

# **CROSS CONNECTION CONTROL**

## **STANDARDS & SPECIFICATIONS MANUAL**



**MOORE COUNTY PUBLIC WORKS DEPARTMENT**

**AMENDED: June 2017**

## PREFACE

This Manual is for the Moore County Public Utilities and the East Moore Water District water and sewer systems, all of which are operated by the Moore County Public Works Department (MCPW).

These standards are for design and construction of water distribution facilities which will come under the jurisdiction of Moore County Public Works (MCPW). **These standards alone do not constitute a complete set of construction documents. The owner's or developer's Professional Engineer is responsible for design and compilation of complete construction and contract documents.** These standards are set forth as the minimal requirements to achieve a suitable quality level for utilities which will become the property of MCPW.

The standards do not include a complete commentary on methods of installation and detailed information or quality of workmanship in place. The owner's or developer's Professional Engineer must include detailed information on methods of construction and should expand on the testing and any of the special requirements to the engineer's satisfaction, subject to the approval of MCPW.

From time to time, these standards will be amended and/or expanded at the request of the MCPW Engineering Division with approval of the Director. It will be the responsibility of the owner or developer to contact the MCPW to obtain updated standards.

There may be circumstances whereby the design engineer may wish to propose changes or modifications to these standards, when this occurs permission from the County Engineer shall be obtained prior to submission to NCDEQ.

### Disclaimer

To the best of their ability, the authors have insured that material presented in this manual is accurate and reliable. The design of engineered facilities, however, requires considerable judgment on the part of the designer. It is the responsibility of the design professional to insure that techniques utilized are appropriate for a given situation. Therefore, neither Moore County Public Works, nor any author or other individual, group, etc., associated with production of this manual, accepts any responsibility for improper design, any loss, damage, or injury as a result of the use of this manual.

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# **STANDARD & SPECIFICATIONS MANUAL - CROSS CONNECTION CONTROL**

## **1.0 INTRODUCTION**

In today's world of advanced technology most people assume that the water they drink is safe. Few people even give a second thought to the possibility that the public water system might be the carrier of dangerous or even fatal bacteria, chemical or other agents harmful to the human body. The Moore County Public Works Department (MCPW) has long been concerned about cross connections and potential backflow conditions in plumbing systems and in our drinking water supply distribution system.

Most of us realize that contaminated water can easily result in disease and death if it is consumed by humans or animals but how many are aware that the danger is present with us every day. The more complex our industry and our technology becomes, the greater the potential hazard to human health. In spite of our advanced public water systems, the potential for contamination is growing. A Backflow Prevention and Cross Connection Control Program are essential to ensure that water remains as safe as it is when it leaves the treatment facility.

The Federal Safe Drinking Water Act mandates that the water supplier be responsible for the quality of the water to the service connection. Therefore MCPW must take every precaution for protecting the public potable water from backflow of dangerous substances which would endanger the public health or physically damage the public water system.

The County of Moore has a "Cross-Connection Control Ordinance". This ordinance requires all industrial, commercial and irrigation customers to install and maintain a backflow prevention assembly at every service connection to the MCPW system, in accordance with MCPW specifications and standard details before any branching of the private system can be used.

The County of Moore requires backflow prevention assemblies to be installed and maintained by the customer. The customer is required to have backflow prevention assemblies tested annually by a certified tester. If the interruption of water service would have a critical impact on your operation, two backflow prevention assemblies must be installed in parallel in order for testing and maintenance requirements to be fulfilled. This will allow one backflow prevention assembly to continue providing water while the other is being tested or repaired.

When it is determined that a backflow prevention assembly is required for the protection of the public system by County Ordinance, AWWA Standard C511 for a Double Check Valve or C512 for a Reduced Pressure Zone backflow preventer, then the developer shall be required, at the developer's expense, to install an approved backflow prevention assembly at each service connection. The installed assembly shall be tested immediately upon installation and thereafter annually to demonstrate functionality. It is the Property Owner's responsibility to properly test, repair and maintain such assembly or assemblies

and to keep adequate records of each test. All test reports and repair reports shall be submitted to BSI, MCPW's Cross Connection Control Consultant.

