



**STANDARDS
FOR
BACKFLOW PREVENTION
ASSEMBLIES**

October 2009

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Standards For Backflow Prevention Assemblies

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Approved by Resolution No. 1374
At the Regular Meeting of the Board of Water Commissioners
October 7, 2009

Medford Water Commission

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RESOLUTION NO. 1374

A RESOLUTION Approving the Medford Water Commission's Revised Standards for Water Facilities, Fire Protection Services, and Backflow Prevention Assemblies

WHEREAS, the above referenced Standards are generally reviewed by staff every two years; and

WHEREAS, the last revision to the Standards was approved in 2000; and

WHEREAS, staff reviewed and evaluated all materials supplied to ensure they meet the standards of the Commission; and

WHEREAS, electronic versions of the three books were available for review by the Board of Water Commissioners on the Commission's Web site prior to the October 7, 2009 board meeting; and

WHEREAS, staff presented a report on the recommended revisions at said board meeting; and

WHEREAS, the Board of Water Commissioners, acting as the Public Contract Review Board reviewed all proposed revisions;

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF WATER COMMISSIONERS OF THE CITY OF MEDFORD, OREGON, AS FOLLOWS:

That the Standards for Water Facilities, Fire Protection Services, and Backflow Prevention Assemblies, as revised October 7, 2009, and as set forth in Exhibits A, B and C, copies of which are on file in the Commission's office and by reference made a part hereof, are hereby approved and become effective immediately.

PASSED at a regular meeting of the Board of Water Commissioners and signed by me in authentication thereof this 7th day of October 2009.

ATTEST:

Karen M Spoons
Karen Spoons, Deputy City Recorder

Cathie Davis
Cathie Davis, Chair

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SECTION I
REGULATIONS

I-A. AUTHORITY

1. OAR Chapter 333 Division 061 Rules for Public Water Systems require water suppliers to conduct an active program for systematically identifying and controlling cross connections. These standards set forth minimum requirements for safe practice in the delivery of water for domestic use. They are to be interpreted as meeting only the minimum requirements of design, construction, maintenance, and operation of the water utility system.
2. As set forth in Medford Water Commission's (MWC's) "Regulations Governing Water Service," compliance with cross connection control rules is mandatory.
 - a) MWC may immediately discontinue service to any premises where actual or potential cross connections exist.
3. As a condition of water service, customers shall install, maintain, and operate their piping and plumbing systems in accordance with the State of Oregon Plumbing Specialty Code and the Oregon Administrative Rules Chapter 333, Division 061, Public Water Systems addressing cross connection control and backflow prevention assemblies and, if applicable, in accordance with the City of Medford Plumbing Code.
 - a) Plumbing permits are required by the City of Medford or Jackson County when installing backflow prevention assemblies. Please contact these agencies for information about plumbing permits.

I-B. GENERAL STATEMENT

For the purpose of these minimum requirements, the word "shall" indicates a mandatory requirement and the word "should" indicates a recommendation for good waterworks practice.

I-C. WATER SYSTEM

1. The water system shall be considered as made up of two parts: The utility system and the customer system.
2. The utility system shall consist of the source of facilities and the distribution system, and shall include all those facilities of the water system under the complete control of the utility, up to the point where the customer system begins, generally at the water meter, which is at the easement line or property line.
3. The customer system shall include those parts of the facilities which convey domestic water to points of use beyond the termination of the utility system. The term "customer system" is that of any user whether or not a charge is made.

I-D. CONNECTION WITH CUSTOMER SYSTEM

1. INSPECTIONS:

The customer's system should be open for inspection at all reasonable times to authorized representatives of the utility to determine whether cross connections or other hazards, including violations of these regulations, exist. When such a condition becomes known, the utility may deny or immediately discontinue the service to the premises by a physical break in the service until the condition has been corrected, provided that opportunity by the customer to be heard upon request shall be allowed thereafter as soon as practicable.

2. TYPE OF ASSEMBLY REQUIRED:

The type of backflow prevention required shall be a least commensurate with the degree of hazard which exists:

- a) An Approved Air Gap (AG) or an approved Reduced Pressure Principle Backflow Prevention Assembly (RP) shall be installed where the substance which could backflow is hazardous to health. Typical applications for installations are used to isolate high hazard applications such as pools, fountains, systems with chemical injections.
- b) An approved Double Check Valve Backflow Prevention Assembly (DC) shall be installed where the substance which could backflow is objectionable but does not pose an unreasonable risk to health. The DC is used to isolate low hazard applications such as irrigation systems without chemical injection.
- c) An approved Pressure Vacuum Breaker Backsiphonage Prevention Assembly (PVB), Spill Resistant Pressure Vacuum Breaker Backsiphonage Prevention Assembly (SVB), or an Atmospheric Vacuum Breaker (AVB) shall be installed where the substance which could backflow is objectionable but does not pose an unreasonable risk to health and where there is no possibility of backpressure in the downstream piping.
- d) A shutoff valve may be installed on the line downstream of a PVB and a SVB but shall not be installed downstream of an AVB.

3. APPROVED BACKFLOW PROTECTION:

Any backflow protection assembly required herein shall be approved by MWC and the State of Oregon Department of Human Services. AVBs shall meet Oregon Plumbing Specialty Code requirements.

4. ASSEMBLY INSTALLATION:

All backflow protection assemblies/devices installed shall comply with the Installation Guidelines defined in these rules and access to such assemblies/devices shall remain unrestricted at all times.

5. OWNER RESPONSIBILITY:

A water user or premise owner who obtains water from a water supplier must notify the water supplier if they add any chemical or substance to the water (OAR 333-061-0070(7)).

It shall be the responsibility of the owner of the property served to provide and keep required backflow prevention assemblies in good working condition at all times. It shall also be the responsibility of the owner of the property at any premise where backflow prevention assemblies are installed to have all assemblies tested at least once a year by a certified backflow assembly tester approved by MWC as a competent backflow assembly tester. In those instances, as determined by MWC where successive annual tests indicate failure or where there are facilities that pose extreme health risks, more frequent testing shall be required.

Backflow Prevention Assemblies shall be repaired, overhauled or replaced promptly at the expense of the owner of the property whenever they are found to be defective. Non-compliance may cause water service to be denied or discontinued.

COMMISSION RESPONSIBILITY:

It shall be the responsibility of MWC's representatives to ensure that all backflow protection for the public drinking water supply is commensurate with the degree of hazard. It shall also be the responsibility of MWC's representatives to ensure that all required backflow assembly tests, and maintenance, are performed. At the discretion of MWC, approved backflow assembly testers may be required to notify MWC in advance when the test is to be under-taken so that a Commission representative may witness the test.

Records of such tests and repairs shall be maintained by MWC, and it is the responsibility of any backflow prevention assembly tester performing tests and maintenance on backflow prevention assemblies to submit records of such tests and maintenance to MWC.

6. EXISTING ASSEMBLIES:

Backflow Prevention Assemblies installed before the effective date of these Rules which were approved at the time they were installed but are not on the current list of approved assemblies maintained by the State of Oregon Department of Human Services, shall be permitted to remain in service provided they are properly maintained, are commensurate with the degree of hazard, tested at least annually, and perform satisfactorily. When assemblies of this type are moved, or require more than minimum maintenance, or are on services that are modified, changed in size or remodel, they shall be replaced with assemblies on the current State of Oregon Department of Human Services list of approved assemblies.

8. PREMISE ISOLATION:

All Commercial Systems and Multi-Family Units shall be required to install backflow protection at the service connection to the premise at the time of service installation, remodel, tenant improvements, and/or change of use.

In addition, backflow prevention assemblies for protecting community water systems shall be installed at the service connection to premises where an approved air gap does not exist and:

- a) There is an auxiliary water supply which is, or can be, connected to the potable water piping;
- b) There is piping for conveying liquids other than potable water, and where that piping is under pressure and is installed in proximity to potable water piping;
- c) There is intricate plumbing which makes it impractical to ascertain whether or not cross connection exists.
- d) There is backsiphonage potential.
- e) Cross connections or potential cross connection exists.

