

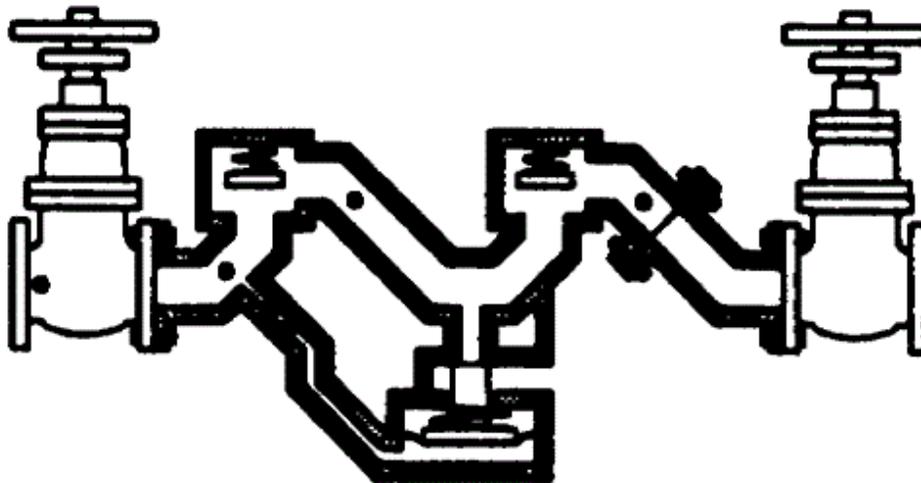


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*Shaping
our community
together*

Cross-Connection Control Program

Department of Public Works



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1. Introduction

1.1. Purpose and Scope

This Policy establishes the Cross Connection Control Plan for the City of Lacey. The purpose of this plan is to provide a clear definition of regulated existing and potential connections, provide procedures and design criteria for backflow prevention, outline duties of parties pertaining to the Public Drinking Water System, and summarize current city, state, and federal policies and regulations regarding cross connections. This revision supersedes any previous editions.

The City of Lacey relies on 'Premise Isolation' to administer the cross-connection program. The customer is responsible to install backflow assemblies at fixtures within their establishment, per the 'Uniform Plumbing Code', to protect the potable water from contaminating other areas of the establishment. All pertinent departments within the City of Lacey shall coordinate efforts in administering this policy.

The City of Lacey Public Works Department will carry out the functions of the Cross Connection Control Program. The Public Works Director will oversee and manage the program administration and designate employees to carry out daily procedures. These designees will meet the requirements outlined for certification. This joint effort will include communication between the CCS and other water operations staff, water system designers, engineers, financial, and administrative staff.

The City of Lacey will educate the public regarding cross-connection hazards by various means including but not limited to: brochure distribution, City website information, Consumer Confidence Reports, displays at public functions, site inspections, questionnaires, predevelopment meetings, pre-construction meetings and over-the-counter dialogue.

1.2. Importance of Backflow Prevention

Contaminants may be introduced into the potable water system during backflow conditions or through an unprotected cross connection. These may be microbiological contaminants (e.g. Giardiasis, Legionella, Hepatitis, Typhoid, *E. coli*), chemical contaminants (e.g. boiler chemicals, herbicides, pesticides, industrial chemicals), or physical contaminants (e.g. hot water, compressed air, gasoline).

When you go to your tap, you can have confidence in the fact that the City of Lacey operates a reliable, first-class water system. It is important to us that our drinking

water customers, their families and businesses receive drinking water that is safe all day, every day.

2. Definitions

2.1. Key Definitions

The following are definitions for words which are widely used throughout this document. Therefore, it is important to understand these key terms.

Backflow	The undesirable reversal of the flow of water from its intended direction. It occurs when a differential pressure exists between two different points in a continuous fluid system. Backflow is caused by either backpressure or backsiphonage.
Cross Connection	Any actual or potential connection between a potable water line and any source of non-potable liquid, solid, or gas that could contaminate the potable water supply by backflow.
Potable Water	Water suitable for human ingestion, free from harmful or objectionable materials.
Non-Potable Water	Water that has not been examined, properly treated, and not approved by appropriate authorities as being safe for consumption.

2.2. Definitions Pertaining to the Cross-Connection Control Program

Actual Cross Connection	A cross connection that currently exists.
Acute Hazard	Posing an immediate risk to human health.
Auxiliary Water Supply	Any water supply on or available to the premises other than the City of Lacey water supply. These auxiliary waters may include water from another purveyor’s public potable water supply or any natural source(s) such as a well, spring, river, stream, etc., or “used waters.”
Backflow Assembly Tester (BAT)	An individual certified by Washington State Department of Health who inspects, tests, maintains and repairs backflow assemblies and air gaps that protect the public water system.

Backflow Prevention Assembly	An assembly that has passed laboratory and field evaluation tests performed by a certified organization and is listed on the State of Washington DOH list of approved backflow prevention assemblies.
Backpressure	Results when pressure on the user's side of the service connection is greater than the pressure provided by the Public Water System. Some common causes are: <ol style="list-style-type: none">1. Pump2. Boiler3. Elevated tank or tall building
Backsiphonage	Results from a negative pressure within the piping system (partial vacuum). Some common causes are: <ol style="list-style-type: none">1. High velocities in pipe lines2. Line repair or break3. Lowered main pressure due to high water withdrawal rate (e.g. firefighting or main flushing)4. Reduced pressure on the suction side of a booster pump
Contamination	Degradation of the quality of the potable water by any foreign substance which creates a hazard to public health or which may impair quality of the water.
Cross-Connection Control Specialist (CCS)	An individual certified by Washington State Department of Health that develops and implements a cross-connection control program, including investigation and enforcing compliance.
Local Administrative Authority	The local building official, board, department or agency authorized to administer and enforce the provisions of the Universal Plumbing Code as adopted under Chapter 19.27 of the Revised Code of Washington
Local Health Agency	Refers to Thurston County Department of Health (DOH), Office of Drinking Water.
Potential Cross Connection	A cross connection that may occur at any time. Examples include: bypass arrangements, jumper connections, unattached hose connections, intricate piping, existing wells onsite, etc.