Houses that have sewer septic tanks are allowed by law (after October 1, 2017) to connect their irrigation system to their domestic service line and not required to have a separate irrigation meter. Such installations shall require a lockable valve within two (2) feet of the domestic water meter. The irrigation system is required to have a RPZ backflow prevention device as specified herein. See STD. NO. CC 5 for detail.

## **2.0 DEFINITIONS**

**Air Gap Separation** – An unobstructed vertical distance through the atmosphere between the lowest opening from any pipe or faucet supplying water from any source to a tank, plumbing fixture or other device and the flood level rim of the receptacle. An approved, air gap separation shall be at least double the diameter of the supply pipe. In no case shall the air gap separation be less than one (1) inch.

**Approved** - Those assemblies or methods which have been accepted by MCPW as an effective assembly or method to prevent backflow.

**Auxiliary Water Supply** - Any water source other than the public water system that is used in conjunction with or is otherwise available to a private water system.

**Backflow** - Any flow of water, other liquid, gas, other substances or any combination thereof into the public water system from any source due to an unprotected cross connection, back pressure, back-siphonage, any combination thereof or any other cause.

**Backflow Prevention Assembly** - An approved and effective assembly or method used to prevent backflow.

**Back Pressure** - Any pressure on water, other liquid, gas, other substances or any combination thereof in a private water system that is connected in any manner to the public water system under circumstances in which such pressure is greater than the pressure on the water in the public water system, so that backflow may occur.

**Back-Siphon** - Any circumstance in which the pressure on the water in the public water system is less than the pressure on water, other liquid, gas, other substances or any combination thereof in a private water system that is connected in any manner to the public water system, so that backflow may occur.

**Certified Tester** - An individual person who has proven his/her competency to test, repair and overhaul backflow prevention assemblies of all types and to prepare reports on such assemblies as evidenced by successful completion of a training program.

**Contamination** - The impairment of the quality of water to a degree that human consumption could result in poisoning or the spread of disease.

**Containment** -The prevention of backflow from a private water system by an approved, properly functioning backflow prevention assembly which is properly installed, operated and maintained.

**Cross Connection Control ORC** - an employee designated by MCPW to administer and enforce the backflow prevention and Cross Connection Control Ordinance.

**Customer** - Any person who is capable of receiving water from the public water system through the customer's private water system, without regard to whether MCPW is aware of the existence of such customer. If such person does not own the private water system, "customer" shall also be construed to include the person who owns the private water system.

**Customer's Private Water System** - The private water system through which a customer is capable of receiving water from the public water system.

**Customer's Potable Water System** - The private water system through which a customer receives water from the public water system for purposes of human consumption.

**Degree of Hazard** - The evaluation of a hazard within a private water system as moderate or high.

**Double Check Valve Assembly** - An approved, properly functioning assembly composed of two, independently acting check valves including tightly closing shut-off valves attached at each end of the assembly and fitted with properly located test cocks. This assembly may only be used to protect against a moderate hazard.

**Health Hazard** - An actual or potential threat of contamination to the public water system that could cause illness or death.

**Severe Hazard** - An actual threat of contamination to the public water system that could cause serious illness or death.

**Pollution** - The presence of any substance in water that tends to degrade the quality of such water or adversely affects the usefulness of such water.

**Potable Water** - Water from any source which has been approved for human consumption by the appropriate agency of the state of North Carolina.

**Private Water System** - Any pipe(s), system of pipes or other associated facilities that are not part of the public water system and is used in whole or in part to move or receive water, regardless of the source(s) of the water in such system.

**Protected Cross Connection** - Any physical connection or other condition which does not permit backflow because containment is achieved.

**Public Water System** - The potable water system owned and operated by MCPW. This system includes all distribution mains, lines, pipes, connections, storage tanks and other facilities conveying potable water from tested and approved sources to the service connection of each customer.

**Reduced Pressure Principle Assembly (RPZ)** - An approved, properly functioning assembly containing two, independently acting check valves with a hydraulically operating, mechanically independent pressure differential relief valve located between the check valves and at the same time below the first check valve. The assembly must include properly located test cocks and tightly closing shut-off valves at each end of the assembly. This assembly is designed to protect against a high hazard.

**Service\Connection** - The terminal end of a complete service connection. In the absence of a complete service connection, the point at which water leaves the public water system and enters a private water system.