For premises listed or defined in Table 32, Premises Requiring Isolation (see Appendix C), an approved RP or an approved AG shall be installed at the service connection.

Premises not listed in Table 32 shall be evaluated for degree of hazard on a case by case basis. For such systems, required backflow protection shall be commensurate with the degree of hazard. The application of standards for premise evaluation, and the installation of backflow assemblies, shall remain the same for both commercial and residential systems.

Backflow Prevention Assemblies which are installed to isolate premises from the public potable water system shall be installed on the downstream side of the meter at or near the property line or immediately inside the building being served, but in any case shall be installed before the first branch line.

New services shall be locked OFF until backflow protection compliance, and initial test, is verified by MWC.

9. TESTING:

All Assemblies must be tested upon installation and at least once per year thereafter by an approved certified tester. Records of such tests and repairs will be maintained by MWC, and it is the responsibility of any backflow prevention assembly tester performing tests and maintenance on backflow prevention assemblies to submit records of such tests and repairs to MWC.

The cost of annual performance testing and any required maintenance is the responsibility of the assembly owner. (Single-family residential customers, please refer to Section I-E: Residential Backflow Program).

All assemblies are required to be tested annually by persons authorized by the State of Oregon to test backflow prevention assemblies.

10. THERMAL EXPANSION:

The installation of a backflow assembly may allow for thermal expansion to occur. The installer is responsible to make provisions for the possibility of thermal expansion. Check with your contractor or local plumber.

I-E. RESIDENTIAL BACKFLOW PROTECTION PROGRAM

MWC has adopted a program to assist single-family residential customers with the annual testing and maintenance requirements for backflow prevention assemblies. The Residential Backflow Protection Program provides annual testing and maintenance for all privately owned backflow assemblies located on single-family residential services.

Backflow prevention assembly installation and initial performance testing is the responsibility of the assembly owner. Assemblies will be adopted into the program thereafter. All backflow prevention assemblies remain the property of the customer. Customers are responsible for maintaining adequate access for the testing and maintenance of backflow assemblies. MWC will provide annual testing and maintenance only. Major repairs such as valve replacements or assembly replacement are not covered in this assistance program, and are the responsibility of the customer.

Customers may opt to secure their own annual testing services in lieu of allowing Commission representatives access to test and maintain the assembly.

I-F. FIRE PROTECTION SYSTEMS

Backflow Protection Requirements are defined in the current "Medford Water Commission Standards for Fire Protection Systems."

I-G. INTERCONNECTION WITH OTHER WATER SUPPLIES PROHIBITED

1. MWC shall not permit any physical connection between any other water supply and MWC's water distribution system unless an approved AG or approved RP is installed and maintained at the service connection. MWC will immediately discontinue water service to any premises or customer where such a condition occurs until such time as the cross connection is eliminated or the required backflow prevention assembly is installed.

Customers using MWC's water supply and any other water supply on the same premises shall install and maintain a separate plumbing system for MWC's water supply which shall be verified by inspection, and install an approved RP at the service connection to protect against potential or inadvertent cross connections between the two systems.

I-H. PRIVATE WELLS & AUXILIARY SUPPLIES

1. MWC Cross Connection Policies and Requirements for customers with private wells and auxiliary water supplies are as follows:
 - a) No backflow protection is required if the auxiliary source is verified to be permanently inactivated by removing the well pump and associated plumbing, and welding the well casing closed. In such cases, formal abandonment in accordance with requirement of the Jackson County Water Master should be pursued by the property owner.

- b) If the well remains active an approved RP is required at the service connection. The RP shall drain to daylight and be protected from freezing. On-site plumbing is the responsibility of the local plumbing authority.
 - c) Visual inspection of a weld sealed well casing is required to avoid installing backflow protection.
 - d) Premise isolation (with an approved RP assembly) is required for all other auxiliary water sources, such as Irrigation District Supplies.
2. A new service to any premise with an active well or other auxiliary water supply on-site shall be locked OFF until the installation and initial test of a RP is verified by the MWC.
 3. An existing service to any premise with an active well or other auxiliary water supply on-site shall be required to be retro-fit with a RP at the service connection when a well is determined to be on the premises.

I-I. PROTECTION AGAINST CIRCULATING FLOW

1. MWC may refuse to service any premise with more than one service connection except that multiple service connections may be used for service to a premise under one ownership or management wherein each service connection serves a separate building, and there is no physical connection between the separate plumbing systems which would permit circulating flow at the time of application for service, and there is reasonable assurance that no future interconnection will be established.

In large industrial and commercial customer piping systems requiring multiple service connections for adequate supply and fire protection, MWC may permit such multiple connections with interconnection on the customer's premises provided that there shall be an approved backflow prevention assembly installed immediately downstream from each meter to prevent circulating flow.

I-J. VAULTS

1. Vaults and lids shall be approved pre-cast type. All vaults shall be well drained, constructed of suitable materials, and sized to allow for the minimum clearances established.

MWC provides only initial inspection and approval of vaults and appurtenances. Vaults, lids, and the backflow assembly are owned by the property owner, and they incur all responsibility and liability of these items. These items shall be maintained by the property owner.

Vaults shall be provided with a sump pump when in potential groundwater installations. Brass or plastic plugs are required in all assembly test ports in vault installations.

I-K. BACKFLOW PROTECTION FOR FIRE HYDRANT USE

(Refer to MWC's "Regulations Governing Water Service")

1. Temporary service from a fire hydrant requires a Commission installed backflow assembly and control device. Such equipment shall only be furnished by and installed and removed by Water Commission personnel. Between November 1 and through March 1, the applicant is required to provide adequate protection against freezing weather conditions.

SECTION II

INSTALLATION GUIDELINE STANDARDS

INSTALLATION GUIDELINES

Only assemblies approved for vertical installation by Oregon Department of Human Services and MWC, including the proper direction of flow, may be installed vertically.

(Refer to Appendix D: Standard Detail Drawings, for backflow assembly installations)

II-A. AIR GAP (AG)

An AG provides maximum protection from backflow hazards and may be utilized at premises where the substance which could backflow is hazardous to health.

1. An AG shall be at least twice the diameter of the supply pipeline measured vertically above the top rim of the receiving vessel – in no case less than one (1) inch.

If splashing is a problem, tubular screens may be attached or the supply line may be cut at a 45 degree angle. The air gap distance is measured from the center of the angle. Hoses are not allowed.

2. An AG shall not be altered or voided in any way without prior approval from the MWC and must be available for inspection at all reasonable times.

II-B. REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY (RP)

RPs may be utilized at premises where the substance which could backflow is hazardous to health. The RP is normally used in locations where an air gap is impractical and is effective against both backsiphonage and backpressure.

1. RPs must be sized to provide an adequate supply of water and pressure for the premises being served. Flow characteristics are not standard. Consult manufacturer's specifications for specific performance data.
2. Premises where interruption of the water supply is critical should be provided with two assemblies installed in parallel. They should be sized in such a manner that either assembly will provide the minimum water requirements while the two together will provide the maximum flow required.
3. Bypass lines are not permitted. Pipe fittings which could be used for connecting a bypass line must not be installed.
4. The assembly must be readily accessible for testing and maintenance and must be located in an area where water damage to building or furnishings would not occur from relief valve discharge. An approved air gap funnel assembly may be used to direct minor discharges away from the assembly; the air gap funnel will not control flow in a continuous relief situation. Drain lines to accommodate full relief valve discharge flow should be considered. Relief valves shall not be extended or plugged.

RPs are typically installed above grade in well drained areas, but may be installed below grade if an adequate drain to daylight is provided.