Premise Isolation	A means of protecting the City owned and controlled water system through the installation of approved air gaps or backflow prevention assemblies at or near the service connection (or an alternate location acceptable to the City) to isolate the user's water system from the City's distribution system. This type of protection does not provide protection to personnel on the premises.
Premises	Any and all areas on a customer's property which are served or have the potential to be served by the City of Lacey Water System.
Public Water System	Refers to the City of Lacey water distribution system, providing water for human consumption.
Purveyor	An agency, subdivision of the state, municipal corporation, firm, company, mutual or cooperative association, institution, partnership, person, or other entity owning or operating a public water system. This includes the authorized agents of such entities.
Reclaimed Water	Wastewater which is suitable for uses other than potable water as a result of treatment. Class A reclaimed water is clean enough for public contact and almost any use except drinking.
Service Connection	The point of connection between a user's piping and the water supplier. The water meter serves as this point.
Water Supplier	The person or organization that owns or operates the approved water supply system.
Water User	Any person obtaining water from the City of Lacey.

2.3. Backflow Prevention Assemblies

RBPA	Reduced Pressure Backflow Assembly; incorporates the use of two independently-acting spring-loaded check valves separated by a spring-loaded differential pressure relief valve, two resilient seated shutoff valves and four properly located test cocks.
DCVA	Double Check Valve Assembly; two single check valves assembled within one body and furnished with four test cocks and two shut-off valves.

AG	Air Gap ¹ . Non mechanical devices referring to the unobstructed vertical space between the water outlet and the flood level of a fixture.
DCDA	Double Check Detector Assembly; an outgrowth of the double check valve and is primarily utilized in fire line installations.
RPDA	Reduced Pressure Detector Assembly; an outgrowth of the Double Check Detector Assembly and is typically only used on fire line applications.
PVBA	Pressure Vacuum Breaker Assembly; an outgrowth of the SRVB used to prevent backsiphonage in constant pressure applications.
SRVB	Spill-Resistant Vacuum Breakers; prevent backsiphonage on indoor point-of-use applications.
Hose Bibb VB	Hose Bibb Vacuum Breaker; consists of a spring-loaded check valve that seals against an atmospheric outlet when the water supply is turned on. Required use for Lacey water customers. (See Fig. 4)

3. Statutory Requirements

3.1. Introduction

The program in this manual contains each of the elements required by Federal and State regulations pertaining to cross connection control; this includes enforcement authority, administration, personnel, certification, facility surveys, assembly testing, and public education.

3.2. References

1. Environmental Protection Agency Safe Drinking Water Act
 - a. 40 CFR 141. National Primary Drinking Water Regulations
2. Revised Code of Washington (RCW) Title 43
3. Washington Administrative Code (WAC) 246-290. Group A Public Water Suppliers

¹ Air Gaps are not considered assemblies, but these configurations are acceptable for the protection of the water supply. As their approval is limited to certain situations, please check with Community Development prior to installation to determine if your site is acceptable for this configuration.

- a. WAC 246-290-415. Operations and Maintenance
- b. WAC 246-290-490. Cross Connection Control
4. WAC 246-292. Waterworks Operator Certification
5. Washington State Department of Health (DOH)
 - a. Publication #331-234 - *Guidance Document: Cross-Connection Control for Small Water Systems.*
6. American Water Works Association (AWWA) Standards
 - a. *Cross-Connection Control Manual, Accepted Procedure and Practice*
7. USC Foundation for Cross-Connection Control and Hydraulic Research
 - a. *Manual of Cross Connection Control*
8. Uniform Plumbing Code (UPC) Chapter 10
9. Uniform Fire Code (UFC)
10. City of Lacey Development Guidelines and Public Works Standards
 - a. Chapter 6. Water
11. Lacey Municipal Code (LMC)
 - a. LMC 13.48.070. Cross-connections and backflow protection. (Ord. 195 §7, 1971; Ord. 946 §2, 1992; Ord. 104 §7, 1968).

3.3. Responsibility

Implementing an effective cross connection control program requires full cooperation of the water users, suppliers, and local health agency. If the drinking water system on a premise is found to be contaminated, the health agency and water supplier should be promptly notified and appropriate measures taken to eliminate contamination. The responsibilities of the various entities involved are outlined below.

3.3.1. Cross Connection Control Specialist (CCS)

3.3.1.1. A designated CCS shall develop, implement, and maintain a cross-connection control program that meets WAC requirements. This person will serve as Cross-Connection Program Manager*, with support as needed from additional certified Cross-Connection Control Specialists to ensure at least one certified operator is on staff at all times. These personnel include:

- a. Ashley Smith, Water Resources Division CCS*
- b. Terry Cargil, Water/Wastewater Supervisor
- c. Lance Sponberg, Senior Utilities Control Tech
- d. Ed Andrews, Senior Water Distribution Tech
- e. Jason Bourgault, Controls Specialist
- f. Andrew Smith, Controls Specialist
- g. Chris Nickell, Water Treatment Plant Operator
- h. Tracy Anderson, Senior Wastewater Control Tech
- i. Jim Baker, Controls Specialist

3.3.1.2. A CCS shall perform the following duties:

- a. Assess the degree of hazard to the public water system

Cross Connection Control

- b. Determine appropriate backflow protection
 - c. Inspect backflow prevention assemblies (BPAs) to verify adequate protection for the degree of hazard
 - d. Investigate and respond to backflow incidents
 - e. Develop and maintain cross-connection control records
 - f. Complete and sign cross-connection related reports
 - g. Take corrective action when a consumer fails to comply with requirements regarding installation, inspection, field testing, maintenance, or repair of a backflow preventer
 - h. Review inspection and test reports for backflow preventers
- 3.3.1.3. If the purveyor grants exceptions to mandatory premises isolation as required by WAC, the CCS shall:
- a. Determine on a case by case basis whether such an exception is appropriate;
 - b. Complete and sign an exception form;
 - c. Include the completed form in DOH Annual Summary Report and Department records.