**Unapproved Water Supply** - A water supply which has not been approved for human consumption by the appropriate agency of the state of North Carolina.

**Unprotected Cross Connection** - Any physical connection or other condition which could permit backflow to occur by any means including, but not limited to, manipulation of valves, improper functioning of valves or direct discharge. Unprotected cross connection includes any condition in which backflow could occur as a result of the improper functioning of a backflow prevention assembly.

### **3.0 INSTALLATION SPECIFICATIONS**

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 and free from dirt. The location must meet requirements of all other local authorities i.e. Fire, Planning, Zoning, Local Ordinance and North Carolina Department of Transportation (NCDOT). The installation shall be in accordance with the manufacturer's information, current updated North Carolina State Building Code and MCPW standards. Installation of backflow prevention assemblies shall be upstream of the first branch line leading off the service line. If MCPW determines that it is impossible or impractical for the backflow prevention assembly to be installed outside it may be installed just inside the building. All backflow prevention assemblies shall be installed in a horizontal direction, unless a manufactured vertical assembly is approved by the County Engineer. The backflow prevention assembly must be installed by a Licensed Plumbing or Utility Contractor.

The type of backflow prevention assembly installed will be determined based on the NCDEQ requirements and shall depend upon the degree of hazard as stated in the Cross Connection Control Ordinance. If the hazard cannot be determined, then a RPZ shall be installed. The backflow prevention assemblies installed shall be MCPW approved

backflow prevention assemblies which include the shut-off valves on each end of the assembly and are considered part of the assembly. These shut-off valves shall be those approved with each specific assembly and there shall not be any substitutions. There shall be four test cocks provided as specified in the section titled “Approved Assemblies and Materials” and located in the following areas.

1. on the upstream side of the first shut off valve (upstream being the side closest to the property line)
2. between the first shut off valve and the first check valve
3. between the first and second check valve
4. between the second check valve and the second shut off valve

The backflow prevention assembly is the responsibility of the customer to install and maintain. If damage occurs to the assembly for any reason, it is the customer’s responsibility to repair or replace it.

All backflow prevention assemblies shall have protective enclosures to prevent freezing or vandalism for backflow prevention assemblies installed outside and above ground. All backflow prevention assemblies must be readily accessible for maintenance and testing including removing the entire assembly. RPZ backflow prevention assembly shall be protected from freezing with a “hot box” or an approved equal. Adequate drainage shall be provided by hinged door or drain ports along the bottom of the protective structure. The minimum drain size shall be provided according to the current state plumbing code. Insulation shall not be wrapped around the assembly.

If the enclosure is non-removable and must be entered in order to test or repair the assembly, the same minimum and maximum clearances that are specified for vault installations shall apply. Covers or doors placed above a protective enclosure or vault shall be lightweight and shall have adequate width and length to remove the entire assembly. Doors or covers for 3 inch - 10 inch vault installations shall be double hinged.

#### Reduced Backflow Prevention Assemblies

All installations shall be installed where they are easily accessible for testing and maintenance. RPZs shall be installed above ground outside of easements, setback areas and according to MCPW standards and details. For an RPZ installed outside, the assembly shall be inside an insulated enclosure. RPZs must be installed above ground and in an upright horizontal direction. For an RPZ installed inside a building, a floor drain or an air-gap drain shall be provided that discharges by gravity to surface of ground, or to a catch basin in a storm drainage system and shall be twice as large in size of the backflow prevention assembly. RPZs must be installed in an upright horizontal position unless approved for vertical installation.

#### Double Check Valve Assemblies

Double Check Valve Assemblies (DCVA) may be installed above ground or below ground according to MCPW standards and details. DCVA’s must be installed in an upright horizontal position. If the DCVA is installed below ground, it must be installed



in a meter box or vault depending on the size. The vault must have a floor drain or an air-gap drain that discharges by gravity to surface of ground, or to a catch basin in a storm drainage system and shall be twice as large in size of the backflow prevention assembly. If positive drainage cannot be accomplished, the DCVA shall be installed above ground outside of easements and setback areas. All drainage systems shall be approved by the Inspections Division of the Moore County Planning Department. .

