



<b>Number:</b>	P300-17-1	<b>Type of Policy:</b>	Operations
<b>Title:</b>	Cross-Connection Control and Backflow Prevention		
<b>Description:</b>	Provides guidance for control of cross connections and prevention of backflow		
<b>Original Adoption:</b>	1/12/17	<b>Reviewed:</b>	n/a
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The Scotts Valley Water District protects the public water system from contamination or pollution resulting from backflow.

## Background

Backflow is the flow of water or other substances from the customer's plumbing into the public water system and can represent a significant public health risk. The District, as the water purveyor, has the responsibility to maintain the quality of water within its system and to maintain public confidence in its use.

This policy has been established under the provisions and authority of the State of California Code of Regulations Title 17 and the Scotts Valley Water District Code of Regulations Number 1.4.7

Title 17 requires that water purveyors protect the public water system from contamination by implementing a cross-connection control policy and list the general guidelines. The Scotts Valley Water District Code of Regulations Number 1.4.7 provides the regulatory framework for the District Cross-Connection Control and Backflow Prevention Policy. It, in part, establishes that each customer is responsible to furnish, install, and maintain any required backflow prevention devices and it gives the District the authority to determine the type of protective device required in accordance with the degree of hazard present on the premises. It also provides the authority for discontinuing all water services to a premises should the requirements of the Policy not be implemented.

## Definitions

**Approved** – Acceptable to the District as suitable for intended use.

**Auxiliary Water** – Any water supply on or available to the premises other than the public water system. These auxiliary waters include water from another public water system; any natural source such as a well, spring, pond, river, or stream; industrial fluids; used waters, such as grey water, reclaimed water or recycled water; or any water held in a storage tank, reservoir or cistern.

**Backflow** – The undesirable reversal of flow of water or mixtures of water and other liquids, gases or other substances into the distribution pipes of the public water system from any source or sources.

Backflow Prevention Assembly or Backflow Prevention Device – An approved effective method or mechanical apparatus as defined in this policy intended to reliably prevent backflow into the public water system.

Backpressure – Any elevation of pressure in the downstream piping system (by pump, elevation or piping, of steam, water, and/or air pressure) above the supply pressure at the point of service which would cause or potentially cause a reversal of the normal direction of flow through the water service connection.

Backsiphonage – A method of backflow where a reduction in system pressure causes a negative or sub-atmospheric pressure to exist at a point in the water system.

Contamination – An impairment of the quality of the water which creates an actual hazard to the public health through poisoning or the spread of disease by sewage, industrial fluids, waste or used water.

Cross-Connection – Any unprotected actual or potential connection or structural arrangement between a customer's water system and any other source or system through which it is possible to introduce into any part of the system any used water, industrial fluid, gas, or substance other than the intended water with which the system is supplied. Bypass arrangements, jumper connections, removable pipe sections, swivel or change-over devices and other temporary or permanent devices through which this may occur are considered to be cross-connections.

Customer – Any person, business or other entity receiving water service from the District.

Degree of Hazard - Defines the type of backflow prevention device used to prevent backflow from occurring at the point of a cross-connection from potential pollutants and contaminants.

District – Scotts Valley Water District.

Fire Systems – Fire suppression systems consisting of on-site sprinklers, hose connections, piping, hydrants and other appurtenances used to protect premises from fire.

Industrial Fluids – Any fluid or solution which may be chemically, biologically or otherwise contaminated or polluted in a form or concentration such as would constitute a health, system, pollution or plumbing hazard if introduced into an approved water supply. This may include, but not be limited to: polluted or contaminated used waters; all types of process waters and used waters originating from the public water system which may deteriorate in sanitary quality; chemicals in fluid form; plating acids and alkalis; circulated cooling waters connected to an open cooling tower and/or cooling waters that are chemically or biologically treated or stabilized with toxic substances; contaminated natural waters such as from wells, springs, ponds, rivers, streams, bays, harbors, seas, irrigation canals or systems, etc.; oils, gases, glycerin, paraffin's, caustic and acid solutions and other liquid and gaseous fluids used for industrial or other processes or for firefighting purposes.