3.3.2. Backflow Assembly Tester (BAT)

A BAT shall inspect, test, maintain, and repair backflow prevention devices and air gaps that protect the public water system and report the results to the Public Works Department CCS and the owner of the backflow preventer. This will be accomplished by conforming to the following:

- Inspected backflow assemblies must have a tag attached indicating the test date and passing status.
- Record inspection and test results completely, accurately, and legibly.
- Submit instrument calibration records and current BAT certification card to the City of Lacey CCS.
- Any suspected fraudulent test reports will be rejected.

3.3.3. Water User

A water user refers to the customer. The water user has the primary responsibility to keep contaminants out of the potable water system. This responsibility begins at the user connection and includes all water distribution piping on the premises. The water user has the responsibility of notifying the water supplier when a cross-connection exists.

3.3.4. Property Owner

If an actual or potential cross-connection exists, the property owner shall have a backflow prevention assembly installed, tested, and maintained at their expense as directed by the water supplier.

3.3.5. Water Supplier

Cross Connection Control

The City of Lacey Water System is operated and maintained to ensure a safe and reliable drinking water supply, as required under the Federal Safe Drinking Water Act. This includes implementing a cross connection control program to prevent contamination of the Lacey Water System by backflow. This responsibility begins at the source and ends at the user connection; it includes the entire distribution system.

3.3.6. Health Agency

The WA DOH oversees and regulates all planning, capital construction, maintenance, and monitoring of the Lacey Water system as an approved drinking water supply. This includes ensuring that drinking water systems have and implement cross connection control programs to protect the health of consumers using public drinking water supplies.

3.4. Record Keeping and Reporting

All original records (correspondence, plans, etc.) will be kept in the water system's files.

3.4.1. Record of Risk Assessment

For each customer, the City shall maintain a record of the initial risk assessment and subsequent re-assessments, in the form of a completed:

- Water Use Questionnaire (i.e., for residential customers); and/or
- Cross-Connection Survey Report.

3.4.2. Inventory of Backflow Preventers

The designated CCS shall maintain via a digital database an inventory of all backflow preventers or air gaps required to protect the distribution system to include:

- Information on the exact location of the backflow preventer or AG (adequate details to find the backflow preventers), as well as GIS location information;
- Description of hazard isolated (either the category of premises such as a medical clinic or the fixture such as a boiler);
- Type, size, make, model, serial number and installation date of backflow assembly, or AG details including installation date; and
- Size, make, model and installation date of AVBs used on irrigation systems.

3.4.3. Inventory of Backflow Preventers Test/Inspection Reports

For each assembly field test or AG inspection, the test report inventory information should include at a minimum:

- The name and certification number of the BAT performing each test or inspection;
- Test results (pass/fail and actual readings) or inspection results; and
- Repair/re-plumbing history.

3.4.4. Correspondence

The City will maintain copies of all correspondence with customers, DOH, and the Local Administrative Authority for a period of at least five years. The City will also maintain, *as a permanent record*:

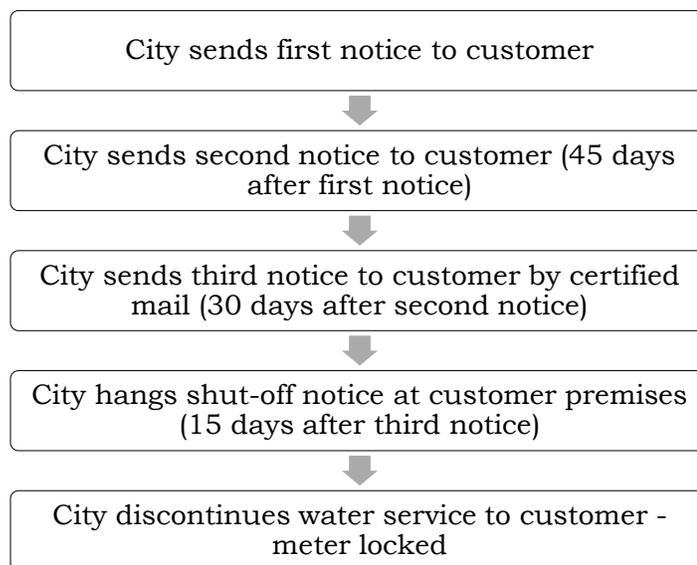
- Current service agreements
- Notification to the customer to install a backflow preventer(s) to protect the public water system from contamination.

4. Enforcement

It is unlawful for any person to allow contaminants to backflow from their facility and/or property into the City distribution system. Any person who willfully violates any of the provisions or requirements of this Policy is guilty of a gross misdemeanor (LMC 13.48.080) and upon said conviction of offense shall be subject to a fine not exceeding the sum of \$5000.00 and/or one (1) year in jail. Each day that each violation of this chapter continues shall be punishable as a separate offense.

Any services existing now or hereafter that create an actual or potential cross-connection shall be disconnected and/or eliminated. Connections which cannot be disconnected and/or eliminated shall require the installation of a backflow prevention assembly.