Enclosures shall be designed for easy access and sized to allow for the minimum clearances established below. Removable protective enclosures are typically installed on smaller assemblies. Daylight drain port must be provided to accommodate full pressure discharge from the assembly.

All assemblies shall have a minimum of 12 inches on the back side, 24 inches on the test cock side, and the relief valve opening shall be at least 12 inches plus nominal size of assembly above the floor or highest possible water level.

Minimum clearances for assemblies 2 inches or smaller may be reduced provided that they are accessible for testing and repairing and approved by the water purveyor. The 12-inch minimum clearance below the relief valve must be maintained.

Maximum height of installation shall not exceed 5 feet for assemblies unless there is a permanently installed platform meeting Occupational Safety and Health (OSHA) standards to facilitate servicing the assembly.

5. The assembly must be protected from freezing and other severe weather conditions.
6. Lines should be thoroughly flushed prior to installation. A strainer with blow out tapping is recommended ahead of the assembly.
7. The property owner assumes all responsibility for leaks and damage.
8. All RPs must be tested upon installation and at least once per year thereafter by an approved certified tester. Records of such tests and repairs will be maintained by MWC, and it is the responsibility of any backflow prevention assembly tester performing tests and maintenance on backflow prevention assemblies to submit records of such tests and repairs to MWC.
9. RPs shall be installed above the 100-year flood level.
10. Variances from these specifications will be evaluated on a case by case basis. Any deviations must have prior written approval of MWC.

II-C. REDUCED PRESSURE PRINCIPLE-DETECTOR BACKFLOW PREVENTION ASSEMBLY (RPDA)

RPDAs may be utilized in all installations requiring a reduced pressure backflow assembly and detector metering.

1. RPDAs shall comply with the installation requirements applicable for reduced pressure backflow assemblies.
2. Bypass meter for RPDAs must be purchased from MWC.

II-D. DOUBLE CHECK VALVE BACKFLOW PREVENTION ASSEMBLY (DC)

DCs may be installed at premises where the substance which could backflow is objectionable but not hazardous to health.

1. DCs must be sized to provide an adequate supply of water and pressure for the premises being served. Flow characteristics are not standard. Consult Manufacturer's specifications for specific performance data.
2. Premises where interruption of water supply is critical should be provided with two assemblies installed in parallel. They should be sized in such a manner that either assembly will provide the minimum water requirements while the two together will provide the maximum flow required.
3. Bypass lines are not permitted. Pipe fittings which could be used for connecting a bypass line shall not be installed.
4. The assembly shall be readily accessible with adequate room for testing and maintenance. DCs may be installed below grade in a vault, provided water-tight brass or plastic plugs are installed in the test cocks. The assembly shall not, however, be subject to continuous immersion. All vaults shall be well drained, meet MWC vault standards, and be sized to allow for the established minimum clearances.
5. Assemblies two (2) inches and smaller shall have at least 12-inch clearance below and 3-inch clearance on both sides of the assembly. All assemblies larger than two (2) inches shall have a minimum clearance of 12 inches on the back side, 24 inches on the test cock side, and 12 inches below the assembly.
6. Maximum height of installation shall not exceed 5 feet for assemblies unless there is a permanently installed platform meeting Occupational Safety and Health (OSHA) standards to facilitate servicing the assembly.
7. DCs may be installed vertically as well as horizontally provided that the assembly is approved for vertical installation by Oregon Department of Human Services and MWC, including the proper direction of flow.
8. The assembly must be protected from freezing and other severe weather condition. Lines should be thoroughly flushed prior to installation. A strainer with blow out tapping is recommended ahead of the assembly.
9. The property owner assumes all responsibility for foundation or basement wall penetration, leaks, and damage. The owner shall also see that the vault is kept reasonable free of silt and debris.
10. All DCs must be tested upon installation and at least once per year thereafter by an approved certified tester. Records of such tests and repairs will be maintained by MWC, and it is the responsibility of any backflow prevention assembly tester performing tests and maintenance on backflow prevention assemblies to submit records of such tests and repairs to MWC.
11. Variances from these specifications will be evaluated on a case by case basis. Any deviations must have prior written approval of MWC.

11-E. DOUBLE CHECK-DETECTOR BACKFLOW PREVENTION ASSEMBLY (DCDA)

DCDAs may be utilized in all installations requiring a double check valve assembly and detector metering.

1. DCDAs shall comply with the installation requirements applicable for double check valve assemblies.
2. Bypass meters for DCDAs must be purchased from MWC.

11-F. PRESSURE VACUUM BREAKER BACKSIPHONAGE PREVENTION ASSEMBLY (PVB) & SPILL RESISTANT PRESSURE VACUUM BREAKER BACKSIPHONAGE PREVENTION ASSEMBLY (SVB)

PVBs & SVBs may be utilized at premises where the substance which could backflow is objectionable but not hazardous to health.

1. Downstream side of pressure vacuum breaker may be maintained under pressure by a valve but there may be absolutely no means of imposing backpressure by pump or other means.
2. PVBs and SVBs are designed to protect against backsiphonage only, not backpressure.
3. Install in location where occasional water discharge from the assembly caused by pressure fluctuations will not be objectionable.
4. Adequate spacing shall be available for maintenance and testing.
5. Shall not be subject to flooding and be installed above the 100-year flood level.
6. Shall be installed a minimum of twelve inches above the highest downstream piping and /or outlets.
7. All PVBs & SVBs must be tested upon installation and at least once per year thereafter by an approved certified tester. Tests are the responsibility of the owner. The owner must notify MWC upon installation of any backflow prevention assembly.
8. Variances from these specifications will be evaluated on a case by case basis. Any deviations must have prior written approval of the MWC.

11-G. ATMOSPHERIC VACUUM BREAKER (AVB)

AVBs protect against backsiphonage only and shall not be installed where there is potential for backpressure.

1. Absolutely no means of shut-off on the down stream or discharge side of the atmospheric vacuum breaker.
2. For intermittent use only. Must not be pressurized for more than 12 hours in any 24 hour period.

3. Shall not be subject to any backpressure.
4. Shall not be installed in dusty or corrosive atmospheres.
5. Shall not be installed where subject to flooding and shall be installed above the 10-year flood level.
6. Shall be installed a minimum of six inches above the highest downstream piping and/or outlets.

APPENDIXES

APPENDIX A

APPROVED BACKFLOW PREVENTION ASSEMBLIES

Under current Oregon Administrative Rule 333-061-0070, Oregon Department of Human Services-approved *testable* backflow prevention assemblies shall be assemblies approved by the University of Southern California (USC), Foundation for Cross Connection Control and Hydraulic Research. Membership to the Foundation is required for access to this list of approved assemblies. The Oregon Department of Human Services has limited permission from USC to provide this reformatted list by mail to public water systems and water system consultants working within Oregon. New assemblies approved by USC are available on cumulative addendums prepared throughout the year.

