4135 (12-3) 10 MSR A.Y. McDonald Ford Style C Watts WES2-7</p> <p>Schlumberger Dual Check + T-10 Meter</p>	<p style="text-align: center;">$\frac{3}{4}$" – 1"</p>
<p>NON-RESIDENTIAL:</p> <p>Continuous Pressure Backflow Preventer Low Hazard</p> <p>Carbonated Beverage Machine & Ice Machine Low to High Hazard</p> <p>Laboratory Faucet Vacuum Breaker All High Hazard</p> <p>Low to High Hazard Faucets & Vacuum Breakers (Residential & Commercial)</p> <p>Atmospheric Vacuum Breaker</p>	<p>Conbraco 40-400 Watts 9DM2 & M3 Febco 815 Wilkins 740</p> <p>Watts SD-2-MF & Watts SD-3-MF</p> <p>Conbraco 4C-101-1 & Conbraco 4C-102-1</p> <p>Conbraco 38-500 Watts NLF9 Watts N9</p> <p>Watts 8, S8C, 8A, 8P, HF8 Watts Frost Proof Faucets Wilkins BFP-8 & BFP-8F All Woodford Models w/BFP</p> <p>Ames A100 Conbraco 38-100 Conbraco 98-200 Febco 710A/715A</p>	<p>1/2" and 3/4"</p> <p>1/4" and 3/8"</p> <p>1/4" and 3/8"</p> <p>1/4" and 3/4" 3/8" Only 1/4" and 3/4"</p> <p>3/4" Hose 3/4" Hose 3/4" Hose</p> <p>3/4" – 2" 1/4" – 2" 1/4" – 3/4" 1/2" – 2"</p>

Low Hazard to High Hazard	Watts 288AM3 & M5 Wilkins 35 Series	3/4" – 2" 1/4" – 2"
Pressure Vacuum Breaker	Ames A200 Conbraco 40-503-508 Febco 765 Flomatic PVB Watts 800M4QT Wilkins 720a & 420	1/2" – 2" 3/4" – 1" 1/2" – 2"
Low to High Hazard		
Spill Resistant Vacuum Breaker	Conbraco 4W-500 Watts 008PCQT	1/4" – 1/2" 1/2" and 1"
Hose Bibb Vacuum Breaker	Conbraco 38-304, 404 & 38P & 38-304-02	3/4" Hose

DOUBLE CHECK VALVE ASSEMBLIES

TYPE OF PROTECTION	DEVICE/ASSEMBLY – MFG	BFP SIZE
Nonresidential & Domestic Double Check Valve Assemblies	Ames 2000B & M3 (3/4" Only) Ames 2000SS Ames 2000SE Ames 2000CIV Ames 2000SSM	1/2" – 2" 2 1/2" – 8" 2 1/2" and 6–8" 4" – 10" 4" and 6"
Low Hazard	(N&Z Configurations) Cla-Val DC & VW & VY	2 1/2" – 10"
	Conbraco 40-103-109(02) Standard & Top Entry This includes T2 & TC2 Conbraco 40-100-10G(02-06) Conbraco 1/2 DC & 2 1/2-6 DCU	1/2" – 2 1/2" 3" – 10" 1/2" and 2 1/2"–6"
(N&Z Configurations)	Febco 805Y Febco 805YD Febco 850U Febco 850 Febco 870 Febco 870V	3/4" – 2" 2 1/2" – 10" 1/2" – 2" 1/2" – 8" 2 1/2" – 10" 2 1/2" – 10"
	Flomatic DCV Flomatic DCVE	3/4" – 4" 3/4" – 2"
All variations including U models	Watts 007 Watts 007M3QT Watts 709 Watts 774 Watts 775QT	2 1/2" – 3" 3/4" – 2" 2 1/2" – 10" 2 1/2" – 10" 1/2" – 1 1/2"
	Wilkins 350 & 350G Wilkins 450 Wilkins 950 Wilkins 950XL Wilkins 950XLT Wilkins 950XLU	4" and 6" 4" and 6" 3/4" – 10" 3/4" – 1" 3/4" – 2" 3/4" – 2"

REDUCED PRESSURE PRINCIPLE ASSEMBLIES

TYPE OF PROTECTION	DEVICE/ASSEMBLY – MFG	BFP SIZE
Reduced Pressure Principle Zone Assembly	Ames 4000B Ames 4000CIV Ames 4000SS	1/2" – 2" 2 1/2" – 10" 2 1/2" – 6"
High Hazard (RP)	(N&Z Configurations) Cla-Val RP & VW & VY Conbraco 40-200-02, 03 & 05 Conbraco 40-201-208 (including 99T Models) Conbraco 40-204 A2U-40-208 A2U Conbraco 40-209-20G (02, 03)	2 1/2" – 10" 3" 1/4" – 2" 3/4" – 2" 2 1/2" – 10"
(N&Z Configurations)	Febco 825 Y & YA Febco 825 YD Febco 860 Febco 860U Febco 880 Febco 880V Flomatic RPZ Flomatic RPZ II Watts 009M3QT (including U Models) Watts 009 Watts 909M1QT Watts 909M1 Watts 994 Watts 995 Wilkins 375 & 375G Wilkins 475 V & G Wilkins 975 Wilkins 975XL (All variations)	3/4" – 2" 2 1/2" – 10" 1/2" – 9" 1/2" – 2" 2 1/2" – 10" 2 1/2" – 10" 3/4" – 4" 1/2" – 3/4" 1/4" – 2" 2 1/2" – 3" 3/4" – 2" 2 1/2" – 10" 2 1/2" – 6" 1/2" – 1" 2 1/2" – 6" 4" and 6" 3/4" – 10" 1/4" – 2"

**LOW HAZARD
FIRE SPRINKLER SYSTEMS BACKFLOW PREVENTERS**

TYPE OF PROTECTION	DEVICE/ASSEMBLY – MFG	BFP SIZE
Fire Lines (Sprinkler Systems) Double Check Valve Assembly (DCVA & Low Hazard)	Ames 2000B *	1/2" – 2"
	Ames 3000SS	2 1/2" – 10"
	Ames 3000SE	2 1/2" and 6-8"
	Ames 3000B	2"
Double Detector Check Valve Assembly (DDCVA)	Ames 3000CIV	4" – 10"
	Cla-Val DD & VY (N&Z Configurations)	2 1/2"–6" and 10"
	Conbraco 40-107-108 *	1 1/2" – 2"
(N&Z Configurations)	Conbraco 40-600-60G(03)	3" – 10"
	Conbraco 2 1/2 – 6 DDA	2 1/2" 6"
	Febco 805Y *	1 1/2" – 2"
	Febco 806YD	3" – 10"
	Febco 850 *	1/2" – 2"
	Febco 856	2 1/2" – 8"
	Febco 876	2 1/2" – 10"
	Febco 876V	2 1/2" – 10"
	Watts 007M3QT *	1 1/2" and 2"
	Watts 007DCDA	2" – 3"
	Watts 709DCDA	3" – 10"
	Watts 774DCDA	2 1/2" – 8"
	Wilkins 350DA & 350DAG	4" – 6"
	Wilkins 450DA & 450DAG	4" – 6"
	Wilkins 950XL *	1 1/2", 2"
	Wilkins 950DA	2 1/2" – 10"