Service of the city water supply system to any premises upon which the potential for backflow exists, and/or a user has failed to complete backflow testing requirements, may be discontinued or refused unless such corrective action is taken. If at any time a serious threat to public health exists, water service will be terminated immediately. (LMC 13.48.070)



5. Backflow Incident Procedures

The City will immediately begin a backflow incident investigation whenever the initial evaluation of a water quality complaint indicates that:

- A backflow incident has occurred (i.e., drinking water supply has been contaminated) or may have occurred; or
- The complaint can't be explained as a "normal" aesthetic problem.

Also, whenever a water main break (or power outage for pumped systems) causes a widespread loss of water pressure in the system (creating backsiphonage conditions), City staff will initiate a check of distribution system water quality as a precursor to the need for a backflow incident investigation.

5.1. Agency Notification

The City will notify DOH, the Local Administrative Authority, and local health jurisdiction as soon as possible, but no later than the end of the next business day when a backflow incident contaminates the potable water supply. An emergency contact telephone list will be maintained in the water system's O&M Manual.

5.2. Customer Notification

As soon as possible, the City will notify customers not to consume or use water. This could remain in effect for several days while the source and type of contamination is identified, and the distribution system is cleaned and/or disinfected.

The City will begin notification procedures with the customers nearest in location to the assumed source of contamination (usually the customer(s) making the water quality complaint).

The City will inform the customer of the reasoning behind the backflow incident investigation and efforts to restore water quality. Customers will be informed when they may use water, and of the need to boil water for consumption until the incident is resolved (e.g. bacteriological test results received from lab).

When a customer cannot be notified immediately, the City will place a written notice on the front door handle, and a follow-up visit will be made to confirm they received notice.

5.3. Identification of Source of Contamination

Consideration will be given to the distribution system as a potential source of contamination (e.g. air valve below ground, water source).

The City will not start flushing the distribution system until the source of contamination is identified (flushing may aggravate the backflow situation, and will

likely remove the contaminant before a water sample can be collected to fully identify the contaminant).

The City will conduct a site to site survey to search for the source of contamination and the extent that the contaminant has spread through the distribution system.

Note: a check of water meters may show a return of water (meter running backward) to the distribution system.

When the cross connection responsible for the system contamination is located, water service will be discontinued to that customer, until the customer completes corrective action ordered by the City.

5.4. Isolation

Portions of the system that are suspected of being contaminated will be isolated by closing isolating valves; leave one valve open in a one-way flow configuration to ensure that positive water pressure is maintained throughout the isolated system.

City staff will notify all affected customers in the isolated area first followed by other customers served by the system.

5.5. Public Health Impacts

The City will seek immediate input from and work with state and local agencies to accurately communicate and properly mitigate potential health effects resulting from the backflow incident. If appropriate, the City will refer customers that may have consumed the contaminant or had their household (or commercial) plumbing systems contaminated to public health personnel and Local Administrative Authorities (plumbing inspectors).

5.6. Cleaning/Disinfecting the Distribution System

A plan of action will be developed and implemented for cleaning the contaminated distribution consistent with the contaminant(s) identified. Where both chemical and bacteriological contamination has occurred, disinfection will occur after the removal of the chemical contaminant.

5.7. Backflow Incident Report Form

The Department of Health "Backflow Incident Report Form," DOH 331-457-F will be completed and filed following the incident.

6. Survey and Evaluation of Hazards

6.1. Introduction

A cross connection control survey is the first step in abating cross-connection hazards. This includes a review of a customer's water use practices, with the purpose of identifying where the water system may be interconnected with a potential source of contamination.

6.2. Notification Procedures

It shall be standard operational procedure for the City of Lacey staff to provide the customer advanced notice and coordinate a mutually convenient time before conducting a survey of the premises. Unannounced inspections shall be used in the case of customers who have failed to provide necessary information to continue water service or if actual cross-connections are observed.

Following the survey, the customer will receive a letter informing them of the findings and what (if any) remedial actions are necessary. Typically, sixty days will be granted; however, this may be shortened depending on the degree of hazard involved and the history of the device(s) in question.

6.3. Priority

The following sequence will be used to determine the priority in which surveys will be initiated according to the probable severity of health impacts, should a backflow incident occur, and the likelihood of existing cross-connections. The Water Resources division shall maintain a list of pending surveys to be conducted within a given year.

1. Premises that have been identified as having an actual cross-connection.
2. Customers that meet the use definitions of WAC 246-290-490 table 9: Severe and High Health Cross-connection Hazard Premises Requiring Premises Isolation by AG or RPBA.
3. Customers that have an active permit for construction or tenant improvement.
4. Premises that are suspected of having a potential cross-connection.
5. Commercial customers shall be surveyed before residential customers.

6.4. Building Development

In the case of new development, the City of Lacey will review applicable plans and determine backflow prevention assemblies required, if any. In any case, a minimum of premise isolation RPBA will be required on any new commercial construction. A residential development (e.g. apartment complex, condominium, mobile home park) having one or more metered connections serving more than two living units per meter will be treated as a commercial service and will require premise isolation. This assembly shall be installed prior to the City Of Lacey releasing water meter.

If customer requires a building permit, the status of their current backflow protection will be reviewed. If a significant change of use or tenant improvement occurs that changes the facilities' risk, or involves >50% of the square footage of the building, a premises isolation will be required. The tenant will require service isolation, regardless of this threshold, if they meet the requirements on Table 1 (Premises Requiring Mandatory Service Protection) and are non-conforming.

Following permit issuance, the device will be inspected by Public Works staff to insure it is appropriate for the applicable hazard and that installation is in accordance with Development Guidelines.