For information on approved backflow prevention assemblies, contact:

Oregon Department of Human Services Drinking Water Program
Cross Connection/Backflow Prevention Program (DWP CC/BPP)
P.O. Box 14450
Portland, OR 97293-0450

Phone: (971) 673-1220
Phone: (971) 673-0405
Fax: (971) 673-0694
TTY: (971) 673-0372

Web site: www.oregon.gov/DHS/ph/crossconnection.com

OR

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200 S. Ivy St. – Room 177
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Phone: (541) 774-2450 or (541) 774-2447

Web site: www.medfordwater.org

APPENDIX B

DEFINITIONS

As used in these standards, unless the context requires otherwise, the following definitions shall apply:

- a) "APPROVED AIR GAP (AG)" means a physical separation between the free-flowing discharge end of a potable water supply pipeline and an open or non-pressurized receiving vessel. An "Approved Air Gap" shall be at least twice the diameter of the supply pipe measured vertically above the overflow rim of the vessel and in no case less than 1 inch and in accord with the Oregon Plumbing Specialty Code.
- b) "ATMOSPHERIC VACUUM BREAKER (AVB)" means a device consisting of an air inlet valve or float check, a check seat and an air inlet port(s). This device is designed to protect against a non-health hazard or a health hazard under a backsiphonage condition only.
- c) "AUXILIARY WATER SUPPLY" means any supply of water used to augment the supply obtained from the public water system which serves the premises in question.
- d) "BACKFLOW" means the flow of water or other liquids, mixtures, or substances into the distributing pipes of a potable supply of water from any sources other than its intended source, and is caused by backsiphonage or backpressure.
- e) "BACKFLOW PREVENTER" means a device, assembly or method to prevent backflow into the potable water system.
- f) "BACKFLOW PREVENTION ASSEMBLY" means a backflow prevention assembly such as a Pressure Vacuum Breaker Assembly, Spill-Resistant Pressure Vacuum Breaker Backsiphonage Prevention Assembly, Double Check-Detector Backflow Prevention Assembly, Reduced Pressure Principle Backflow Prevention Assembly, or Reduced Pressure Principle-Detector Backflow Prevention Assembly and the attached shutoff valves on the inlet and outlet ends of the assembly, assembled as a complete unit.
- g) "BACK PRESSURE" means an elevation of pressure downstream of the distribution system that would cause, or tend to cause, water to flow opposite of its intended direction.
- h) "BACKSIPHONAGE" means a drop in distribution system pressure below atmospheric pressure (partial vacuum), that would cause, or tend to cause, water to flow opposite of its intended direction.
- i) "CHECK VALVE" means a valve which allows flow in only one direction.
- j) "CROSS CONNECTION" means any actual or potential unprotected connection or structural arrangement between the public or user'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. Bypass arrangements, jumper connections, removable sections, swivel, or change-over devices, and other temporary or permanent devices through which, or because of which, backflow can occur are considered to be cross connections.

- k) "CUSTOMER" shall mean the owner or operator of an on-site water system(s) having potable water service from MWC.
- l) "DEGREE OF HAZARD" means either pollution (non-health hazard) or contamination (health hazard) and is determined by an evaluation of hazardous conditions within a system.
- m) "DOUBLE CHECK-DETECTOR BACKFLOW PREVENTION ASSEMBLY (DCDA)" means a specially designed assembly composed of a line size approved double check valve assembly assembled with a bypass containing a specific water meter and an approved double check valve assembly. The meter shall register accurately for only very low rates of flow up to three gallons per minute and shall show a registration for all rates of flow. This assembly is designed to protect against a non-health hazard.
- n) "DOUBLE CHECK VALVE BACKFLOW PREVENTION ASSEMBLY (DC)" means an assembly of two independently acting approved check valves, including tightly closing resilient seated shutoff valves attached at each end of the assembly and fitted with properly located resilient seated test cocks. This assembly is designed to protect against a non-health hazard.
- o) "POTENTIAL CROSS CONNECTION" means a cross connection that would most likely occur, but may not be taking place at the time of an inspection.
- p) "PREMISE ISOLATION" means the practice of protecting the public water supply from contamination or pollution by installing backflow prevention assemblies at, or near, the point of delivery where the water supply enters the premise. Premise isolation does not guarantee protection to persons on the premise.
- q) "PRESSURE VACUUM BREAKER BACKSIPHONAGE PREVENTION ASSEMBLY (PVB)" means an assembly consisting of an independently operating, internally loaded check valve and an independently operating loaded air inlet valve located on the discharge side of the check valve. This assembly is to be equipped with properly located resilient seated test cocks and tightly closing resilient seated shutoff valves attached at each end of the assembly. This assembly is designed to protect against a non-health hazard or a health hazard under backsiphonage conditions only.
- r) "REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY (RP)" means an assembly containing two independently acting approved check valves, together with a hydraulically operating, mechanically independent pressure differential relief valve located between the check valves and at the same time below the first check valve. The unit shall include properly located resilient seated test cocks and tightly closing resilient seated shutoff valves at each end of the assembly. This assembly is designed to protect against a non-health hazard or a health hazard.

- s) “REDUCED PRESSURE PRINCIPLE-DETECTOR BACKFLOW PREVENTION ASSEMBLY (RPDA)” means a specifically designed assembly composed of a line size approved reduced pressure principle backflow prevention assembly with a bypass containing a specific water meter and an approved reduced pressure principle backflow prevention assembly. The meter shall register accurately for only very low rates of flow up to three gallons per minute and shall show a registration for all rates of flow. This assembly is designed to protect against a non-health hazard or a health hazard.

- t) “SPILL RESISTANT PRESSURE VACUUM BREAKER BACKSIPHONAGE PREVENTION ASSEMBLY (SVB)” means an assembly containing an independently operating, internally loaded check valve and independently operating loaded air inlet valve located on the discharge side of the check valve. The assembly is to be equipped with a properly located resilient seated test cock, properly located bleed/vent valve, and tightly closing resilient seated shutoff valves attached at each end of the assembly. This assembly is designed to protect against a non-health hazard of a health hazard under a backsiphonage condition only.

- u) “THERMAL EXPANSION” means the pressure increase due to a rise in water temperature that occurs in water piping systems when such systems become “closed” by the installation of a backflow prevention assembly or other means, and will not allow for expansion beyond that point of installation.

APPENDIX C

TABLE 32

PREMISES REQUIRING ISOLATION* BY AN APPROVED AIR GAP OR REDUCED PRESSURE PRINCIPLE TYPE OF ASSEMBLY HEALTH HAZARD

1. Agricultural (e.g., farms, dairies)
2. Beverage bottling plants**
3. Car washes
4. Chemical plants
5. Commercial laundries and dry cleaners
6. Premises where both reclaimed and potable water are used
7. Film processing plants
8. Food processing plants
9. Medical centers (e.g., hospitals, medical clinics, nursing homes, veterinary clinics, dental clinics, blood plasma centers)
10. Premises with irrigation systems that use the water supplier's water with chemical additions (e.g., parks, playgrounds, golf courses, cemeteries, housing estates)
11. Laboratories
12. Metal plating industries
13. Mortuaries
14. Petroleum processing or storage plants
15. Piers and docks
16. Radioactive material processing plants and nuclear reactors
17. Wastewater lift stations and pumping stations
18. Wastewater treatment plants
19. Premises with piping under pressure for conveying liquids other than potable water and the piping is installed in proximity to potable water piping
20. Premises with an auxiliary water supply that is connected to a potable water supply
21. Premises where the water supplier is denied access or restricted access for survey
22. Premises where the water is being treated by the addition of chemical or other additives

* Refer to OAR 333-061-0070(8) Premise Isolation Requirements.