* Note: For 13R and 13D Systems ONLY

**HIGH HAZARD
FIRE SPRINKLER SYSTEMS BACKFLOW ASSEMBLIES**

TYPE OF PROTECTION	DEVICE/ASSEMBLY – MFG	BFP SIZE
Fire Lines (Sprinkler Systems)	Ames 4000B **	1 1/2" – 2"
High Hazard	Ames 5000CIV	2 1/2" – 10"
Reduced Pressure Principle Zone Detector Assembly (RPDA)	Conbraco 40-207-208 ** Conbraco 40-700-70G(C3)	1 1/2" and 2" 3" – 10"
& Reduced Pressure Principle Zone Assembly (RP)	Febco 825Y ** Febco 826YD	1 1/2" – 2" 2 1/2" – 10"
	Watts 009M3QT ** Watts 909 RPDA	1 1/2" and 2" 2 1/2" – 10"
	Wilkins 375DA Wilkins 475DA	4" – 6" 4" – 6"
	Wilkins 975XL Wilkins 975DA & DAG	1 1/2" – 2" 2 1/2" – 10"

** Note: For 13R and 13D Systems and for isolation of freeze-protected sections of regular sprinkler systems

**APPROVED DOUBLE CHECK VALVE ASSEMBLIES & DOUBLE DETECTOR CHECK
VALVE ASSEMBLIES FOR VERTICAL INSTALLATION
(INLET ON THE BOTTOM UNLESS OTHERWISE SPECIFIED)**

TYPE OF PROTECTION	DEVICE/ASSEMBLY – MFG	BFP SIZE
Low Hazard Domestic DCVA	Ames 2000B ***	1/2" – 2"
	Ames 2000CIV	4" – 6"
	Ames 2000SS & SE	2 1/2" – 8"
	Conbraco 1/2 DC & 2 1/2-6 DC	2 1/2" – 6"
	Febco 805YB ***	3/4"
	Febco 850 (Vertical up & down)	1/2" – 2"
	Febco 850	2 1/2" – 8"
	Watts 007	2 1/2" and 3"
	Watts 007QTM3 ***	1/2" – 2"
	Watts 709	4" – 10"
Watts 775 (Vertical up & down)	1/2" – 1 1/2"	
Low Hazard Fire Lines DDCVA	Ames 3000B	2"
	Ames 3000 SS, SE, & CIV	4" – 8"
	Conbraco 2 1/2 DCDA-6 DCDA	2 1/2" – 6"
	Febco 856	4" – 8"
	Watts 007DCDA	2" and 2 1/2"
	Watts 709DCDA	4" – 10"
	Wilkins 350DA & 350DAG	4" – 6"
	Wilkins 950DA	2 1/2" – 8"

*** Note: For use on 13R and 13D Fire Sprinkler Systems Also

Note: All large body assemblies (2 1/2" – 10") shall be fusion bonded epoxy coated ductile iron or be stainless steel. All shut off valves on large assemblies shall be fusion bonded epoxy coated and have a resilient wedge "gate." All shut off valves on small assemblies (1/4" – 2") shall be a resilient seat full port quarter turn ball valve with a blow-out proof stem with a pressure rating of 400psi W.O.G. Fire line assemblies shall have OS&Y shut off valves and a detector side with a low flow meter and backflow assembly with equal value to the fire flow assembly. No RP is allowed to be installed in the vertical position.

CITY OF WILSON

**BACKFLOW INSTALLATION
SPECIFICATIONS**

BACKFLOW INSTALLATION SPECIFICATIONS

I. GENERAL REQUIREMENTS

- A. The installation location of all backflow prevention assemblies shall be in an area that provides a safe working environment for testing and maintenance. This area shall be readily accessible, away from electrical hazards, traffic hazards, and free from dirt. The location must meet the requirements of all other local authorities i.e. Fire, Engineering, Zoning, and Inspections.
- B. The installation shall be in accordance with the manufacturers' information. North Carolina State Building Code and City of Wilson Water Resources Standards. Installation of backflow prevention assemblies shall be upstream of the first branch line leading off the service line, fire line, commercial domestic, or irrigation, a minimum distance of five feet from the meter in residential installations and five feet from the service connection in fire line installations and commercial and industrial private water mains. If it is impossible or impractical for the backflow prevention assembly to be installed outside near the service connection it may be installed on a set back from the water meter or the service connection. Set backs will be dealt with on a case by case basis. An encroachment agreement shall be approved for devices installed on Public Right-of-Way. The backflow prevention assembly must be installed by a licensed plumbing or utility contractor. Fire line services require a licensed fire sprinkler contractor or utility contractor to install the approved assembly. All contractors and plumbers must be registered by the City of Wilson Cross Connection Program, to be able to install or test devices.
- C. For an irrigation system that is not separately metered, the City of Wilson will allow an upstream tap, provided that the owner agrees to comply with all backflow ordinances for irrigation system requirements on the irrigation part of the private water service.
- D. [Reduced pressure backflow prevention assemblies](#) shall be installed according to City of Wilson Backflow Diagrams in [Section VIII](#). The minimum height from the relief port to the ground shall be 12" and the maximum height shall be 30". A floor drain and an air gap drain shall be provided for RP's installed inside of buildings (minimum drain sizes are four times the relief valve discharge port and shall be sized to handle four (4) times the maximum flow of relief valve). Assemblies installed in buildings shall be above outside ground level. The clearance for an RP installed inside a building shall be 4" minimum from the wall to the shut off valve, 30" minimum from the wall or any obstruction on the side utilized for testing, and 6" minimum on the other side to the assembly for 3/4" - 2". For 2 1/2" - 10" RP, the clearance shall be 30" minimum from the wall or any obstruction on the side utilized for testing and 12" minimum on the other side of assembly. RP's must be installed above ground, in a horizontal direction, in a location in which no portion of the assembly can

become submerged under any circumstances. All RP are required above ground in a 1060ASSE enclosure.

- E. [Double check valve assemblies \(DCVA\)](#) shall be installed according to City of Wilson Backflow Drawings in [Section VIII](#). Double check valve assemblies 3/4" and 1" must be installed in an above ground enclosure with a minimum size of 12" deep, 19" wide, and 24" long. Devices 1 1/2" and 2" must be installed in an above ground enclosure with a minimum size of 18" deep, 27" wide, and 40" long. The floor of the enclosure must be gravel with a minimum depth of 12" or a concrete pad with a minimum thickness of 4". The distance between the lowest point of the assembly to the surface of the gravel or pad shall be no less than 6". The assembly must be installed in the center of the enclosure to allow adequate clearance for the testing, and/or repair of the assembly. Double check valve assemblies 2 1/2" - 10" shall be installed above ground in a freeze proof enclosure.
- F. The assembly must be supported to allow for the weight of the assembly. Support construction can be concrete blocks, bricks, steel, or concrete filled PVC. Supports must have a 4" concrete footing. Assembly supports must not interfere with valves, test cocks, testing and/or repair of the assembly.
- G. For 2 1/2" - 10" DCVA, DCDA, RP, and RPDA's there shall be a minimum of 30" clearance on the side utilized for testing, 12" clearance on the other, and 8" clearance on each end.
- H. Protective structures must be used to prevent freezing or vandalism for backflow prevention assemblies installed outside above ground. Freeze proof enclosures that meet or exceed North Carolina Plumbing Code Standards are acceptable provided that insulation is at least 7.5 R factor, and have the ASSE 1060 approval plate. The cover is secured, and the device is protected from freezing. The Backflow prevention assembly must be readily accessible for maintenance and testing. Adequate drainage shall be provided by a hinged door or drain ports along the bottom of the walls of the protective structure. Insulation shall not be wrapped around the assembly. If the structure is not removable it must be accessible by doors large enough for entrance and repair.