Pollution – An impairment of the quality of the water to a degree which does not create a hazard to the public health but which does adversely and unreasonably affect the aesthetic qualities of such waters for use by the public.

Point of Service – Terminal end of a service connection from the public water system, i.e. where the District loses jurisdiction and sanitary control over the water at its point of delivery to the customer's water system. When a meter is installed on the service connection, the point of service begins on the customer's side of the meter.

Potable Water – Any water which is safe for human consumption pursuant to the standards set by the California State Water Resources Control Board – Division of Drinking Water

Premises – A building or facility which is determined by the District to be a single unit for purposes of receiving, using, and paying for water service.

Public Water Supply, Public Water Supply System or Public Water System – Water System operated by the District to supply water for commercial, domestic, irrigation or fire protection purposes. This system will include all sources, facilities and appurtenances between the water source and the point of delivery used to produce, convey, treat or store water for public consumption or use. The system may consist of but not be limited to pipes, valves, pumps, tanks, reservoirs, hydrants and service connections.

Service Connection – Pipeline and water meter assembly which provides the physical connection between the public water main and the premises to be served.

Used Water – Water supplied by the District, from the public water system to a customer's water system, after it has passed through the service connection and is no longer under the sanitary control of the District.

### **Protection Based on a "Policy of Containment"**

Even though plumbing code provisions may be rigidly enforced on new construction, experience has shown that on-site modifications and alterations to private plumbing are common. Many possibilities therefore exist where cross-connections can be created and result in hazards to the public water supply. These hazards may be caused by something as simple as a submerged outlet on a hose connection or as complex as mechanical failure on intricate process machinery.

The only practical method to eliminate the property-side hazards to the public water system is to provide backflow protection at the point of service. In this manner, the public water system is protected regardless of operations occurring inside the customer's property or subsequent changes made to the private plumbing.

Therefore, the District's backflow prevention program is a policy of containment. Under this basis, high risk service connections are identified by category and the public water system is protected by an approved backflow prevention assembly installed by the customer at the customer's point of service. The District generally will not seek to identify or eliminate actual or potential plumbing cross-connections within the customer's premises.

### **Backflow Prevention Methods**

A backflow prevention method is an approved specific piping configuration or an approved device or assembly of devices specifically designed to prevent backflow at the customer's service connection.

A. Types of devices that meet this requirement are limited to the following:

1. Air Gap (AG) – A physical separation between the free-flowing discharge end of the public water system and an open or non-pressurized receiving vessel. The air gap separation must be a minimum of one inch or double the diameter of the supply pipeline, whichever is greater.
2. Reduced Pressure Principle Assembly (RP) – An assembly conforming to AWWA Standard C511-97 which consists of a mechanical, independently operating, hydraulically dependent relief valve located between two independently operating, internally loaded check valves that are located between two tightly closing resilient-seated shutoff valves with four properly placed resilient-seated test cocks.
3. Reduced Pressure Principle Detector Assembly (RPDA) – A specifically designed assembly composed of an approved line-sized RP assembly with a bypass apparatus containing a water meter and a specific approved RP assembly.
4. Double Check Valve Assembly (DC) – An assembly conforming to AWWA Standard C510-97 which consists of two independently operating, internally loaded check valves that are located between two tightly closing resilient-seated shutoff valves with four properly placed resilient-seated test cocks.
5. Double Check Detector Assembly (DCDA) – A specifically designed assembly composed of an approved line-sized DC assembly with a bypass apparatus containing a water meter and a specific approved DC assembly.

B. Types of backflow prevention devices that are approved on a case by case basis for certain applications but are not designed to prevent contamination of the public water supply at the customer's service connection are limited to the following:

1. Dual Check Valve – A specifically designed assembly consisting of two internally loaded, independently operating in-line check valves.
2. Dual Check Valve with Intermediate Atmospheric Vent – A specifically designed assembly consisting of two internally loaded, independently operating in-line check valves with an atmospheric vent between the two checks.
3. Hose Bibb Vacuum Breaker – A specifically designed apparatus installed on a hose bibb that is composed of a spring-loaded check valve which seals against an atmospheric outlet.