If drainage is provided to a catch basin in a storm drainage system, the invert elevation of the drain pipe must be at or above the (top) crown level of the main storm drain pipe flowing out of the catch basin. All work shall be performed on the customer's property and not in the public road right-of-way. Vault installations shall conform to MCPW Standard Details for DCVA vault installations.

#### Fire Line

Fire line installations shall be as follows: High hazard fire line installations require an RPDA. All assemblies on a fire line 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 updated State Building Code enforced by the Fire Marshal. If a booster pump exists, it is recommended that it be installed approximately 100 feet downstream of the backflow prevention assembly, if possible. Strainers shall not be installed on fire lines. All fire line installations shall be protected to a minimum of 40 degrees, or as required by current building code, so as not to freeze.

## **4.0 CONSTRUCTION GUIDELINES**

### **A. New Residential Lawn Irrigation System connected to Existing Service Line. (only for services with septic tanks)**

#### Requirements for Backflow Prevention Assembly Installation

1. Install assembly before any branches in new irrigation system outside easements and setback areas, per MCPW standard details.
2. Locate 12 inch minimum above ground, 30 inch maximum, in horizontal direction, 30 inch minimum clear of any permanent obstruction. See installation specifications for below ground requirements.
3. Use type "1" brass pipe (1 inch dia. Min.), from 5 feet before to 5 feet past assembly.
4. Protective structure required with insulated protection 7.4R factor minimum. Insulation shall not be wrapped around assembly.
5. Location of connection and backflow prevention assembly will be outside and accessible to MCPW at all times.
6. If unions are used, caps must be provided and stored with assembly, for use any time the assembly is removed. It is required to cap remaining piping to service line and is subject to MCPW inspection at any time assembly is removed.
7. Assembly required to be installed by a Licensed Plumber or Utility Contractor in the State of North Carolina.

### Procedures for Backflow Prevention Assembly Installation Approval

1. Apply for a plumbing permit at the appropriate Inspection Department.
2. After applying for the plumbing permit, fill out cross-connection questionnaire.
3. For quick determination of assembly requirements deliver questionnaire to MCPW.
4. MCPW will specify assembly required. MCPW will notify owner listed on questionnaire and inspection department of requirements.
5. Install irrigation system
6. With approved installation, MCPW requires owner to submit a copy of the backflow prevention assembly test record.

### **B. New Residential Lawn Irrigation service with New Lawn Irrigation System connected to New Lawn Irrigation Meter.**

#### Requirements for Backflow Prevention Assembly Installation

1. Install assembly before any branches in new irrigation system outside set back areas, per MCPW standard details.
2. Locate 12 inch above ground min., 30 inch max. in horizontal direction, 30 inch min. and clear of any permanent obstruction.
3. Use type "1" brass pipe (1 inch dia. Min.), from 5 feet before to 5 feet past assembly.
4. Protective structure required with insulated protection 7.4r factor minimum. Insulation shall not be wrapped around assembly.
5. Location of connection and backflow prevention assembly will be accessible to MCPW at all times.
6. If unions are used, caps must be provided and stored with assembly, for use any time the assembly is removed. It is required to cap remaining piping to service line.
7. Assembly is required to be installed by a Licensed Plumber or Utility Contractor in the State of North Carolina.

### Procedures for Backflow Prevention Assembly Installation Approval

1. Apply for new irrigation meter at MCPW.
2. Complete backflow questionnaire.
3. Submit completed backflow questionnaire and service connection fees, to MCPW.
4. MCPW will determine hazard and specify assembly required. MCPW will notify owner listed on questionnaire and inspection department of requirements.
5. Apply for plumbing permit at the inspection department.
6. Flag location for MCPW crew to install new meter.
7. Install irrigation system.
9. With approved installation, MCPW requires owner to submit a copy of the backflow prevention assembly test record.

### **C. New Commercial Lawn Irrigation to an Existing Commercial Service Line or Fire Line connected to a Water Main.**

#### MCPW Requirements at Existing Meter

1. Install assembly before any branches in new system outside setback areas, per MCPW standard details and accessible to MCPW at all times. On fire lines, shut-off valves must be OS&Y type and be provided with supervisory tamper switches with trouble signal to go to the emergency control station as required by current building code.
2. Locate 12 inch above ground min., 30 inch max. in horizontal direction, 30 inch min. and clear of any permanent obstruction. Strainers shall not be installed on fire systems.
3. Use type "1" brass pipe (1 inch dia. Min.), from 5 feet before to 5 feet past assembly.
4. Protective structure required with insulated protection 7.4r factor minimum. Insulation shall not be wrapped around assembly. All assemblies used on fire line services shall be protected to min. 40 degrees or as required by current building code.
5. If unions are used (3/4 inch - 2 inch), caps must be provided and stored with assembly, for use any time the assembly is removed. It is required to cap remaining piping to service line.
6. Assembly required to be installed by a licensed plumber, utility contractor or licensed fire sprinkler contractor in the State of North Carolina.