II. FIRE LINE INSTALLATIONS

- A. High hazard fire line installations require a Reduced Pressure Principle Detector Assembly (RPDA). Moderate hazard fire line installations require a Double Check Detector Assembly (DCDA).
- B. It is recommended, if possible, if a booster pump exists, the placement of the pump be approximately 100ft. Located after the number two shut off valve downstream of the backflow prevention assembly.
- C. Strainers shall not be installed on fire lines. Unmetered fire line installations require either a double detector check valve assembly or a reduced pressure detector assembly depending on the degree of hazard.

- D. All backflow installations prohibit **all above-ground** BPA's from being installed within the setback and sideyard areas. Setbacks of 50' or more will be dealt with on a case-by-case basis.
- III. NO "UPSTREAM" BRANCHES, TAPS OR HYDRANTS
- A. No taps, Fire Department connection points, private hydrants, or piping branches are permitted between the backflow prevention assembly and the service connection on the fire line. There is NO GRANDFATHER CLAUSE IN FIRE LINE INSTALLATION TO STOP THE INSTALLATION OF A CONTAINMENT BACKFLOW ASSEMBLY AT THE SERVICE CONNECTION OR POINT OF USE for all existing fire services without backflow protection. All of these must be either eliminated or re-piped to be supplied from the downstream side of the backflow assembly.
- IV. FREEZE PROTECTION REQUIREMENTS/RECOMMENDATIONS
- A. Heat for Above-ground BPA's:
 - 1. Heat is only required for BPA's supplying fire protection systems. However, the City of Wilson Water Distribution Division recommends that all above-ground Backflow Assemblies be heated. Small Backflow Prevention Assemblies (3/4" to 4") are especially subject to freeze damage.
- V. FIRE PROTECTION SYSTEM ISSUES
- A. Be aware that the City of Wilson Deputy Fire Marshall has requirements which bear upon Fire Line BPA installations. Requirements of which the City of Wilson Water Distribution Division are aware are included below. For clarification, the appropriate Fire Department officials should be contacted.
 - 1. Heat, OS&Y Gate Valves, and Strainer Requirements & Restrictions
 - a) Provide Heat:
 - (1) Fire Department requires that any enclosure which is not fully below-ground and which houses a BPA that supplies any type of fire protection system (even just FH's), must maintain a minimum temperature of 40 degrees Fahrenheit.
 - b) OS&Y Gate Valves:
 - (1) OS&Y type gate valves are required on all BPA's supplying a fire protection system.
 - (2) OS&Y type gate valves are not necessary on domestic-only system BPA's - they require a much taller (more expensive) enclosure!
 - c) No Strainers:
 - (1) Although strainers reduce maintenance needs on RP's, the Fire Department does not allow strainers on BPA's supplying a fire protection system.
 - 2. Properties with only FH'S FOR protection (i.e. not a sprinkler system)
 - a) Repipe "upstream" private FH's:

- (1) If currently supplied from the upstream side of the proposed BPA location, The City of Wilson requires that the supply point for private hydrants be relocated to a point on the downstream side of the Backflow Prevention Assembly.
 - b) Note: extra measures will be necessary when a fire sprinkler system is involved. No taps, Fire Department connection points, private hydrants, or piping branches are permitted between the Backflow Prevention Assembly and the service connection.
 - c) Chains and Locks:
 - d) Secure OS&Y gate valves in the "open" position with chains and locks.
3. Properties with a fire sprinkler system for protection
- a) Tamper Switches:
 - (1) All assemblies on a fire system, or combination domestic and fire, shall be fire line approved installations with OS & Y type shut-off valves. These valves shall be provided with supervisory tamper switches as required by current Building Code enforced by the Deputy Fire Marshall.
 - (2) The backflow assembly OS&Y gate valves must be outfitted with supervisory tamper switches whenever a fire sprinkler system is supply with water through the BPA. Tamper switches must be connected to an alarm system per Fire Department specs. Fire Department plans for the sprinkler system shall show routing of cable for supervisory tamper switches & connection to alarm panel!
 - (3) Fire Department requires that hydraulic calculations be submitted to them prior to BPA installation on a system that supplies water to a fire sprinkler system - installation should not proceed without their approval.
4. Repipe "upstream" private FH's
- a) Just as in non-sprinkler systems, if private hydrants are currently supplied from the upstream side of the proposed BPA location, the City of Wilson requires that the supply point be relocated to a point on the downstream side of the BPA.
 - b) The City Wilson Engineer and the City of Wilson Cross Connection Coordinator shall approve all dedicated fire hydrants on the City of Wilson Right of Way. All dedicated fire hydrants shall be placed on fire sprinkler services for the sole purpose of charging the sprinkler system in the event of a fire.

c) Once installation is completed, the customer shall have the backflow prevention assembly inspected by a City of Wilson approved inspector and tested by a registered tester. The test results shall be submitted to the City of Wilson for the initial test and annual tests thereafter. All rubber shall be replaced every five years. It is the responsibility of the customer to install and maintain the backflow prevention assembly. If damage occurs to the assembly for any reason it is the customers responsibility to repair or replace as needed. Before starting installation of a backflow preventer, contact the City of Wilson, Water Distribution Division for assistance to insure proper installation of the backflow prevention assembly, and to insure the backflow prevention assembly does meet the current approval list.

d) Minimum Drain Sizes Required for Freeze Proof Installations of a Relief Pressure Principle Assembly Shall be as follows

Size of Assembly	Drain Size
$\frac{3}{4}$ " – 2"	2"
2 $\frac{1}{2}$ " – 10"	4"

e) Minimum Drain Sizes for Indoor Installations of Reduced Pressure Principle Assembly

Size of Assembly	Drain Size
$\frac{3}{4}$ " – 1"	4"
1 $\frac{1}{2}$ " – 2"	5"
2 $\frac{1}{2}$ " – 3"	6"
4" – 6"	
8" – 10"	(2) 8"

VI. CONSTRUCTION GUIDELINES

A. Existing Services Requiring Backflow Protection

1. Upon determination that a backflow prevention assembly is required to be installed on a customer's private water system, the customer will be notified in writing of the backflow prevention assembly which is required.
2. Depending on the size and type of device, the customer may have up to 60 days to install the device.
3. Installation plans for installing the assembly shall be approved through the City of Wilson Water Distribution Division.
4. Customer shall apply for permit and pay all necessary fees.
5. Customer shall install the assembly and verify the assembly has been correctly installed.
6. Customer shall contact the Division to approve the installation of the device.
7. Customer shall have the assembly tested by an approved certified tester.
8. Upon installation, the customer shall be responsible for ensuring that the City of Wilson Water Distribution Division receives a copy

of the assembly test record, and shall annually send a copy of the test results.

- B. New Services Requiring Backflow Prevention Assemblies
 - 1. Customer shall apply for permit and pay all necessary fees.
 - 2. New construction plans shall be reviewed by the City of Wilson Water Resources Division for adequate protection against cross - connections.
 - 3. Customer shall install the assembly and verify by Cross Connection Coordinator the assembly has been correctly installed.
 - 4. Customer shall contact the Water Distribution Division to approve the installation of the device.
 - 5. Customer shall have the assembly tested by an approved certified tester.
 - 6. Upon installation, the customer shall be responsible for insuring that the City of Wilson Water Distribution Division receives a copy of the assembly test record, and shall annually send a copy of the test results.