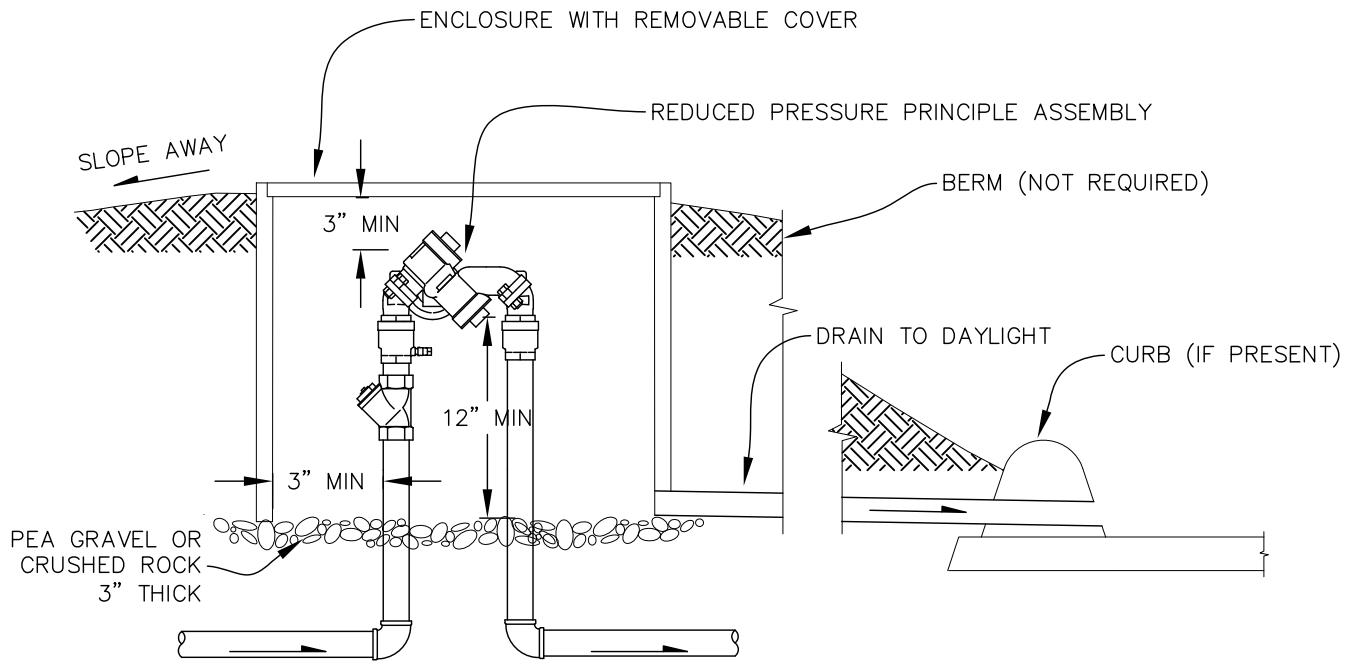
** A Double Check Valve Backflow Prevention Assembly could be used if the water supplier determines there is only a non-health hazard at a beverage bottling plant.

APPENDIX D

**STANDARD DETAIL DRAWINGS
FOR
BACKFLOW PREVENTION ASSEMBLIES**

TABLE OF CONTENTS

<u>Standard Detail No.</u>	<u>Description</u>
801	Reduced Pressure Principle Assembly (RP)
803	Reduced Pressure Principle Detector Assembly (RPDA)
806	Double Check Valve Assembly (DC)
807	Double Check-Detector Assembly (DCDA)
808	Pressure Vacuum Breaker Backsiphonage Prevention Assembly (PVB) & Spill Resistant Pressure Vacuum Breaker Backsiphonage Prevention Assembly (SVB)
809	Atmospheric Vacuum Breaker (AVB)
810	Air Gap Separation (AG)



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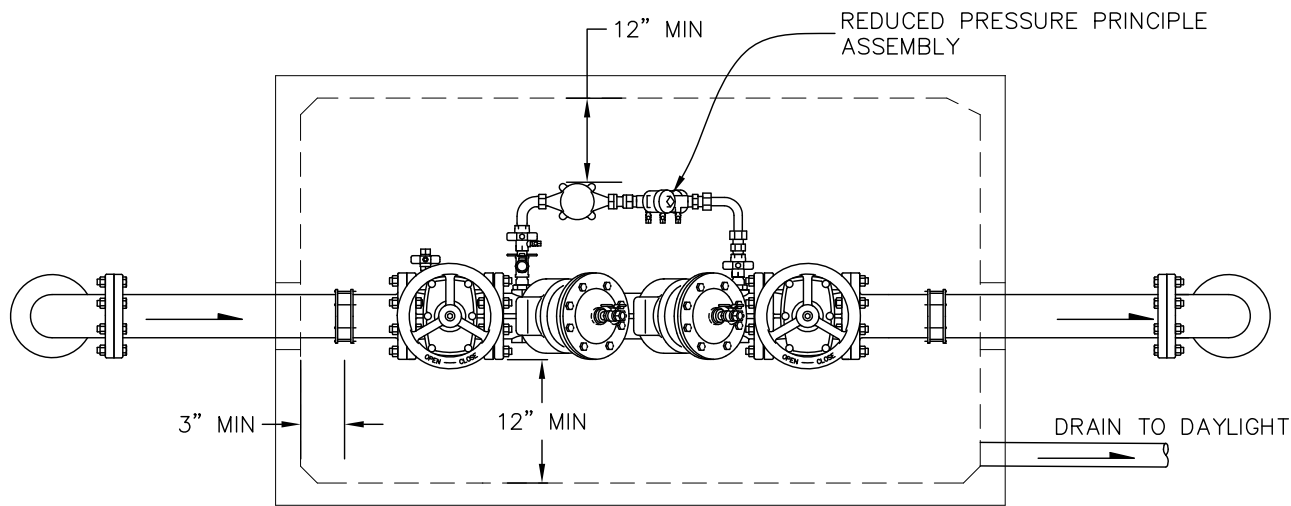
NOTES

1. RP's MUST BE INSTALLED ABOVE NATURAL GROUND, BUT MAY HAVE A BERM AROUND ENCLOSURE. ELEVATION VIEW DEPICTS AN ABOVE NATURAL GROUND INSTALLATION WITH A BERM.
2. BOTTOM AND SIDE CLEARANCES APPLY WHEN ASSEMBLIES ARE INSTALLED INSIDE BUILDING. ACCESS DOORS MAY BE PROVIDED ON SIDE OF ABOVE-GROUND VAULT.
3. RP's SHALL ALWAYS BE INSTALLED ABOVE THE 100 YEAR FLOOD LEVEL UNLESS OTHERWISE APPROVED BY MWC.
4. RELIEF VALVES SHALL NOT BE PLUGGED OR EXTENDED.
5. PROVIDE PROTECTION FROM FREEZING.
6. RP's SHALL NOT BE INSTALLED IN AN ENCLOSURE UNLESS A DRAIN TO DAYLIGHT IS PROVIDED AND BRASS OR PLASTIC PLUGS ARE PROVIDED IN ALL TEST PORTS.
7. MINIMUM CLEARANCES FOR ASSEMBLIES 2 INCHES AND SMALLER MAY BE REDUCED PROVIDED IT IS ACCESSIBLE FOR TESTING AND REPAIR AND APPROVED BY MWC. A MINIMUM CLEARANCE OF 12 INCHES UNDER THE RPPA MUST BE MAINTAINED.
8. MAXIMUM HEIGHT OF INSTALLATION SHALL NOT EXCEED 5 FEET FOR ASSEMBLY UNLESS THERE IS A PERMANENT PLATFORM INSTALLED IN ACCORDANCE WITH OCCUPATIONAL SAFETY AND HEALTH (OSHA) STANDARDS TO FACILITATE SERVICING THE ASSEMBLY.