#### Building Standards Requirements for Backflow Prevention Assembly at Connection of New Irrigation or Fire Line

1. Locate 12 inch above ground min., 30 inch max. before any branches in new system in horizontal direction and 30 inch min. from any obstruction.
2. Protective structure required with insulated protection 7.4R factor minimum. Insulation shall not be wrapped around assembly. All assemblies used on fire line services shall be protected to min. 40 degrees or as required by current building code.
3. If unions are used (3/4 inch - 2 inch), caps must be provided and stored with assembly, for use any time the assembly is removed.
4. Assembly required to be installed by a Licensed Plumber, Utility Contractor or Fire Sprinkler Contractor in the State of North Carolina.

#### Procedures for Backflow Prevention Assembly Installation Approval

1. Apply for plumbing permit at inspection department.
2. Complete application for plumbing permit and pay fee.
3. Turn in completed backflow questionnaire with plumbing permit application to inspection department where they will forward the questionnaire to MCPW.
4. For quick determination of hazard and assembly requirements deliver

questionnaire to MCPW.

5. MCPW will determine hazard and specify assembly required. MCPW will notify owner listed on questionnaire and inspection department of requirements.
6. Installation of assembly may be subject to other local authority requirements and approval (i.e. Fire, Planning, Zoning or NCDOT).
7. Install irrigation or fire system backflow prevention assemblies at meter or at connection to water distribution system.
8. If required fire flow cannot be met as determined by AWWA standard flow test with the backflow preventer installed on the Fire Line at the meter or at connection to water distribution system, then the backflow preventer can be eliminated but the water main is required to be looped back into the water system. The looped water main shall have the required Moore County easement and be deeded over to Moore County.
9. With approved installation, MCPW requires owner to submit a copy of the backflow prevention assembly test record at existing meter.

**D. New Commercial Service or Irrigation System with New Service or Lawn Irrigation System connected to a New Meter.**

Requirements for Backflow Prevention Assembly Installation

1. Install assembly before any branches in new system outside zoning setback areas, per MCPW standard details. On fire lines shut-off valves shall be OS&Y type and be provided with supervisory tamper switches with trouble signal to go to the emergency control station as required by current building code.
2. Locate 12 inch above ground min., 30 inch max. in horizontal direction and 30 inch min. clear of any permanent obstruction. No strainers shall be installed on fire systems. See installation specifications for below ground requirements.
3. Use type "1" brass pipe (1 inch dia. Min.), from 5 feet before to 5 feet past assembly.
4. Protective structure required with insulated protection 7.4R factor minimum. Insulation shall not be wrapped around assembly. All assemblies used on fire line services shall be protected to min. 40 degrees or as required by current building code.
5. Location of connection and backflow prevention assembly will be located outside and accessible to MCPW at all times.
6. If unions are used (3/4 inch - 2 inch), caps must be provided and stored with assembly, for use any time the assembly is removed. It is required to cap remaining piping to service line and is subject to MCPW inspection at any time assembly is removed.
7. Assembly required to be installed by a licensed plumber, utility contractor or licensed fire sprinkler contractor in the State of North Carolina.
8. Building standards requirements for backflow assembly at connection of new lawn irrigation or fire line.
9. Locate 12 inch above ground min., 30 inch max. before any branches in new system, in horizontal direction, and 30 inch min. from any obstruction.

10. Protective structure required with insulated protection 7.4R factor minimum. Insulation shall not be wrapped around assembly. All assemblies used on fire line services shall be protected to min. 40 degrees or as required by current building code.
11. If unions are used (3/4 inch - 2 inch), caps must be provided and stored with assembly, for use any time the assembly is removed.
12. Assembly required to be installed by a Licensed Plumber, Utility Contractor or Fire Sprinkler Contractor in the State of North Carolina.