VII. GUIDELINES FOR CROSS CONNECTION CONTROL IN WATER DISTRIBUTION SYSTEMS

- A. Degree of Hazard
 - 1. Severe: Actual or potential threat of contamination that presents an imminent danger to the public health with consequence of serious illness or death.
 - 2. Moderate: One that presents foreseeable and significant potential for pollution, nuisance, aesthetically objectionable or other undesirable alterations of the drinking water supply.
- B. Backflow Prevention Assembly Requirements:
 - 1. RPZ
 - a) Above ground installation only
 - b) 12 inches minimum clearance from vault walls and floors
 - c) Installation in accordance with manufacturer's recommendations
 - 2. DCVA
 - a) Vertical or horizontal installation acceptable
 - b) Adequate drainage shall be provided if installed below ground
 - c) Old assemblies that was installed below ground shall have gravity drain to sunlight

Degree of Hazard	RPZ*	DCVA**	Air Gap
Severe	X	—	X
Moderate	—	X	—

* Reduced pressure zone

** Double check valve assembly

C. Facilities that Require Installation of a Backflow Preventer***

- 1. Moderate hazard - DCVA:

- a) Fire sprinkler systems without booster pump facilities or chemical additives.
 - b) Connection to tanks, lines and vessels that handle non-toxic substances.
 - c) Most commercial establishments
 - d) Automotive service stations, bakeries and beauty shops with no health hazard and bottling plants with no back pressure.
2. Severe hazard - RPZ or air gap:
- a) Lawn sprinkler systems with or without chemical injection or booster pump
 - b) Wastewater treatment plants
 - c) Connection to an unapproved water system or unapproved auxiliary water supply
 - d) Connection to tanks, pumps, lines, steam boilers and vessels that handle sewage, lethal substances toxic or radioactive substances
 - e) Fire sprinkler systems with booster pump –facilities or chemical additives
 - f) Buildings with five or more stories above ground level
 - g) Hospitals and other medical facilities
 - h) Morgues, mortuaries and autopsy facilities
 - i) Metal plating facilities
 - j) Bottling plants (subject to back pressure)
 - k) Canneries
 - l) Battery manufacturers
 - m) Exterminators and lawn care companies
 - n) Chemical processing plants
 - o) Dairies
 - p) Film laboratories
 - q) Car wash facilities
 - r) Dye works
 - s) Laundries
 - t) Swimming pools
 - u) Water front facilities

*** This is not intended to be an exhaustive list

- D. COMMON CROSS CONNECTION LOCATIONS
- 1. Air conditioning systems
 - 2. Air compressors
 - 3. Air conditioning chill water
 - 4. Air liners
 - 5. Air conditioning cooling tower
 - 6. Air washer
 - 7. Air conditioner condenser water
 - 8. Aquariums
 - 9. Aspirators
 - 10. Autoclaves

11. Auxiliary systems
12. Baptismal pools
13. Baptistries
14. Bathing tanks
15. Bathtubs
16. Bedpan washers
17. Below the rim or inverted water supply inlets
18. Bidets
19. Bird baths
20. Boiler industry feeder lines
21. Boilers
22. Bottle washer
23. Brim tanks
24. Carbonators
25. Cheese tanks
26. Chemical feeders
27. Chiller tanks
28. Chlorinator
29. City of Wilson Water and Sewer direct connections
30. Coffee urns
31. Commercial pressure cookers
32. Commercial dish washing machines
33. Compressors
34. Condensation tanks
35. Cooking kettles
36. Cooling systems
37. Cooling towers
38. Culture vats
39. Cuspidor (gym)
40. Dairy and stable watering troughs
41. Degreasing equipment
42. Demineralizer system
43. Dental cuspidors
44. Dental saliva ejectors
45. Developing tanks
46. Dishwashers
47. Drain lines
48. Drinking fountains
49. Dye jigs, washer, tanks, vats
50. Etching tanks
51. Extractors
52. Fire stand pipes
53. Fire drain lines
54. Fire protection sprinkler systems
55. Fish ponds
56. Floor drains

57. Flush tanks
58. Flushing rims
59. Food mixing tanks
60. Foot tubs
61. Fountains
62. Garbage can washers
63. Garbage disposals
64. Holding tanks
65. Hose faucets
66. Hospital laundry machines
67. Hospital digesters
68. Hot tubs
69. Hot water heaters and tanks
70. Humidifiers tanks and boxes
71. Hydraulic equipment
72. Hydrotherapy baths
73. Ice makers
74. Industrial plants protection meter
75. Industrial in-plant plumbing systems
76. Industrial condensers
77. Irrigations systems
78. Janitor closets
79. Kitchen equipment
80. Laboratory equipment
81. Laundry and other tubs
82. Lavatories
83. Lawn sprinkler systems
84. Liquid handling systems
85. Makeup tanks
86. Medical condensers
87. Medical aspirators
88. Medical equipment
89. Photostat equipment
90. Pipette washer
91. Plumbers friend
92. Pneumatic ejectors
93. Ponds
94. Potato peeler
95. Prime lines
96. Private wells
97. Processing tanks
98. Pumps
99. Recirculated water
100. Rubber hoses equipped with hand controls or self-closing faucets
101. Serrated faucets
102. Sewer, sanitary and storm (bypasses, sump pumps and blow offs)

103. Shampoo basins
 104. Showers
 105. Sinks
 106. Siphon flush tanks
 107. Sitz baths
 108. Sizing baths
 109. Slop sinks
 110. Solar heating systems
 111. Solution tanks
 112. Spring loaded glass washers
 113. Starch tanks
 114. Steam tables
 115. Steam lines
 116. Steam cleaners
 117. Sterilizers
 118. Stills
 119. Suction side of pump chlorinators
 120. Swimming pools, commercial
 121. Swimming pools, home
 122. Tanks
 123. Therapeutic baths
 124. Threaded hose bibbs
 125. Toilets (flush tank, ball cocks, flush valve, siphon jet)
 126. Ultrasonic baths
 127. Urinals (trough or siphon jet blowouts)
 128. Vacuum systems (water operated)
 129. Vats
 130. Vegetable peelers
 131. Wash tanks
 132. Water treatment tanks
 133. Water closets, flush
 134. Water closets (tanks)
 135. Water troughs (with vaccine or other substances added for poultry or other livestock)
 136. Water operated ejectors
 137. Water street mains draining to sewer or storm drains
 138. Water softening systems
 139. Water – jacketed tanks, vats and pots
 140. X-ray equipment
- E. REVISED LIST OF HEALTH HAZARD FACILITIES
1. Aircraft
 2. Amusement Parks
 3. Automotive Plants
 4. Autopsy Facility
 5. Auxiliary Water System
 6. Beverage Bottling Plants

7. Boilers (Large) or Hot Water Systems
8. Breweries
9. Buildings with Sewer Ejectors
10. Buildings with Water Storage Tanks, on non-potable water sources
11. Canneries
12. Car Wash
13. Centralized Heating and Air Conditioning Plants
14. Chemical Plants using a water process
15. Chemical Plants – Manufacturing, Processing, Compounding, or Treatment.
16. Civil Works
17. Clinics
18. Cold Storage Plants
19. Colleges
20. Commercial Laundries
21. Convalescent Homes
22. Creameries
23. Dairies
24. Dental Buildings
25. Dye Works
26. Fabricating Plants
27. Film Laboratory
28. Food Processing Plants
29. Gas Production Properties, Storage, or Transmission Facilities
30. Gravel Plants
31. Hospitals
32. Laboratories
33. Laundries
34. Manufacturing Plants
35. Medical Buildings
36. Metal Plating Industries
37. Metal Processing
38. Metal Manufacturing, or Cleaning Facilities
39. Metal Fabricating Plants
40. Missile Plants
41. Morgue
42. Mortuaries
43. Motion Picture Studios
44. Nursing Homes
45. Oil Storage Facilities, Properties, Production Facilities, or Transmission Packing Houses
46. Paper and Paper Products Plants
47. Petroleum Storage, or Processing Plants
48. Piers and Docks
49. Plating Plants
50. Power Plants