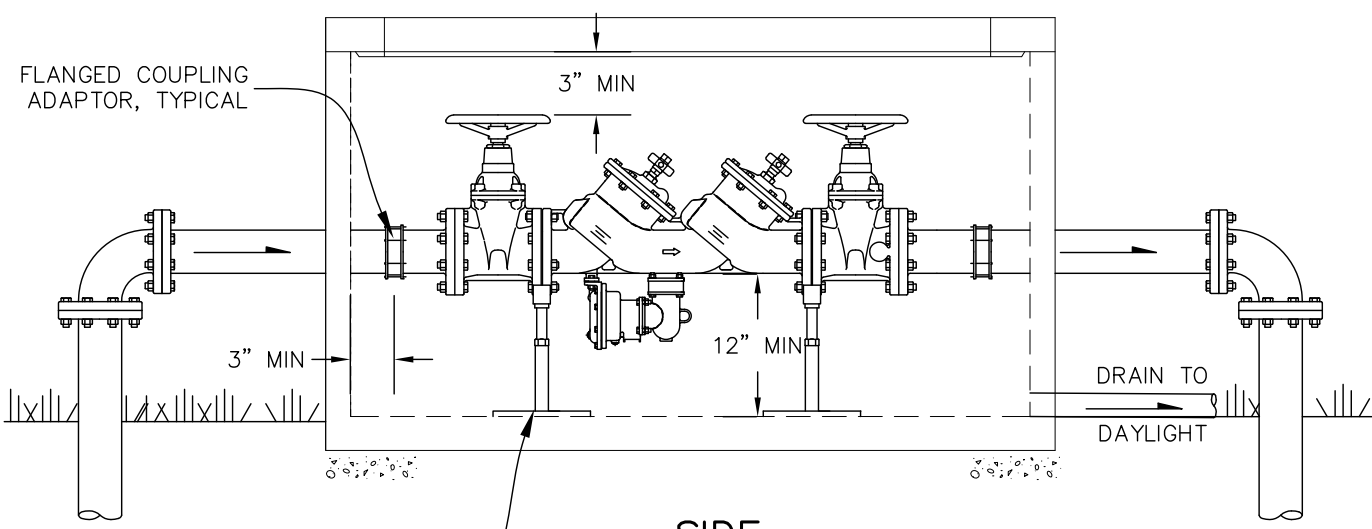
9/22/09 801.dwg



REV	REDUCED PRESSURE PRINCIPLE ASSEMBLY (RP)
10/09	STANDARD DETAIL NO. 801



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SIDE
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PROVIDE ADJUSTABLE METAL PIPE SUPPORT: GRINNELL FIG 258/FIG 259 OR AS APPROVED

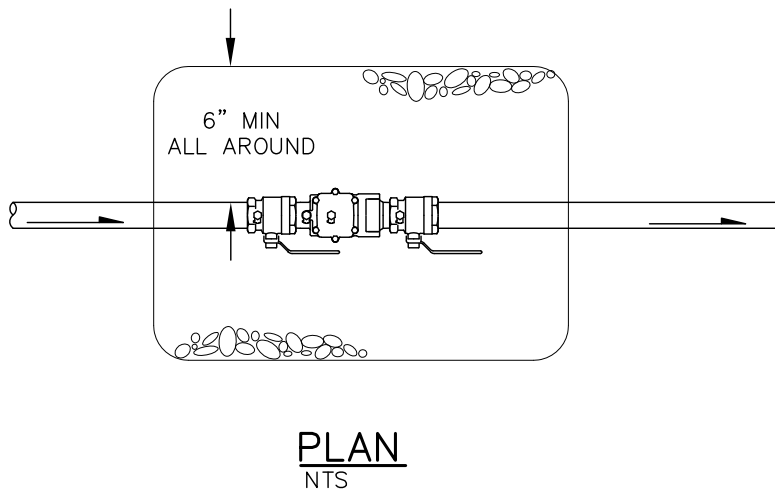
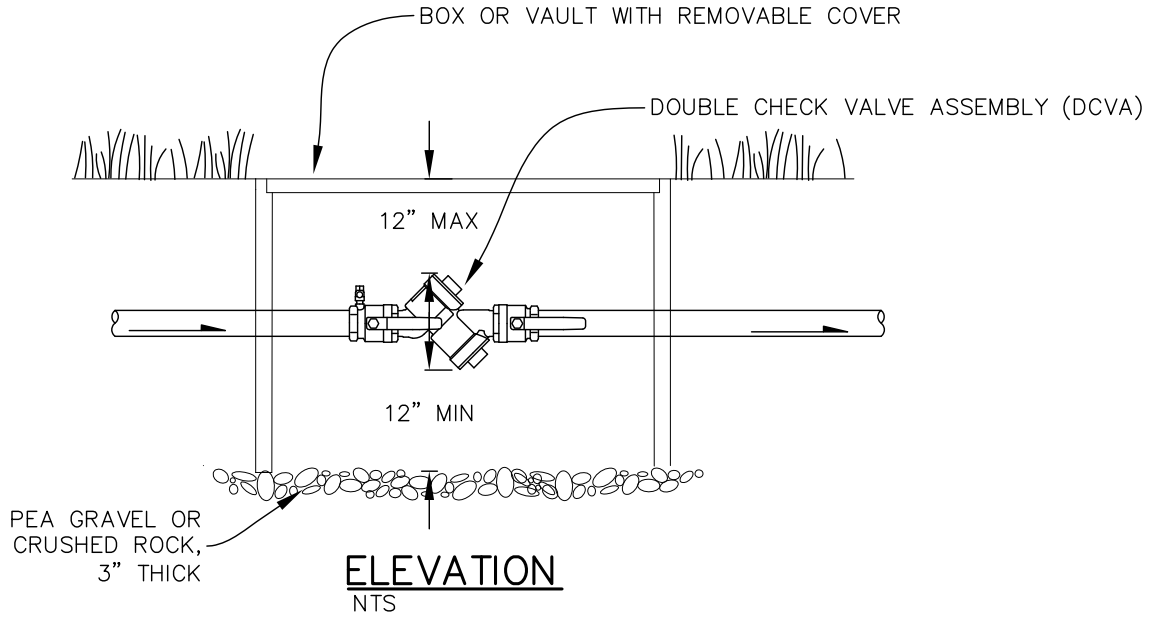
NOTE:

1. LARGE ASSEMBLIES ARE THOSE 2½" AND LARGER.
2. ASSEMBLY SHALL NOT BE SUBJECT TO FLOODING.
3. DRAIN LINES SHALL BE SIZED TO ACCOMODATE FULL RELIEF VALVE DISCHARGE FLOW.
4. RPPAs ARE TYPICALLY INSTALLED ABOVE-GRADE IN WELL-DRAINED AREAS, BUT MAY BE INSTALLED BELOW-GRADE IF AN ADEQUATE DRAIN TO DAYLIGHT IS PROVIDED.
5. RPPA SHALL BE INSTALLED ABOVE THE 100 YEAR FLOOD LEVEL, UNLESS OTHERWISE APPROVED BY MWC.
6. BRASS OR PLASTIC PLUGS ARE REQUIRED FOR ALL VAULT INSTALLATIONS.

803.DWG
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REV	REDUCED PRESSURE PRINCIPLE DETECTOR ASSEMBLY (RPDA)
10/09	STANDARD DETAIL NO. 803