6.5. Facilities Requiring Backflow Protection

Installation of requested backflow protection assemblies shall be a condition of continued water service from the City and shall also be a condition of receiving a business license from the City.

Customers may request an exemption from mandatory premises isolation if they meet the criteria outlined on "Premises Isolation Exemption," DOH 331-156-F.

6.5.1. Severe Health Cross-Connection Hazards

Properties identified as a "Severe Health Cross-Connection Hazard" (as identified in WAC 246-290-490 table 9) must install an RPBA in combination with an approved air gap as a premise isolation. This includes radioactive material processing facilities and wastewater treatment plants.

6.5.2. Mandatory Isolation

Properties identified in Table 1 require mandatory RBPA isolation, at a minimum.

Table 1: Premises Requiring Mandatory Service Protection

This includes, but is not limited to, the following facilities and/or equipment:

• Auto body/repair shops	• Irrigation with chemical addition
• Car washes	• Swimming pools
• Bakeries	• Piers and docks
• Commercial kitchens/restaurants/ premises where food is being prepared	• Greenhouses/Agricultural use
• Food processing facility	• Tall buildings (≥ 3 stories)
• Butchers (includes fish markets and livestock)	• Water storage tanks or pressure tanks
• Distilled breweries/wineries/beverage bottling plants	• Wells (groundwater or aux. supply)
• Beauty salons or barber shops	• Multiple water services
• Nail salons	• Water reuse/recycling
• Commercial laundry facilities	• Booster pumps
• Dry-cleaning establishments	• Chemically treated boilers
• Dental office/Laboratory	• Large boilers (more than 350000 BTU)
• Medical offices/Laboratories (Includes offices that administer medication)	• Heat exchangers (single wall) or cooling towers
• Pharmacies	• Water cooled equipment or chillers
• Veterinary offices/Laboratories	• Manufacturing, cleaning, processing, or fabricating plants
• Funeral Parlors/Mortuaries	• Chemicals used in processing (e.g. photo laboratories, dye plants)
• Apartment complexes	• Warehouses with toxic chemical storage
• Hotels and/or motels	• Sewage treatment or handling
• Mobile home parks or acquired systems supplied with a master meter ³	• Petroleum processing or storage
• Nursing homes	• Complex plumbing
• Marijuana growing/processing facilities	• Survey access denied or restricted

If you believe that your premise does not require a Backflow Prevention device, you may have a Professional Engineer, Registered Architect, or Licensed Master Plumber submit a request for exemption to the Public Works Department for consideration.

6.5.3. Fixture Isolation

In addition to mandatory premises protection, there are numerous fixtures, equipment areas, or other common use areas which could have cross-connection potential. Table 2 lists some examples of these hazards which must be inspected and analyzed to determine potential risk. These require additional backflow protection.

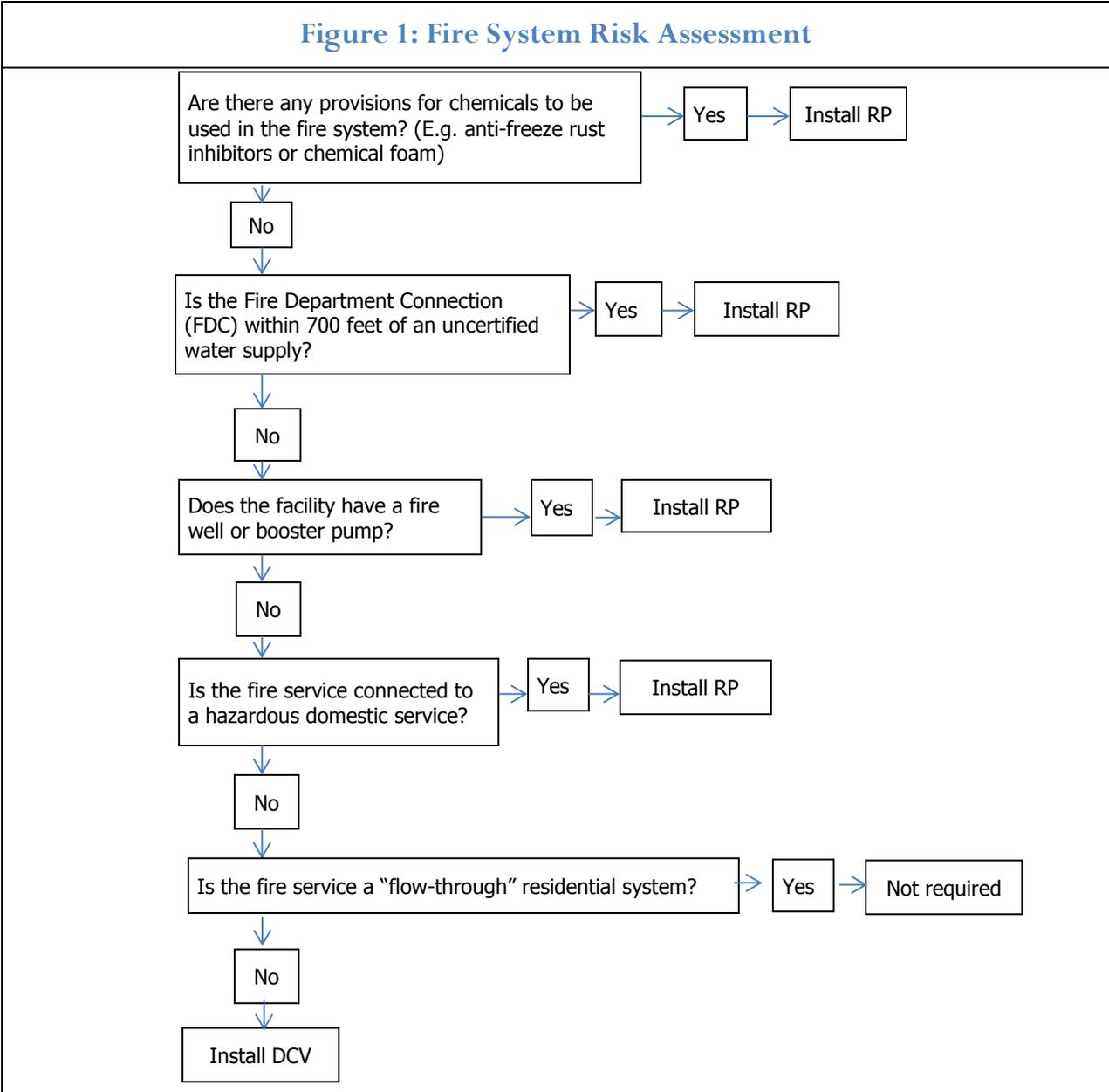
Table 2: Fixtures, Equipment and Areas with Backflow Potential	
This includes, but is not limited to, the following facilities and/or equipment:	
<ul style="list-style-type: none"> • Carbonated beverage dispensers 	<ul style="list-style-type: none"> • In ground irrigation systems³
<ul style="list-style-type: none"> • Tapped coffee lines 	<ul style="list-style-type: none"> • Aquariums⁴
<ul style="list-style-type: none"> • Detergent dispensers 	<ul style="list-style-type: none"> • Decorating ponds⁴
<ul style="list-style-type: none"> • Kitchen equipment 	<ul style="list-style-type: none"> • Hoses and hose bibs - VB
<ul style="list-style-type: none"> • Commercial dishwashers 	<ul style="list-style-type: none"> • Hot tubs/swimming pools⁴
<ul style="list-style-type: none"> • Ice makers⁴ 	<ul style="list-style-type: none"> • Medical equipment
<ul style="list-style-type: none"> • Janitor sinks⁴ 	<ul style="list-style-type: none"> • Laboratory equipment
<ul style="list-style-type: none"> • Lavatories⁴ 	<ul style="list-style-type: none"> • Agricultural equipment
<ul style="list-style-type: none"> • RV dump stations 	<ul style="list-style-type: none"> • Water trucks or temporary water connections⁴