- 51. Processing Plants
- 52. Radioactive materials, or substances-plants or facilities handling
- 53. Reclaimed Waste Water Areas
- 54. Recreational Facilities using water
- 55. Reduction Plants
- 56. Sand Plants
- 57. Sanitariums
- 58. Schools
- 59. Tanneries
- 60. Waste Water Pumping Stations
- 61. Wastewater Treatment Plants
- 62. Water Treatment Plants
- 63. Water Front Facilities and Industries
- F. Approved Backflow Prevention Assemblies
 - 1. Meets ASSE standard and carries ASSE seal or is on the University of Southern California approval list.
- G. Backflow Prevention Assembly Installation
 - 1. Backflow prevention assemblies must be located in a place where it is readily accessible for regular testing, maintenance and inspection. Bypass lines parallel to a backflow prevention assembly shall have an approved backflow prevention assembly installed that is equal to that on the main line.
 - 2. BACKFLOW ASSEMBLY IS THE CUSTOMER'S RESPONSIBILITY. INSTALLATION DOES NOT PREVENT INTERNAL CROSS CONNECTIONS ON PRIVATE WATER SYSTEMS BEYOND THE ASSEMBLY.
 - 3. City of Wilson's responsibility stops at the curb stop for service and repair of the water supply.

VIII. APPENDICES

- A. Customer Letter
- B. Permit
- C. Test and Maintenance Report

IX. BACKFLOW ASSEMBLY DIAGRAMS

- A. DOUBLE CHECK VALVE ASSEMBLY
- B. REDUCED PRESSURE PRINCIPLE ASSEMBLY
- C. RELIEF PRESSURE ASSEMBLY
- D. TYPICAL INSTALLATION OF GANG & METER ASSEMBLY
- E. TYPICAL INSTALLATION FOR DC ASSEMBLIES

SECTION VIII

APPENDICES

CITY OF WILSON
NORTH CAROLINA

July 1, 1993

Dear Customer:

The Safe Drinking Water Act of 1974 defines the maximum contaminant levels allowed in a public water supply and designates the water supplier as the prime entity responsible for insuring safe drinking water at the tap. This poses a problem for water suppliers such as the City of Wilson. We have no control over a customer's private water system, yet we are liable if pollutants from a customer's building enter and contaminate the City's public water supply. Such contamination may occur by backflow through unprotected cross-connections between the potable supply and any potential contaminant.

For this reason, the Wilson City Council adapted a Cross Connection Control Ordinance to require all industrial and commercial users to install a backflow prevention assembly. This Ordinance was adopted on _____, but will not be effective until _____.

We estimate that it will take years for all existing facilities to be retrofitted with the appropriate assembly. Because there are so many existing facilities, the City will concentrate first on those industries which present the highest risk to human health.

Your facility may already have an approved assembly installed. In order to better assess the risk and potential risk at each site, we would appreciate your cooperation in answering the attached permit application.

Based on the information provided, you will be notified in writing if and when you need to install the assembly.

Should you have any questions, please feel free to contact me at 252-205-1845 or 399-2460. Please fill out the attached document and return it in the enclosed self-addressed envelope. Your cooperation is greatly appreciated.

Sincerely,

Martin Ball
Cross Connection Control Coordinator
Water Distribution Division

**CITY OF WILSON
 WATER DISTRIBUTION DIVISION
 CROSS CONNECTION CONTROL AND BACKFLOW PREVENTION PROGRAM
 PERMIT**

PROPERTY OWNER _____

FIRST NAME _____ LAST NAME _____

COMPANY/
 PROPERTY OWNER _____ PHONE _____

CITY _____ STATE _____ ZIP _____

ADDRESS OF
 OCCUPANT _____ PHONE _____

CITY _____ STATE _____ ZIP _____

- | | | |
|--|-----|----|
| 1. Do you have an existing back-flow device? | Yes | No |
| 2. Is there any mixing of water and other substances in your operation? | Yes | No |
| 3. Are there any toxic chemicals used in your operation? | Yes | No |
| 4. Does your cooling system utilize recycled water? | Yes | No |
| 5. Are there any other sources of water to your property for fire protection or additional storage, e.g. private well, elevated storage fed from a well? | Yes | No |
| 6. Is this service for lawn irrigation only? | Yes | No |
| 7. WILL SPRINKLER SYSTEM USE CHEMICALS? | Yes | No |
| 8. Type of facility, e.g. commercial, industrial, medical, institutional | | |

9. Type of operation, e.g. retail container co., warehouse, mfg. plant

10. List type(s) of equipment used in your facility, e.g. chemical feed tanks, mixing vats, dishwashers, booster pumps, cooling towers)

Contact Person _____ Phone _____

DATE OF APPROVAL _____

CROSS CONNECTION CONTROL PROGRAM TEST AND MAINTENANCE REPORT

CUSTOMER _____
 STREET ADDRESS _____
 ASSEMBLY LOCATION _____
 TYPE OF ASSEMBLY: RP DC PVB SIZE _____
 MANUFACTURER _____
 MODEL _____ SERIAL NO _____

RELIEF VALVE	CHECK VALVE #1	CHECK VALVE #2	PRESSURE VACUUM BREAKER
OPENED AT _____ PSID DID NOT OPEN <input type="checkbox"/>	LEAKED <input type="checkbox"/> CLOSED TIGHT <input type="checkbox"/> DIFF PRESSURE ACROSS CHECK VALVE _____ PSID	LEAKED <input type="checkbox"/> CLOSED TIGHT <input type="checkbox"/> DIFF PRESSURE ACROSS CHECK VALVE _____ PSID	AIR INLET OPENED AT _____ PSID DID NOT OPEN <input type="checkbox"/> CHECK VALVE: LEAKED HELD AT _____ PSID
CLEANED ONLY <input type="checkbox"/> REPLACED <input type="checkbox"/> RUBBER KIT <input type="checkbox"/> RV ASSEMBLY <input type="checkbox"/>	CLEANED ONLY <input type="checkbox"/> REPLACED <input type="checkbox"/> RUBBER KIT <input type="checkbox"/> CV ASSEMBLY <input type="checkbox"/>	CLEANED ONLY <input type="checkbox"/> REPLACED <input type="checkbox"/> RUBBER KIT <input type="checkbox"/> CV ASSEMBLY <input type="checkbox"/>	CLEANED ONLY <input type="checkbox"/> REPLACED <input type="checkbox"/> RUBBER KIT <input type="checkbox"/> CV ASSEMBLY <input type="checkbox"/>
OPENED AT _____ PSID	CLOSED TIGHT _____ PSID	CLOSED TIGHT _____ PSID	AIR INLET _____ PSID CHECK VALVE _____ PSID
SHUT OFF VALVE #1		SHUT OFF VALVE #2	
LEAKED <input type="checkbox"/>	CLOSED TIGHT <input type="checkbox"/>	LEAKED <input type="checkbox"/>	CLOSED TIGHT <input type="checkbox"/>

NOTE: ALL REPAIRS MUST BE COMPLETED WITHIN THIRTY DAYS.