Procedures for Backflow Prevention Assembly Installation Approval

1. Apply for plumbing permit at inspection department.
2. Complete application for plumbing permit and pay fee.
3. Turn in completed backflow questionnaire with plumbing permit application to inspection department. The inspection department will forward questionnaire to MCPW.
4. For quick determination of hazard and assembly requirements, deliver questionnaire to MCPW.
5. Installation of assembly may be subject to other local authority requirements and approval (i.e. Fire, Zoning, Planning or NCDOT).
6. Apply for new meter at MCPW.
7. Submit copy of completed backflow questionnaire with connection fees.
8. MCPW will determine hazard and specify assembly required. MCPW will notify owner listed on questionnaire and inspection department of requirements.
9. Flag location for MCPW to install new meter.
10. Install irrigation or fire system.
11. With approved installation, MCPW requires owner to submit a copy of the backflow prevention assembly test record.

**E. Developer Installed Service Connected to New Developer Installed Meter**

Requirements for Backflow Prevention Assembly Installation on Customer Property for Private System

1. Installations must be installed outside the public road right-of-way and outside zoning setback areas on customer property.
2. Install assembly before any branches in new service, per MCPW standard details. On fire lines shut-off valves shall be OS&Y type, and be provided with supervisory tamper switches with trouble signal to go to the emergency control station as required by current building code.
3. Locate 12 inch above ground minimum, 30 inch maximum in horizontal direction and 30 inch minimum clear of any permanent obstruction. No more than 100 feet upstream of new meter. No strainers shall be installed on fire systems. See installation specifications for below ground requirements.
4. Use type "I" brass pipe (1 inch dia. Min.), from 5 feet before to 5 feet past assembly.
5. Protective structure required with insulated protection 7.4R factor minimum.

- Insulation shall not be wrapped around assembly.
6. All installations are required to be outside of site distance triangle.
  7. Assembly required to be installed by a Licensed Plumber or Utility Contractor in the State of North Carolina.

**F. Requirements for Backflow Prevention Assembly Installation within Public Road Right-of-Way for Roadway Irrigation Systems**

1. All construction activities and materials in an existing or future public road right-of-way shall comply with the current NCDOT policies and procedures for accommodating utilities on highway rights of way and any additional requirements of active encroachment agreements.
2. No backflow prevention assembly shall be installed in any fully controlled or limited controlled access roads.
3. No backflow prevention assembly shall be installed above ground in a public road right-of-way. Note all reduced pressure principle backflow prevention assemblies are required to be installed above ground outside of the public road right-of-way, and outside setback areas on customer property.
4. A double check valve assembly shall be allowed to be installed below ground in an NCDOT approved vault. Any below ground installation confine within the public road right-of-way shall be located as near to right-of-way line as possible. Outside face of vault must be located no more than one foot inside public right-of-way. Vault installation is required to drain to free atmosphere. Note if drainage cannot be achieved, the double check valve must be placed above ground outside the public road right-of-way, outside setback areas on customer's property.
5. All construction shall conform to the requirements for water main construction within the jurisdiction of MCPW, from the meter to and 5 feet beyond the backflow prevention assembly installation.
6. Assembly required to be installed by a licensed plumber or licensed utility contractor in the State of North Carolina.

Procedures for Backflow Prevention Assembly Installation Approval

1. Apply for new meter at MCPW.
2. Complete backflow questionnaire.
3. Submit completed backflow questionnaire with service connection fees.
4. MCPW will determine hazard and specify assembly required. MCPW will notify owner listed on questionnaire and inspection department of requirements.
5. Any installation installed in public road right-of-way or set-back areas controlled by local authorities are subject to all state and local approvals.
6. Meter will not be activated until all requirements of MCPW have been met satisfactorily.
7. With approved installation, MCPW requires owner to submit a copy of the backflow prevention assembly test record.