³ DCVA/PVBA protection may be used with Public Works approval

⁴ AG protection may be used with Public Works approval

6.5.4. Fire Sprinkler Systems

Under normal conditions fire sprinkler systems shall be isolated by a DCVA, at a minimum. The following risk assessment will be used to determine if a higher degree of protection is required.



6.5.5. Auxiliary Water Supply

Lacey addresses the use of permit-exempt wells for auxiliary water supply in the LMC, the Development Guidelines and Public Works Standards, and in water service policies of the Water System Comprehensive Plan. Existing permit-exempt wells are required to be decommissioned as a condition of receiving a new water service connection from the Lacey water system, and existing Lacey water customers are prohibited from drilling new permit-exempt wells. If a current customer has an auxiliary water supply on their premises, they will be required to comply with one of the following options:

- 1) Install an RPBA at each service connection immediately downstream (user side) of their meter.
- 2) Eliminate the auxiliary water supply to City specifications. State law prohibits keeping an unused well onsite; therefore, wells must be decommissioned according to Washington State Department of Ecology specifications. Permanently disconnect all apparatus required to draw water from the supply such as a lake, stream, or spring.
- 3) Discontinuing City of Lacey water service.

The customer will be required to pass an inspection with the Public Works Department confirming successful elimination of the potential cross-connection.

6.6. Hazard Re-Assessment

Customers will be re-assessed to determine risk based on the following table:

Table 3: Hazard Re-Assessment	
Hazard Re-Assessment Task	Schedule
Customers assessed as a high health hazard (Table 9 of WAC 246-290-490 facilities) and protected by a premises isolation AG or RPBA	Not required as long as annual test results are satisfactory
Customers assessed as requiring premises isolation (supplemental to Table 9 of WAC 246-290-490 facilities)	Within 3 years if DCVA Installed
Customers where in-premises backflow assemblies are relied upon by purveyor	Within 3 years
All residential customers where purveyor relies upon compliance with Uniform Plumbing Code	Within 5 years (questionnaire)

7. Installation

7.1. Process

7.1.1. Permits and Plan Review Applications may be obtained from the Public Works Department. A plan review is required for any:

- 1) 2" or larger backflow prevention assembly
- 2) PVBA or SRVB

7.1.2. Devices must be installed by a Lacey Licensed Plumber inside of a building, or a Licensed Contractor, in full compliance with all relevant aspects of the Uniform Plumbing Code, and approved for use in Washington State.

7.1.3. BPA installation shall be inspected and approved by a City of Lacey CCS prior to testing.

7.2. General Considerations

7.2.1. Field modifications that affect the functionality or ability to test and maintain BPAs are not allowed. If the assembly is to be vertically oriented, the type and model specified shall be approved by DOH for vertical installation.

7.2.2. All BPAs shall be suitably supported and braced to prevent movement or strain.

7.2.3. Assemblies may not be installed above or next to electrical panels or motors.

7.2.4. Assemblies installed more than 5 feet above floor or ground level shall have a permanent, solidly constructed platform under it to provide safe access for testing and maintenance. The platform must comply with all applicable safety standards and policies; a ladder is not acceptable.

7.2.5. For installations where uninterrupted water service is necessary, a parallel assembly should be installed to facilitate testing and maintenance. The bypass or parallel assembly shall be of the same type (DCVA/RPBA).

7.2.6. The piping and fittings on the inlet side of the BPA shall be rigid brass, copper, or schedule 80 PVC. Galvanized piping or fittings are not allowed.