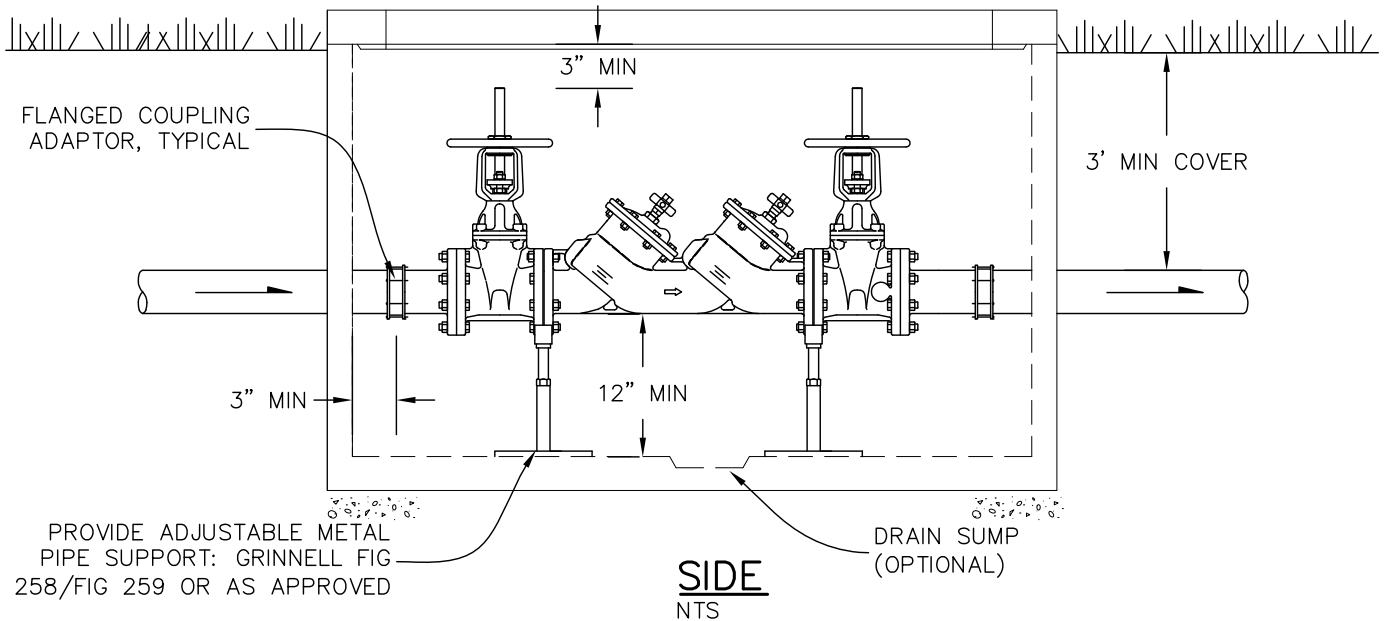
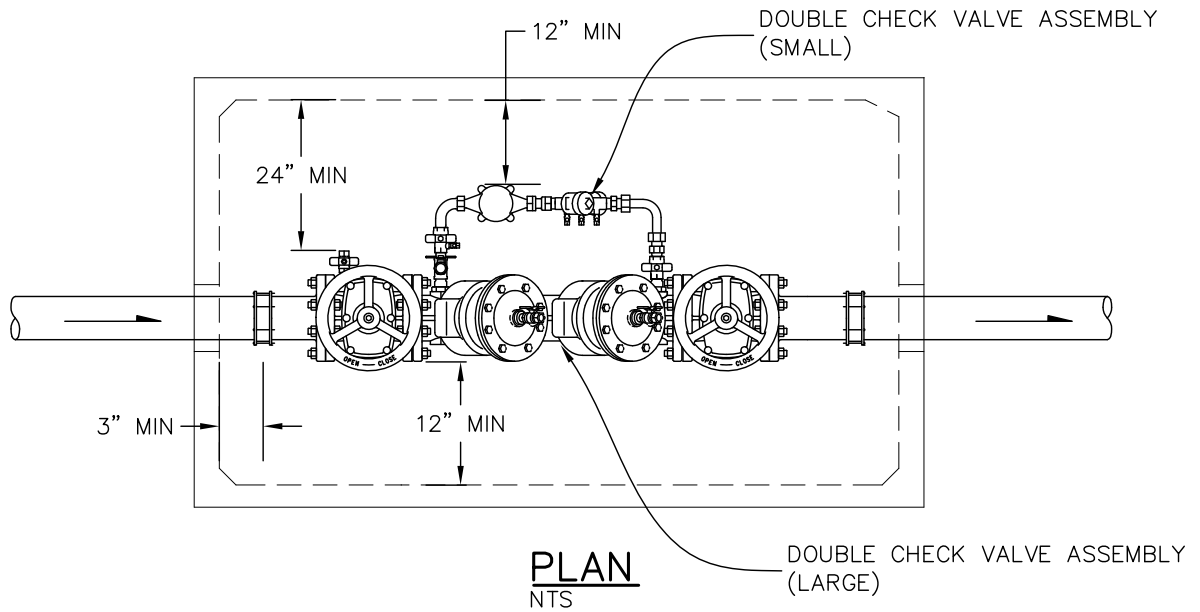
NOTES

1. PROTECTION FROM FREEZING SHOULD BE PROVIDED.
2. DC's SHALL BE INSTALLED BELOW GRADE IN A BOX OR VAULT WITH BRASS OR PLASTIC PLUGS PROVIDED IN ALL TEST PORTS AND ASSEMBLY IS NOT TO BE SUBJECT TO CONTINUOUS IMMERSION.
3. MINIMUM CLEARANCES FOR ASSEMBLIES 2 INCHES AND SMALLER MAY BE REDUCED PROVIDED IT IS ACCESSIBLE FOR TESTING AND REPAIR AND APPROVED BY MWC. A MINIMUM CLEARANCE OF 12 INCHES UNDER THE DC's MUST BE MAINTAINED.
4. DC's SHALL BE INSTALLED ABOVE THE 100 YEAR FLOOD LEVEL UNLESS OTHERWISE APPROVED BY THE MWC.

9/22/09 806.DWG



REV	DOUBLE CHECK VALVE ASSEMBLY (DC)
10/09	STANDARD DETAIL NO. 806



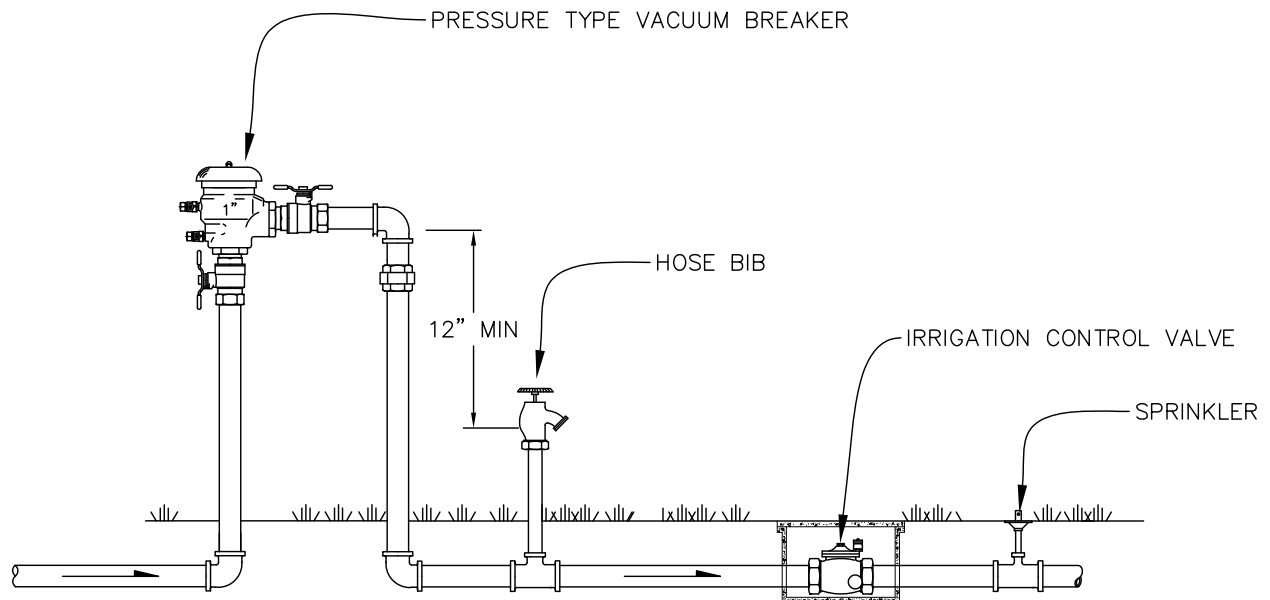
NOTE:

1. LARGE ASSEMBLIES ARE THOSE 2½" AND LARGER.
2. ASSEMBLY SHALL NOT BE SUBJECT TO FLOODING.
3. DCDAs ARE TYPICALLY INSTALLED BELOW-GRADE.
4. DCDAs SHALL BE INSTALLED ABOVE THE 100 YEAR FLOOD LEVEL, UNLESS OTHERWISE APPROVED BY MWC.
5. BRASS OR PLASTIC PLUGS ARE REQUIRED FOR ALL TESTING PORTS.