**G. New or Existing Irrigation Service for a Public Roadway**

### Requirements for Backflow Prevention Assembly Installation Outside of Public Right-of-Way

1. Any above ground installations must be installed outside the public road right-of-way and outside zoning setback areas on private property. All installations are required to be located outside area of site distance triangle. Any work in an existing public road right-of-way(r/w) requires an encroachment agreement with owner of r/w.
2. The assembly must be installed before any branches in new system, per MCPW standard details.
3. Locate 12 inch above ground minimum, 30 inch maximum in horizontal direction and 30 inch minimum clear of any permanent obstruction. No more than 100 feet upstream of new meter.
4. Use type "1" inch brass pipe (1 inch dia. Min.), from 5 feet before to 5 feet past assembly.
5. Required insulated protection 7.4R factor minimum. Insulation shall not be wrapped around assembly.
6. Location of connection and backflow prevention assembly will be located outside and accessible to MCPW at all times.
7. If unions are used (3/4 inch - 2 inch), caps must be provided and stored with assembly, for use any time the assembly is removed. It is required to cap remaining piping to service line and is subject to MCPW inspection at any time assembly is removed.
8. Assembly required to be installed by a Licensed Plumber or Utility Contractor in the State of North Carolina.

### Requirements for Backflow Prevention Assembly Installation within Public Right-of-Way

1. All construction activities and materials in an existing or future public road right-of-way shall comply with the current NCDOT policies and procedures for accommodating utilities on highway rights of way, MCPW and any additional requirements of active encroachment agreements.
2. No assemblies shall be installed in any fully controlled or limited controlled access roads.
3. No backflow prevention assembly shall be installed above ground in a public road right-of-way. Note all reduced pressure principle backflow prevention assembly are required to be installed above ground outside of the public road right-of-way, and outside zoning setback areas on private property.
4. A double check valve assembly shall be allowed to be installed below ground in an NCDOT approved vault. Any below ground installation confine within the public road right-of-way shall be located as near to right-of-way line as possible. Outside face of vault must be located no more than one foot inside public right-of-way. Vault installation is required to drain to free atmosphere. Note if drainage cannot be achieved, the double check valve must be placed above ground outside the public road right-of-way, outside zoning setback areas on customer's property.

5. All construction shall conform to the requirements for water main construction within the jurisdiction of MCPW, from the meter to and 5 feet beyond the backflow prevention assembly installation.
6. Assembly required to be installed by a Licensed Plumber or Utility Contractor in the State of North Carolina.

#### **H. Procedures for Backflow Prevention Assembly Installation Approval**

1. Apply for new lawn meter at MCPW.
2. Complete backflow questionnaire.
3. Submit completed backflow questionnaire with service connection fees.
4. MCPW will determine hazard and specify assembly required. MCPW will notify owner listed on questionnaire and the inspection department of requirements.
5. Any installation installed in public road right-of-way or set-back areas controlled by local authorities are subject to all state and local approvals.
6. Apply for plumbing permit at county or town inspection department and NCDOT encroachment if required.
7. Flag location for MCPW meter.
8. Install system.
9. With approved installation, MCPW will notify owner listed on questionnaire to send a copy of the backflow prevention assembly test record.

#### **5.0 APPROVED ASSEMBLIES AND MATERIAL SPECIFICATIONS**

All backflow prevention assemblies shall be approved by the University of Southern California Foundation for Cross Connection Control and Hydraulic Research (USCFCCHR), The American Society of Sanitary Engineering (A.S.S.E.), conform to applicable AWWA standards and adhere to applicable ANSI and ASTM standards. All assemblies installed on fire lines shall have approval by Factory Mutual System (FM).

Backflow prevention assemblies must also be approved by MCPW.

All internal parts shall be replaceable in line. All internal metal parts shall be bronze or stainless steel. There shall be a minimum of dissimilar metals in an assembly in order to prevent corrosion due to electrolysis. When there are dissimilar metals, the metals shall be electronically similar as possible and insulated if possible.

All assemblies shall have bronze 1/4 turn ball valve test cocks with raised slotted operators or lever type operators. All assemblies shall have four resilient seated test cocks located in the following manner.

1. on the upstream side of the first shut off valve (upstream being the side closest to the property line)
2. between the first shut off valve and the first check valve
3. between the first and second check valve
4. between the second check valve and the second shut off valve



All exterior control piping shall be flexible hose or standard size copper tubing with standard end connections.

All interior control piping or passage ways shall be corrosion resistant. All sensing tubes or passages shall be placed in a manner that prevents clogging or trapping of foreign materials or air.