7.2.7. Assemblies used in domestic services lines shall be lead free.

7.3. Thermal Expansion

The installation of a backflow assembly may alter system-operating pressure, flow, and/or influence other hydraulic functions. Additionally, thermal expansion may result from the installation of a backflow assembly. It is the property owner's responsibility to ensure system-operating requirements are adequate.

7.4. Location

All backflow protection assemblies shall be installed in a location that is easily accessible for inspection and testing, with protection from freezing and adequate clearances for their proper operation. They shall never be submerged in water, or installed in an area subject to flooding. Drawings of installation specifications are located in City Development Guidelines, Chapter 6. Devices that do not meet these criteria shall be relocated as required by the City.

The City of Lacey has the authority to perform regular inspections on all backflow assemblies used to protect the Lacey water system and shall be provided reasonable access to the premises for inspection purposes. If reasonable access cannot be provided, a reduced pressure backflow assembly must be installed at the owner/user's expense, at the service connection to that premises.

7.4.1. Clearances

7.4.1.1. All BPA's shall be installed in a manner that facilitates testing and operation. Both shut-off valves and all test cocks shall be operable and accessible. There shall be no obstacles or structures that may prevent access to the assembly.

7.4.1.2. Assemblies 2" and smaller shall have at least 6" clearance on all sides of the assembly. Alternatively, if the assembly is to be installed near a wall indoors, there shall be a minimum of 3" between the assembly and wall, and a minimum of 18" on the test cock side.

7.4.1.3. Assemblies larger than 2" shall have a minimum of 12" clearance on all sides of the assembly. In addition, they shall have a minimum of 24" clearance on the test cock side.

7.4.1.4. RPBA's must have a minimum of 12" clearance below the assembly drain opening for proper relief operation.

7.4.2. Indoor

An RPBA installed inside a building shall be in a location where occasional spitting from the relief valve and possible constant discharge in the event of a fouled check valve will not be objectionable. An approved air gap assembly, provided by the manufacturer or fabricated for the specific installation, may be installed.

A line from the funnel may be run to an adequately sized floor drain of equal or greater size. Drains shall be sized to carry the full-rated flow of

the assembly. Check with the manufacturer for the relief valve discharge rates to determine the size of drain required.

7.4.3. Outdoor

Assemblies must be protected from freezing and other severe weather conditions. This is accomplished with the use of an approved insulated box and concrete pad.

7.4.4. Vaults

7.4.4.1. Vaults shall have adequate drainage. This is accomplished by complying with minimum clearances as specified in Development Guidelines, and utilizing a minimum of 12" of drainage rock below the vault or irrigation box.

7.4.4.2. Vaults containing 3" or greater BPAs must be equipped with a drain or float activated electric pump. Alternatively, the vault may have a bore-sighted drain to daylight.

7.4.4.3. RPBA's may not be installed below ground.

7.5. Air Gap

If an air gap is to be utilized, it must be approved by the CCS and meet the following criteria:

- 1) Greater than 2 times the diameter of the supply pipe opening, but never less than 1" from the supply pipe opening and flood-level rim of the receiving vessel.
- 2) Side walls, ribs, or similar obstructions may affect the air gap if within a distance of three times the diameter of the opening for a single wall, or four times the diameter of the opening for intersecting walls. In this case, a minimum of 3 times the diameter of the supply pipe opening shall be used.

7.6. Existing Devices

Any existing backflow protection assembly may be used provided:

- 1) The devices are functioning properly based on a current passing test report.
- 2) The degree of protection is appropriate for the degree of hazard.

Backflow assemblies that do not meet these criteria shall be removed and replaced with approved devices.

8. Testing

Cross Connection Control

It is the responsibility of the water user to ensure their backflow prevention assemblies are tested in accordance with their required schedule and to have any failed assemblies repaired or replaced immediately. Failure to test will result in enforcement action as described in Section 4.

8.1. Periodicity

8.1.1. Backflow prevention assemblies shall be tested immediately and after they are installed, relocated or repaired. They shall not be placed in service unless they are functioning as required.

8.1.2. Assemblies shall be tested at least annually thereafter.

8.1.3. Assemblies in extremely hazardous connections may require more frequent testing as required by the CCS.

8.2. Reporting

8.2.1. Test reports for new installation or repairs must be submitted to the City Public Works Department within 30 days.

8.2.2. Test reports for annual verification must be submitted within the month that the assembly is due for testing.

8.2.3. A BAT may use their own test report forms, provided they contain all of the information required by the local health agency, or they may use the City of Lacey BPA Test Report found in the drawing section of this document.

8.2.4. A verification tag, indicating the device's passing status and test date must be clearly displayed on the assembly.

8.3. Customer Notification

As a courtesy, the City will notify the water user that a test is due approximately one month in advance. The notice will contain:

- 1) The service location
- 2) Assembly information, such as serial number, size, and type
- 3) The date by which the assembly must be tested or repaired
- 4) A contact person, usually designated CCS
- 5) A list of certified backflow assembly testers

8.4. Certified Backflow Assembly Testers (BAT)

The City of Lacey will maintain an annual list of certified BATs for distribution.

8.4.1. Any DOH certified tester may apply for inclusion on this list by submitting a copy of their current certification card, instrument calibration, and Lacey business license.

8.4.2. A BAT may be removed from the list at any time if they are suspected of fraudulent testing, or if valid customer complaints are received.

9. Discontinued Use of Hazard

If at any time a customer believes there is no longer an actual or potential cross-connection on their premises, they may request an inspection to verify elimination of the hazard and discontinued use of their backflow assembly/ies.