REMARKS: _____

I HEREBY CERTIFY THAT THIS DATA IS ACCURATE AND REFLECTS THE PROPER OPERATION AND MAINTENANCE OF THE ASSEMBLY.

Initial Test by _____ Certified Tester No. _____ Date _____

Repaired by _____ Date _____

Final Test by _____ Certified Tester No. _____ Date _____

Domestic Fire Lawn Irrigation New Test Recertification Test

Water Meter No. _____ Plumbing Permit No. _____

Test Kit Serial No. _____ Differential Duplex Electronic

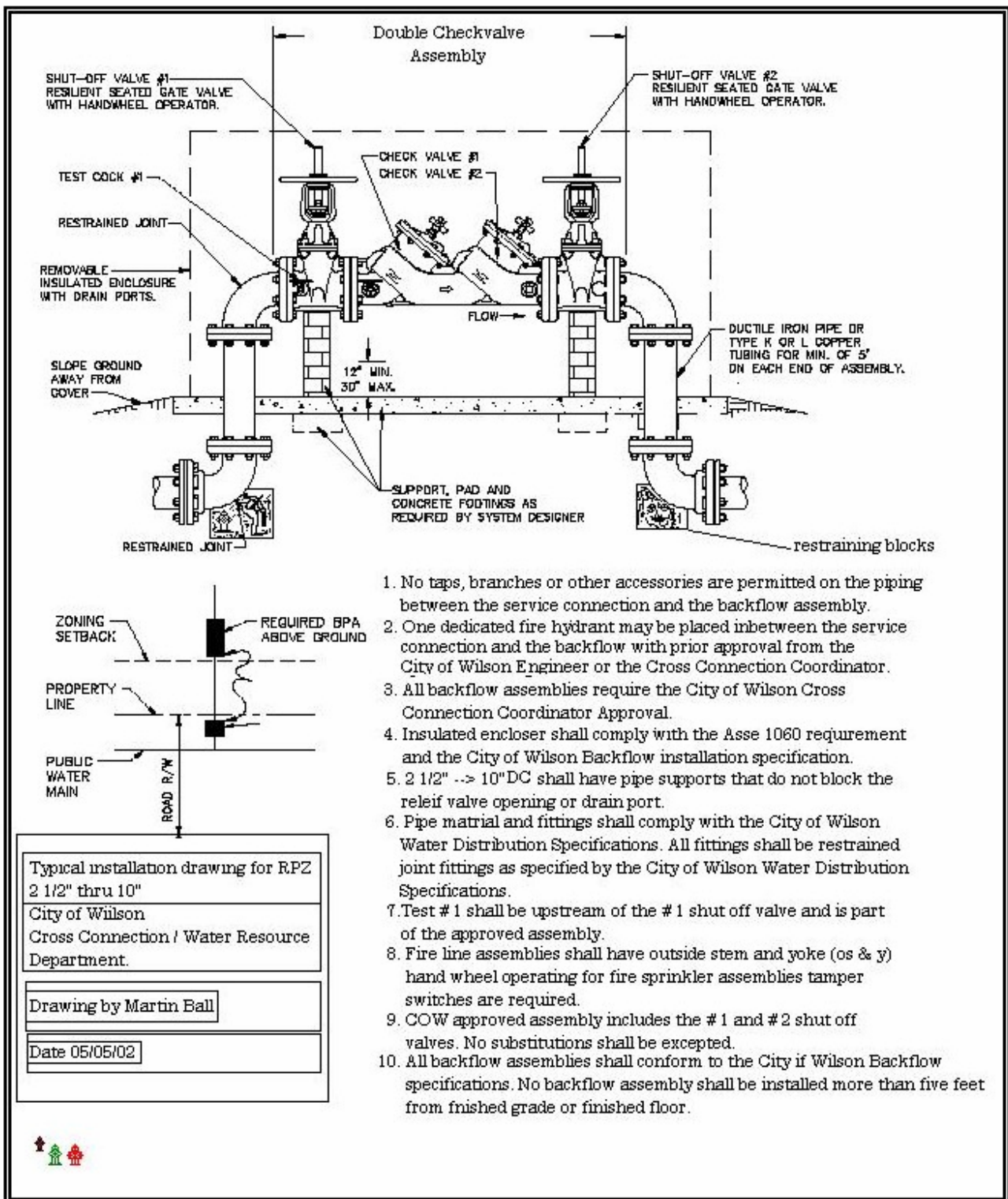
Line Pressure _____ PSI Time of Day: _____ AM PM

Signature of Tester _____

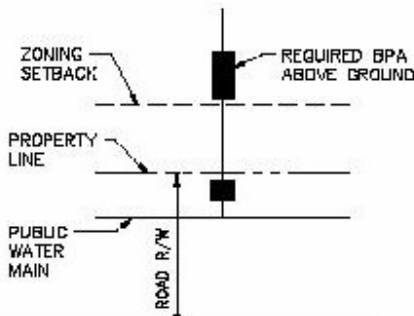
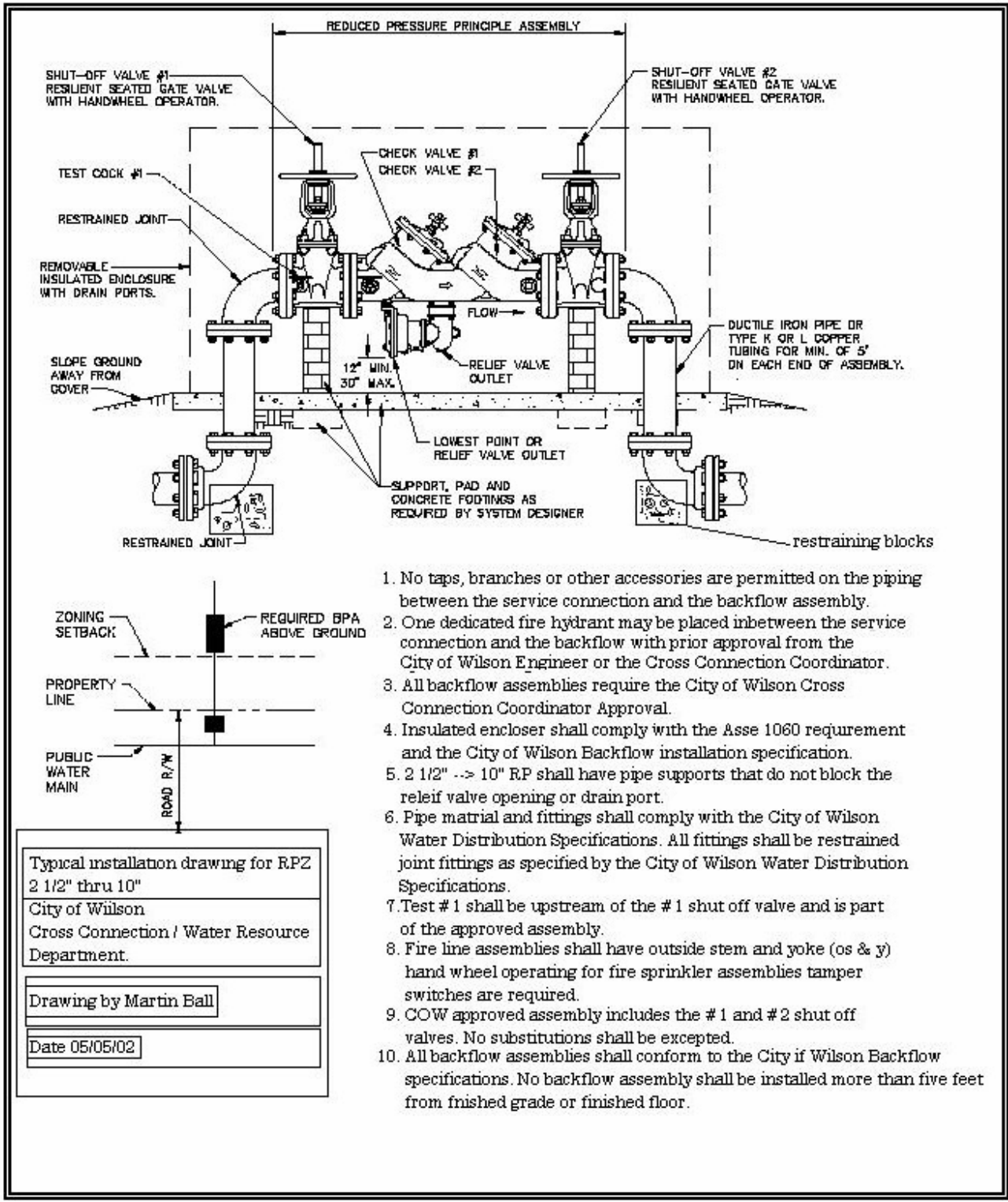
**RETURN TO: Martin Ball, Cross Connection Control Program, City of Wilson
 PO Box 10 Wilson, NC 27893 FAX 252.296.3334 PHONE 252.205.1845**