9/22/09 807.DWG



REV	DOUBLE CHECK DETECTOR ASSEMBLY (DCDA)
10/09	STANDARD DETAIL NO. 807



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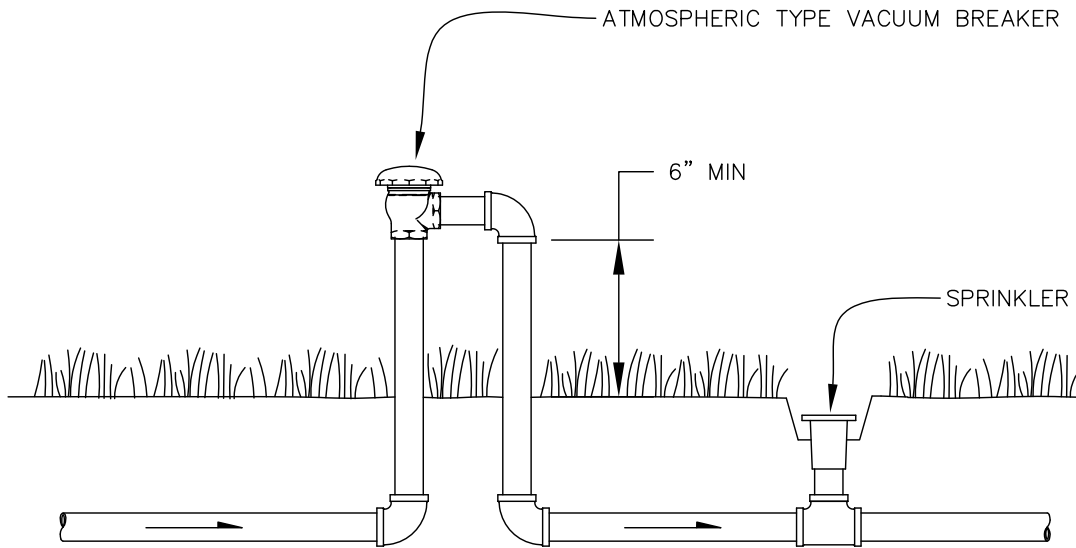
1. DOWNSTREAM SIDE OF PRESSURE TYPE VACUUM BREAKER MAY BE MAINTAINED UNDER PRESSURE BY A VALVE, BUT ANY BACKPRESSURE BY PUMP OR OTHER MEANS IS STRICTLY PROHIBITED.
2. PVB's & SVB's ARE DESIGNED TO PROTECT AGAINST BACK SIPHONAGE ONLY; NOT BACKPRESSURE.
3. PVB's & SVB's SHALL BE INSTALLED WHERE OCCASIONAL WATER DISCHARGE CAUSED BY PRESSURE FLUCTUATIONS IS ACCEPTABLE.
4. PVB's & SVB's SHALL BE INSTALLED A MINIMUM OF 12 INCHES ABOVE THE HIGHEST DOWNSTREAM PIPING AND/OR OUTLETS.
5. PVB's & SVB's SHALL ALWAYS BE INSTALLED ABOVE THE 100 YEAR FLOOD LEVEL UNLESS OTHERWISE APPROVED BY MWC.
6. PROVIDE MINIMUM CLEARANCES FOR TESTING AND REPAIR

808.DWG

9/22/09



REV	PRESSURE TYPE VACUUM BREAKER (PVB & SVB)
10/09	STANDARD DETAIL NO. 808



ELEVATION

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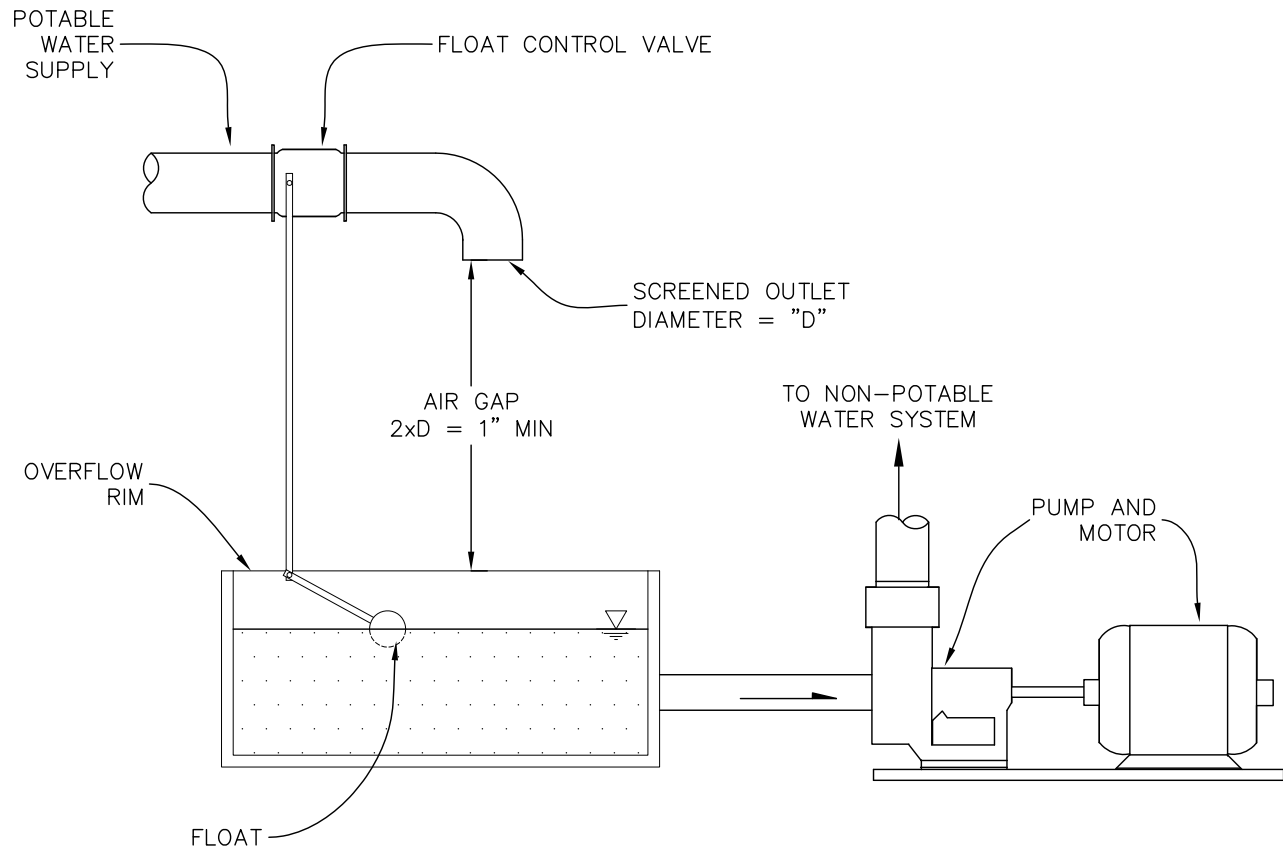
NOTES

1. DOWNSTREAM SIDE OF ATMOSPHERIC TYPE VACUUM BREAKER (AVB's) SHALL NOT CONTAIN ANY MEANS OF SHUT-OFF.
2. AVB's SHALL NOT BE SUBJECT TO ANY BACKPRESSURE.
3. AVB's ARE FOR INTERMITTANT USE ONLY AND SHALL NOT BE PRESSURIZED FOR MORE THAN 12 HOURS IN A 24 HOUR PERIOD.
4. AVB's SHALL NOT BE INSTALLED WHERE OCCASIONAL DUSTY OR CORROSIVE CONDITIONS OCCUR.
5. AVB's SHALL BE INSTALLED A MINIMUM OF 6 INCHES ABOVE THE HIGHEST DOWNSTREAM PIPING AND/OR OUTLETS.
6. AVB's SHALL ALWAYS BE INSTALLED ABOVE THE 100 YEAR FLOOD LEVEL UNLESS OTHERWISE APPROVED BY MWC.

9/22/09 809.DWG



REV	ATMOSPHERIC TYPE VACUUM BREAKER (AVB)
10/09	STANDARD DETAIL NO. 809



9/22/09 810.DWG



REV	AIR GAP SEPARATION (AG)
10/09	STANDARD DETAIL NO. 810