C. List of approved assemblies – The District maintains a list of approved backflow prevention assemblies by type, size and manufacturer. The list can be furnished to any customer required to install or repair a backflow prevention assembly.

- D. Basis for assembly approval – A backflow prevention assembly may be approved by the District if it has received the approval of the Foundation for Cross-Connection Control and Hydraulic Research at the University of Southern California, or the State of California’s Division of Drinking Water.

**General Backflow Prevention Requirements**

- A. An approved backflow prevention assembly will be installed and maintained at every service connection to a premise when the District determines that the water supplied by the public water system may be subject to contamination, pollution, or other deterioration in quality by actual or potential conditions within that customer’s water system.
- B. The backflow prevention method to be utilized will be determined by the District. The method will be sufficient to protect against the potential hazard, as determined by the District, to the public water supply.
- C. Backflow prevention assemblies are installed by the customer, at the customer’s service connection, and at the customer’s expense. The installation must be in conformance with the current revision of the District’s Water System Standard Specifications.
- D. Backflow prevention assemblies will be sized at least equivalently to the diameter of the service connection. When a customer requires a continuous water supply to the premises during testing and repairs, two or more backflow prevention assemblies may be installed in parallel at the service connection. The sum of the cross-sectional areas of the parallel assemblies must be at least equal to the cross-sectional area of the service connection.
- E. All backflow prevention assemblies will be installed in a manner as to be readily accessible for testing and maintenance and be located above ground as close as practical to the point of service, in conformance with the District’s Water System Standard Specifications.
- F. An air-gap separation must be located as close as practical to the customer’s point of service. All piping between the customer’s service connection and receiving tank must be entirely visible unless otherwise approved by the District.
- G. The location of all new backflow prevention assemblies must be approved by the District prior to installation.
- H. Backflow prevention assemblies are installed as permanent fixtures to premises. Some rare instances may exist where it is possible to remove a previously installed backflow prevention assembly due to a change of condition at the site. Such approvals will be made on a case by case basis by the District prior to the removal of the assembly.
- I. Inspection of a customer’s premises may be required to verify whether a backflow prevention assembly is necessary. The District may request the customer to complete a cross-connection survey questionnaire form as part of this process.

**Retroactive Installation Requirements**

- A. The provisions of this policy apply to all existing water customers and all future water customers.
- B. All existing water service connections are subject to periodic survey by the District to identify water customer premises where service protection is required. The selection of service connections to be surveyed will be determined by the District and will be based on suspected or potential hazards.
- C. Backflow prevention assemblies installed but not complying with current requirements must be replaced at the customer’s expense with an approved backflow prevention assembly, in conformance with the District’s Water System Standard Specifications.
- D. Backflow prevention assemblies that are no longer on the District’s List of Approved Assemblies, no longer have spare or replacement parts available, or are no longer approved by the District for certain usages must be replaced with an approved backflow prevention assembly at the customer’s expense.

**Facilities or Activities Requiring Backflow Prevention**

Backflow prevention requirements for all service connections or water users are determined by the following criteria:

- A. Specified facilities or activities – When any of the following activities are conducted on premises served by the public water system, a potential hazard to the public water supply will be presumed, and a backflow prevention method of the type specified for the activity listed below must be permanently utilized or installed at the service connection for that premises.