SECTION IX

**BACKFLOW ASSEMBLY
DIAGRAMS**



DOUBLE CHECK VALVE ASSEMBLY



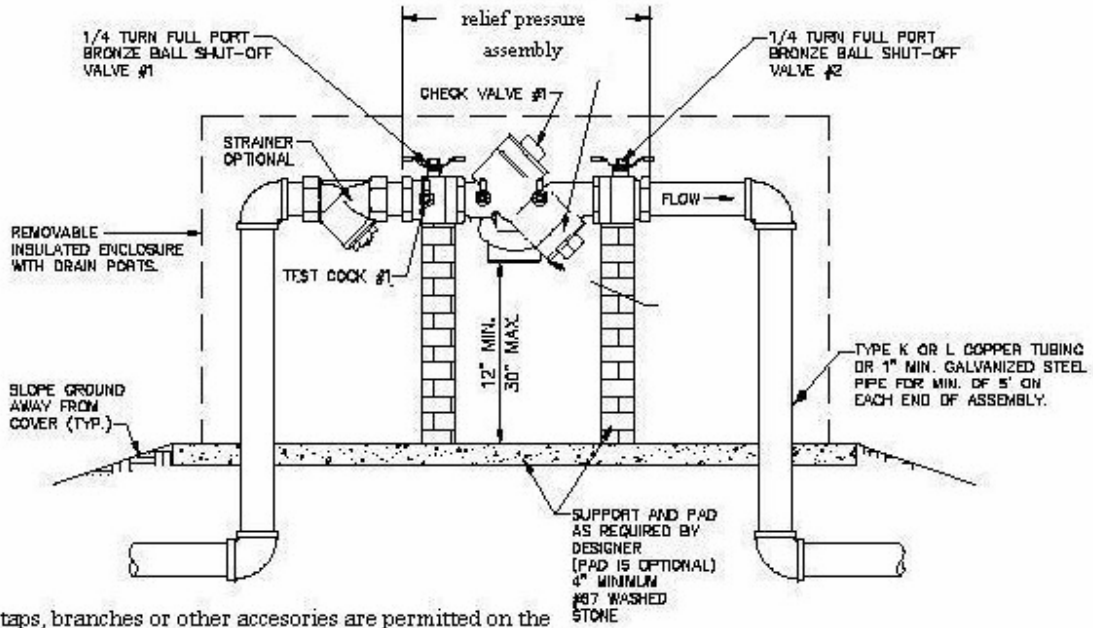
1. No taps, branches or other accessories are permitted on the piping between the service connection and the backflow assembly.
2. One dedicated fire hydrant may be placed inbetween the service connection and the backflow with prior approval from the City of Wilson Engineer or the Cross Connection Coordinator.
3. All backflow assemblies require the City of Wilson Cross Connection Coordinator Approval.
4. Insulated encloser shall comply with the Asse 1060 requirement and the City of Wilson Backflow installation specification.
5. 2 1/2" -> 10" RP shall have pipe supports that do not block the relief valve opening or drain port.
6. Pipe material and fittings shall comply with the City of Wilson Water Distribution Specifications. All fittings shall be restrained joint fittings as specified by the City of Wilson Water Distribution Specifications.
7. Test # 1 shall be upstream of the # 1 shut off valve and is part of the approved assembly.
8. Fire line assemblies shall have outside stem and yoke (os & y) hand wheel operating for fire sprinkler assemblies tamper switches are required.
9. COW approved assembly includes the # 1 and # 2 shut off valves. No substitutions shall be excepted.
10. All backflow assemblies shall conform to the City of Wilson Backflow specifications. No backflow assembly shall be installed more than five feet from finished grade or finished floor.

Typical installation drawing for RPZ
 2 1/2" thru 10"
 City of Wilson
 Cross Connection / Water Resource
 Department.

Drawing by Martin Ball

Date 05/05/02

REDUCED PRESSURE PRINCIPLE ASSEMBLY



1. No taps, branches or other accessories are permitted on the piping between the backflow assembly and the meter.
2. All locations for the backflow assemblies require prior approval from the cross connection coordinator. All backflow assemblies are required to be within five feet of the water meter.

3. backflow assembly enclosures shall be insulated and have an ASSE 1060 stamp of approval.

4. All pipe material shall be as specified in the water distribution specifications for the City of Wilson.

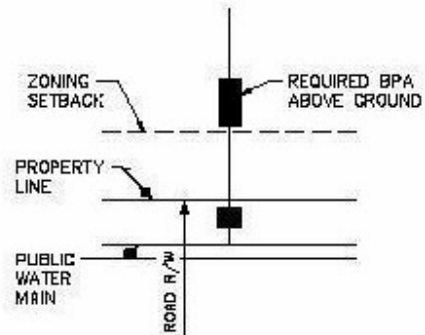
5. Test cock #1 shall be upstream of the #1 shut off valve.

Backflow Assemblies shall be an approved backflow assembly as specified in the backflow assembly installation specifications for the City of Wilson.

6. An approved RP backflow assembly in the City of Wilson includes the #1 and #2 shut off valves. No substitutions shall be permitted.

7. Assemblies with out prior location approval by the cross connection coordinator may be required to be re-installed five feet from the meter.