3/4 inch - 2 inch Assemblies shall have bronze or stainless steel bodies and bonnets.

3/4 inch - 2 inch Assemblies shall be equipped with shut-off valves that are full port, line size, 1/4 turn, lever type bronze or stainless steel ball valves.

2 1/2 inch - 10 inch Assemblies shall have contained check valve modules.

2 1/2 inch - 10 inch Assemblies shall be one of the following.

1. Fusion bonded epoxy coated cast iron, ductile iron or steel
2. Bronze bodies and bonnets
3. Stainless steel

2 1/2 inch - 10 inch Assemblies shall be equipped with resilient seated gate, wedge or ball valves with non-rising stem and manual handwheel operators. For fire line installations, the shut-off valves shall be OS&Y gate valves with manual hand wheel operators on each end of the unit.

An assembly will be removed from the MCPW approved list if it no longer meets MCPW specifications or fails to operate satisfactorily in the field.

MCPW shall be notified in writing of any changes to the design, components, materials, or operation of an assembly. MCPW shall also be notified of any failures, defects or defective material. Failure to do so will result in removal from the MCPW approval list.

**6.0 FORMS**

**MOORE COUNTY PUBLIC WORKS DEPARTMENT  
BACKFLOW PREVENTION QUESTIONNAIRE**

PROPERTY OWNER:

FIRST NAME: \_\_\_\_\_  
LAST NAME: \_\_\_\_\_  
COMPANY NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
PHONE: \_\_\_\_\_  
CITY: \_\_\_\_\_  
STATE: \_\_\_\_\_ ZIP CODE: \_\_\_\_\_

TENANT NAME (if different):

FIRST NAME: \_\_\_\_\_  
LAST NAME: \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
PHONE: \_\_\_\_\_  
CITY: \_\_\_\_\_  
STATE: \_\_\_\_\_ ZIP CODE: \_\_\_\_\_

CONTACT COMPANY NAME:

COMPANY NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
PHONE: \_\_\_\_\_  
CITY: \_\_\_\_\_  
STATE: \_\_\_\_\_ ZIP CODE: \_\_\_\_\_

ADDRESS OF PROPERTY: \_\_\_\_\_  
CITY: \_\_\_\_\_  
STATE: \_\_\_\_\_ ZIP CODE: \_\_\_\_\_

1. Type of facility (i.e., commercial, industrial, medical, institutional):

2. Type of operation (i.e., retail container co., warehouse, manufacturing plant):

Please list Standard Industrial Code (S.I.C.#):

3. List type(s) equipment used in facility (i.e., chemical feed tanks, mixing vats, dishwaters, booster pumps, cooling towers):

- |   |            |          |
|---|------------|----------|
| 4. Is there any mixing of water and other substances in your operation?   | YES        | NO       |
| 5. Are there any toxic chemicals used in your operation?  | YES        | NO       |
| 6. Does your cooling system utilize recycled water?   | YES        | NO       |
| 7. Are there any other sources of water to your property for fire protection or additional storage (i.e., private well, elevated storage fed well)? | YES        | NO       |
| 8. Is this service for lawn irrigation only?<br>WILL SYSTEM USE CHEMICALS?  | YES<br>YES | NO<br>NO |

This questionnaire must be submitted with payment of water service connection fee. The information on this questionnaire will assist in determining the hazard classification of your facility. In the event that the information provided is inaccurate or changes, the hazard classification and the type of backflow prevention assembly required may be revised. If no information can be provided, the location will be classified as a high hazard. If you have any questions, please contact the Moore County Public Works at (910) 947-6315. Keep a copy of this in your records.

ASSESSMENT DATE:

PUBLIC WORKS INSTALLED SERVICE: YES [ ] NO [ ]

DEVELOPER INSTALLED SERVICE: YES [ ] NO [ ]

HAZARD: HIGH [ ] MODERATE [ ]

METER AND BFPA SIZE:

BFPA TYPE: DCVA [ ] RPZ [ ]

BFPA MODEL:

BFPA SERIAL NUMBER:

METER: NEW [ ] EXISTING [ ]

NUMBER OF SERVICES @ ADDRESS:

TYPE: DOMESTIC [ ] IRRIGATION [ ] FIRE LINE [ ] COMBINATION [ ]