Facility or Activity	Method
1. Animal clinics and animal grooming shops	RP
2. Any premises where a cross-connection is maintained or likely to occur; where cross connection inspections cannot be made with sufficient frequency to assure that cross-connections do not exist; or has a history of cross-connections being established.	RP
3. Any premises with an auxiliary water source	RP*
4. Automotive repair with steam cleaner, acid or other chemical cleaning equipment	RP
5. Beverage or chemical bottling plants	RP
6. Breweries	RP
7. Buildings with water fixtures higher than three stories or greater than thirty-four feet in elevation above curb level, or premises subject to a backpressure situation	RP
8. Buildings with water storage tanks	RP
9. Buildings with landscape fountains, ponds or baptismal tanks	RP**
10. Buildings with sewage ejectors (not to include single family detached residences)	RP
11. Bulk propane distributing facilities	RP
12. Canneries, packing houses, and reduction plants	RP
13. Car wash facilities	RP
14. Industrial fluid systems including steam generation and centralized heating and air conditioning facilities	RP
15. Chemical plants	RP

16.	Chemically treated potable or non-potable water systems, including certain solar hot water and hydronic radiant heating systems	RP
17.	Civil works (government facilities not open for inspection by the District)	RP
18.	Commercial laundries	RP
19.	Construction meters	RP
20.	Dairies and cold storage plants	RP
21.	Dry cleaners	RP
22.	Dye works	RP
23.	Film processing laboratories	RP
24.	Food processing plants	RP
25.	High schools and colleges	RP
26.	Holding tank disposal stations	RP
27.	Hospitals and mortuaries	RP
28.	Medical and dental buildings, sanitariums or convalescent homes engaged in diagnosis, care or treatment or human illness	RP
29.	Irrigation systems (not single family detached residences, unless i or ii exist):	
	i. Has a separate water service connection used for sprinklers or drip irrigation	RP
	ii. Has a combined domestic/irrigation service larger than one inch in diameter	RP
30.	Laboratories using toxic materials	RP
31.	Manufacturing, processing, and fabricating plants using toxic or non-toxic materials	RP
32.	Mobile home parks	RP
33.	Motion picture studios	RP
34.	Multiple interconnected services	RP
35.	Paper and paper production plants	RP
36.	Plating plants	RP
37.	Power plants	RP
38.	Radioactive materials processing facilities	RP
39.	Recreational Vehicle (RV) parks, or other facilities with RV hookups	RP
40.	Restricted, classified, or other closed facilities	RP
41.	Sand and gravel plants	RP
42.	Sewage or storm-drainage facilities	AG or RP

\* Grey water systems need to be evaluated on a case by case basis as outlined in item b) below.

\*\* Certain situations may warrant installing hose bibb vacuum breakers instead of an RP assembly. Such instances will be evaluated on a case by case basis.

B. Activities not listed – The District determines backflow prevention requirements for all other facilities or activities not specified herein. This determination will be a case by case evaluation of the degree of hazard present, and requires the customer to comply with all other provisions within this policy. At a minimum, the evaluation will consider the existence of or potential for cross-connections, the nature of materials handled on the property, the probability of a backflow event occurring, the degree of piping system complexity and the potential for piping system modification. Typically, this will result in the installation of a reduced pressure principle assembly.

C. Multiple use facilities or activities – When two or more of the activities listed in section a) above are conducted on the same premises, the most restrictive backflow prevention method required for any of the activities conducted on the premises will be required at all service connections to the

premises. The order of most restrictive to least restrictive backflow prevention methods is as follows:

1. Air gap (most restrictive)
  2. Reduced pressure principle assembly or RPDA
  3. Double check valve assembly or DCDA (least restrictive)
- D. Unspecified use – Any commercial/industrial facility without a defined use or identified tenant will be protected by a minimum of a reduced pressure principle assembly. This is typically applied to new construction or when an existing facility is remodeled.
- E. Service size – Due to the potential volume of water associated with a backflow incident, any service equal to or larger than two inches in diameter will be protected by a minimum of a reduced pressure principle assembly. Large services installed for the purposes of providing water to fire suppression systems are protected as outlined in section g).
- F. Vehicles, portable tanks or equipment – Street sweeping vehicles, water trucks, portable water tanks and equipment such as hydraulic sewer cleaners, portable insecticide, herbicide or commercial power washing spray tanks must have an air gap between the receiving vessel and water source, or be supplied through a water service with a reduced pressure principle assembly, or be permitted by the District to draw water from an RP-protected District supplied portable hydrant meter.
- G. Fire Suppression Systems:
1. A fire suppression system with a direct connection to the public water system must be protected in a manner commensurate with the hazard. Fire suppression systems are classified and protected as follows:

<u>Class</u>		<u>Protection Required</u>
Class I	Direct connection to public water system. No pumps or reservoirs physical connections to other water supplies, anti-freeze or other water supplies, anti-freeze or other additives of any kind. All sprinkler drains discharge to atmosphere.	DCDA*
Class II	Same as Class I except that booster pumps may be installed in the service lines. A connection for a fire pumper truck may also be provided.	DCDA*
Class III	Direct connection to public water system with on-site storage or pressure tanks. Storage facilities are filled by or connected to the public water system	RPDA
Class IV	Direct connection to public water system similar to Classes I and II with an unapproved auxiliary water supply on or available within 1,700 feet of the pumper connection.	RPDA
Class V	Direct connection to public water system and interconnected with unapproved auxiliary supplies such as pumps taking suction from reservoirs exposed to contamination or from rivers, ponds, wells, or industrial water systems. Also includes systems where an-	RPDA



tifreeze or other additives are used.

Class VI Direct connection to public water system and interconnected with an industrial water RPDA system, with or without gravity storage or pump suction tanks.

\* Two-inch diameter and smaller Class I and II residential fire suppression system connections do not require above-ground backflow prevention devices unless specifically required by the District. A dual check valve will be included as part of the two inch and smaller fire service installation per the District's Water System Standard Specifications.

2. All fire services larger than two inches in diameter require above-ground backflow prevention devices installed as part of the double check or reduced pressure principle detector assembly per the District's Water System Standard Specifications. This includes fire services for dedicated private on-site fire hydrants. For certain special situations, an underground double check detector assembly may be approved by the District.
3. Where fire services and domestic/industrial services are installed to the same premises, all service connections may be required to be protected to the highest degree applicable to any individual service to that premises.
4. Existing large fire service connections that do not comply with current backflow prevention requirements will be retrofit at the customer's expense with an approved backflow prevention assembly, in conformance with the District's Water System Standard Specifications. These situations are often discovered during the building permit process, a cross connection control survey, or when the existing service is not functioning correctly.

### Testing, Maintenance, and Records

#### A. General Requirements:

1. As a condition of receiving water service, the customer is responsible for maintaining the proper operating condition of all their backflow prevention assemblies at all times.
2. The customer must test their backflow prevention assemblies at least once a year. Backflow prevention assemblies installed on a service connection used for construction activities will be tested quarterly. Backflow prevention assemblies are required to be tested after they are installed, relocated or repaired. The date of installation acceptance will determine the subsequent testing anniversary.
3. The District will notify the customer when their backflow prevention assembly testing is due. If a test reveals the assembly to be defective or in unsatisfactory operating condition, the customer will perform any repairs necessary (including replacing the assembly) which will return the assembly to satisfactory operating condition within the timelines established in this Policy.
4. Multiple backflow prevention assemblies at a premise or for a particular customer may be given common test dates for the customer's convenience, as long as test intervals defined in this policy are met.

5. All expenses associated with the testing and maintenance of backflow prevention assemblies are the responsibility of the customer.

B. Qualified Testers:

1. All testing will be performed by an American Water Works Association (AWWA) Certified Backflow Prevention Assembly Tester who is recognized by the District. The District may recognize other agencies or organizations involved with the training and certification of testers. Approved testers must perform the backflow prevention assembly tests as described in the tenth revision of the Manual of Cross-Connection Control published by the Foundation for Cross-Connection Control and Hydraulic Research at the University of Southern California.
2. A List of Approved Testers will be maintained by the District and made available to all customers required to install or maintain a backflow prevention assembly.
3. Testers must abide by the provisions of the District's Backflow Tester's Policy and Responsibilities Agreement to be included on the List of Approved Testers.