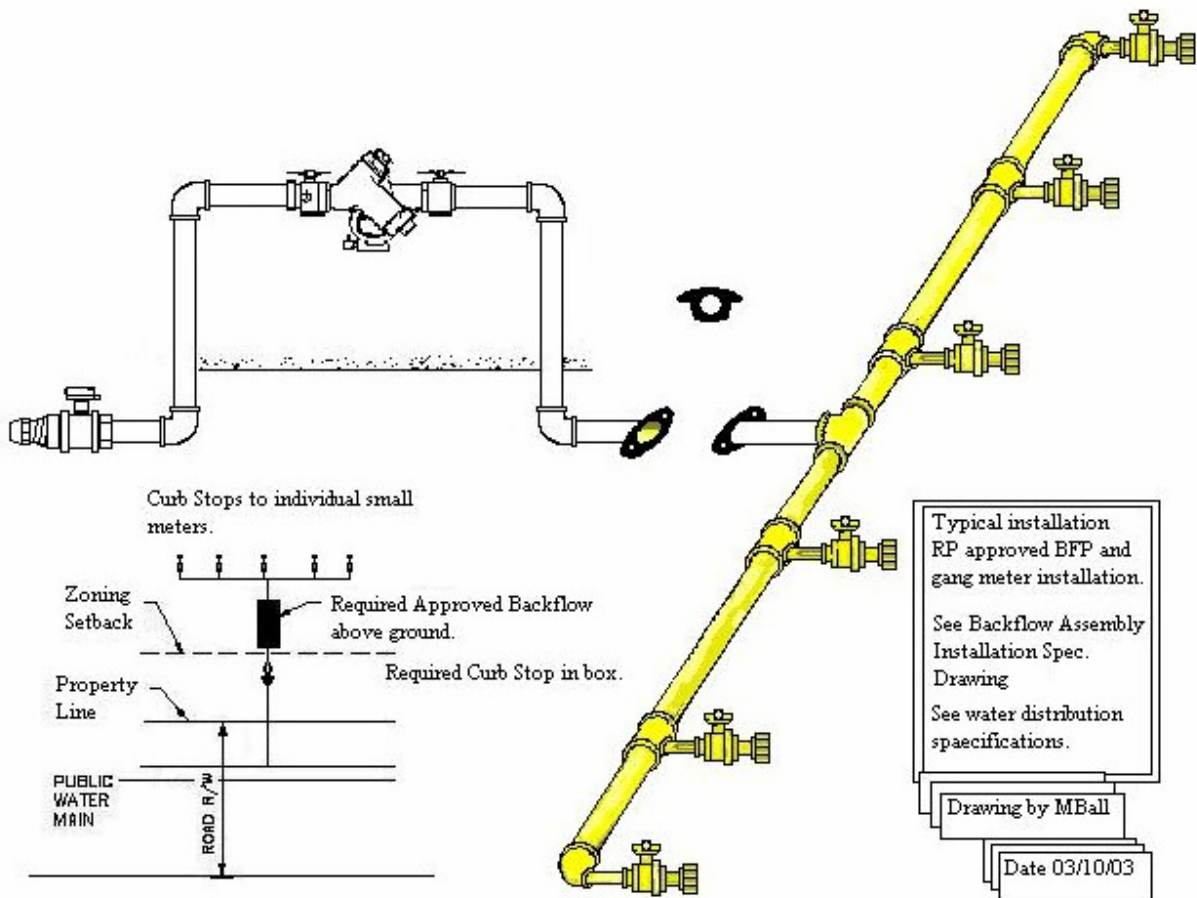
8. No backflow assembly shall be not be installed more than five feet from floor or ground level.



Typical installations for RP Assemblies 3/4" to 2 1/2"
City of Wilson Cross Connection / Water Resources

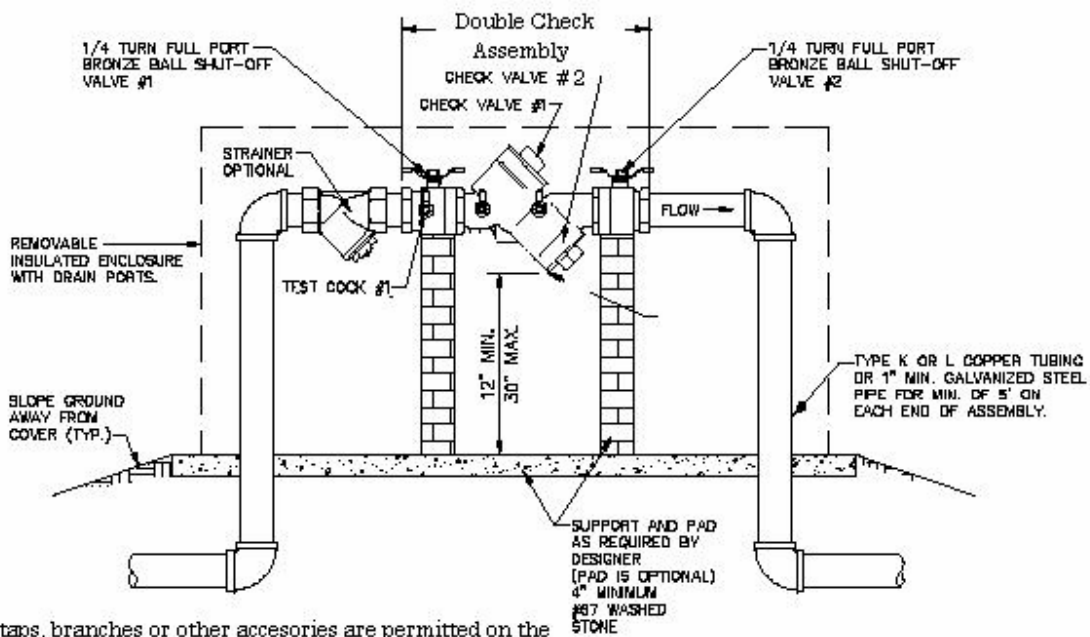
Drawing By MBall
Date 05/10/02

RELIEF PRESSURE ASSEMBLY

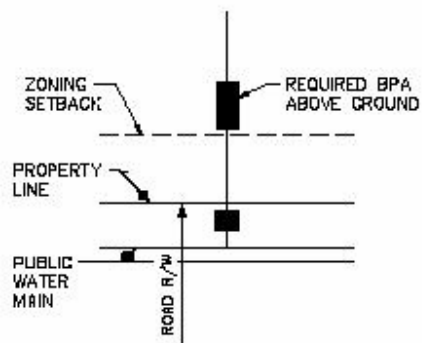


TYPICAL INSTALLATION of RP & GANG METER ASSEMBLY

BACKFLOW ASSEMBLY IS THE CUSTOMER'S RESPONSIBILITY. INSTALLATION DOES NOT PREVENT INTERNAL CROSS CONNECTIONS ON PRIVATE WATER SYSTEMS BEYOND THE ASSEMBLY. THE CITY OF WILSON'S RESPONSIBILITY STOPS AT THE CURB STOP FOR SERVICE AND REPAIR OF THE WATER SUPPLY.



- 1.No taps, branches or other accessories are permitted on the piping between the backflow assembly and the meter.
- 2.All locations for the backflow assemblies require prior approval from the cross connection coordinator. All backflow assemblies are required to be within five feet of the water meter.
- 3.backflow assembly enclosures shall be insulated and have an ASSE 1060 stamp of approval.
- 4.All pipe material shall be as specified in the water distribution specifications for the City of Wilson.
- 5.Test cock #1 shall be upstream of the #1 shut off valve. Backflow Assemblies shall be an approved backflow assembly as specified in the backflow assembly installation specifications for the City of Wilson.
- 6.An approved DC backflow assembly in the City of Wilson includes the #1 and #2 shut off valves. No substitutions shall be permitted.
- 7.Assemblies with out prior location approval by the cross connection coordinator may be required to be re-installed five feet from the meter.
- 8.No backflow assembly shall be not be installed more than five feet from floor or ground level.



Typical installations for DC Assemblies 3/4" to 2 1/2"
 City of Wilson Cross Connection / Water Resources

Drawing By MBall
 Date 05/10/02

TYPICAL INSTALLATION for DC ASSEMBLIES