C. Records:

1. The customer or customer's representative must submit the results of all tests, repairs, or replacement of backflow prevention assemblies on forms approved by the District.
2. Submitted records must be completed and signed by an approved tester.
3. The customer is responsible for prompt submission of records to the District after completion of the activity for which the record is made. Failure to submit records within the timeframes established by the District are subject to the enforcement actions established herein.

### Compliance

A. Discontinuance of Water Service:

If the customer within the time specified in this section:

1. fails to install a required backflow prevention device; or
2. fails to properly test a backflow prevention device; or
3. fails to properly maintain a backflow prevention device; or
4. bypasses or removes a backflow prevention device, or
5. fails to submit records of tests of or repairs to a backflow prevention device; or
6. fails to respond to a cross-connection survey form or inspection request; or
7. has an identified unprotected cross-connection existing in the customer's water system; then,

water service to all service connections to the premises will be discontinued and the service will not be restored until the condition is remedied.

B. Notification – Prior to disconnecting any water service for a violation of this policy, the District will

provide the following notice:

1. Testing of an existing backflow prevention device – When scheduled testing of an existing backflow prevention device is due, the District will send written notice to the customer. The customer has thirty days from the date of the notice to complete the testing. If a completed test report is not received within the thirty day period, the District will send the customer a second notice. If a completed test report is not received by the District within thirty days of the second notice, all water services to the premises will be discontinued upon provision of a forty-eight hour written final notice.
2. Installation of a backflow prevention device on an existing service – When the District determines a new backflow prevention device is required on an existing service, the customer has forty-five days from the date of written notice to complete the installation in conformance with the District’s Water System Standard Specifications. If the installation is not completed within the forty-five day period, the District will send the customer a second notice. If the installation is not completed within fourteen days of the date of the second notice, all water services to the premises will be discontinued upon provision of a forty-eight hour written final notice.
3. Installation of a backflow prevention device on a new water service – When the District determines a new backflow prevention device is required on a new water service; the device must be installed in conformance with the District’s Water System Standard Specifications prior to acceptance of the new service by the District.
4. Initial testing of a new backflow prevention device – When the District has accepted the installation of a new backflow prevention device, the customer will then have thirty days from the date of written notice to complete the initial testing. If a completed test report is not received by the District within the thirty day period, all water services to the premises will be discontinued upon provision of a forty-eight hour written final notice.
5. Removing or bypassing a backflow prevention device, or other violation of this policy – Upon discovery, the District will provide the customer a written notice allowing thirty days to correct the violation. If the violation is not corrected within the thirty day period, all water services to the premises will be discontinued upon provision of a forty-eight hour written final notice.
6. Failed, inoperable or malfunctioning backflow prevention devices – Backflow prevention devices that have failed their annual test or are discovered to be inoperable or malfunctioning must be repaired and restored to proper working order. The District will provide the customer written notice of the requirement to repair the device and have it re-tested within fourteen days. If a completed test report is not received by the District within the fourteen-day period, all water services to the premises will be discontinued upon provision of a forty-eight hour written final notice.
7. Relocated backflow prevention devices – Backflow prevention devices that have been relocated are presumed to be protecting the water supply from a known hazard and therefore must be tested once the installation is finished. When a backflow prevention device relocation is com-

plete, the District will provide the customer written notice of the requirement to have the device tested within fourteen days. If a completed test report is not received by the District within the fourteen-day period, all water services to the premises will be discontinued upon provision of a forty-eight hour written final notice.

- C. The District will disconnect water service without notice to any customer when the District discovers or determines that the customer's water system is contaminating the public water system.

**References:**

1. California Code of Regulations, Title 17 §§ 7583-7622
2. SVWD Code of Regulations, Number 1.4.7, Scotts Valley Water District
3. Water System Standard Specifications, Scotts Valley Water District
4. Backflow Tester's Policy & Responsibilities Agreement, Scotts Valley Water District
5. Manual of Cross-Connection Control, Tenth Edition, Foundation for Cross- Connection Control and Hydraulic Research, University of Southern California, 2012