9.1. In-ground Irrigation system

9.1.1. If the use of a customer’s in-ground irrigation system is no longer desired, the system may be decommissioned by completing the following:

- 1) Remove the existing backflow assembly and cap the water supply line.
- 2) Remove zone control valves and sprinkler heads that are easily visible.
- 3) Remove plastic or concrete boxes and backfill.

9.1.2. Upon completion, the customer must call for an inspection to verify elimination of the potential cross-connection. A certified BAT may submit a test report on behalf of the customer indicating successful completion in lieu of an inspection.

10. Reclaimed Water

All classes of reclaimed water shall be considered a high health hazard. This is because the degree of treatment of reclaimed water is far less than the minimum requirements for the production of potable water. Even the Class A reclaimed water criteria allow water that could contain pathogens (disease-causing organisms). If reclaimed water is to be used on premises, the levels of protection shown on Table 4 must be used, at a minimum:

Table 4: Backflow Protection with Reclaimed Water Use	
1) Premises where the public water system is used to supplement the reclaimed water supply	AG
2) Piping systems where the public drinking water system is used to supplement new irrigation water mains, until which point reclaimed water becomes available	RPBA

3) Premises where reclaimed water is used other than in paragraph 1, and there is no interconnection with the potable water system	RPBA
4) Residences using reclaimed water for landscape irrigation where there is no interconnection with the potable water system	RPBA
5) Landscape irrigation where reclaimed water is used and there is no interconnection with the potable water system	DCVA

All greywater systems shall be considered a high health hazard. A greywater system uses the effluent from untreated household wastewater that hasn't come into contact with toilet waste or food processing waste. Greywater includes wastewater from bathtubs, showers, bathroom sinks, clothes washing machines and laundry tubs. Greywater excludes wastewater from kitchen sinks and dishwashers. A greywater system is sometimes used to supply water for underground landscape irrigation. The system typically contains one or more holding tanks, an underground distribution system connected to perforated irrigation pipe, an overflow gravity drain to the sewer or septic system, and a pump. If grey water is to be used on premises, the levels of protection shown on Table 5 must be used, at a minimum:

Table 5: Backflow Protection with Grey Water Use	
1) Premises where a grey water system is used	RPBA

11. Mobile Vessel and Hydrant Use

See Figure 5: Mobile Vessel and Hydrant Use

11.1. Fire Hydrant Use

11.1.1. A permit in the form of a meter rental agreement is required to use or operate fire hydrants or valves intended for fire-suppression purposes which are installed on water systems. A hydrant meter must be obtained from the City of Lacey Shop. If a hydrant is used without permission, the Lacey Police Department and Lacey Public Works Department should be notified immediately.

11.1.2. Water distributed through a hydrant meter for uses other than tank filling shall be protected from backflow and isolated from the potable water system with an approved Reduced Pressure Backflow Assembly (RPBA) In circumstances where a Double Check Valve Assembly (DCVA) is desired for use, it must be approved prior to meter rental by the City Cross-Connection Control Program Manager.

11.1.3. Whenever a mechanical means of backflow protection is required (RPBA or DCVA), the contractor shall insure that the assembly is tested by a certified BAT immediately upon installation. Along with the testing,

Cross Connection Control

a test report must be submitted to the City of Lacey Public Works Department. A Backflow Prevention Assembly certification tag must be affixed to the hydrant meter while in use.

11.1.4. Plumbing of pipe onto a hydrant for irrigation or dust control on a project is not permitted.

11.2. Mobile Vessel Use

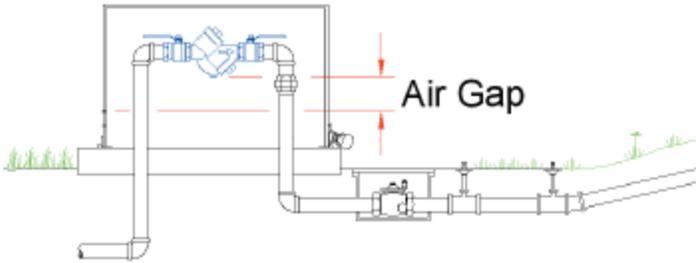
11.2.1. When using a hydrant meter to fill a tanker truck or portable tank of any kind, an approved permanently installed air gap of at least two times the inside diameter of the fill pipe is required.

11.2.2. The air gap must have a current passing annual inspection by a certified CCS or BAT, and the inspection tag affixed to the vehicle.

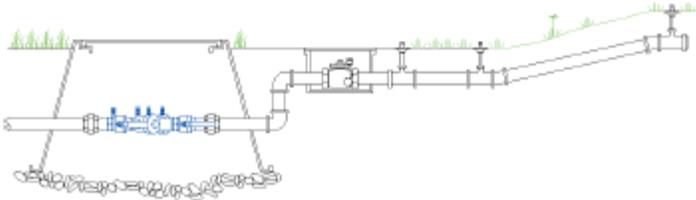
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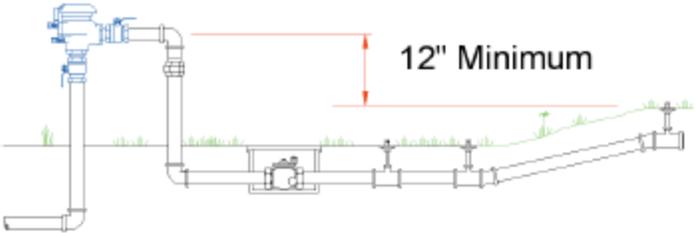
Figure 2: Examples of Installation



*Reduced Pressure Backflow Assembly
in Above-Ground Enclosure*



*Double Check Valve Assembly
in Below-Ground Box*



Pressure Vacuum Breaker Assembly

Figure 3: Air Gap

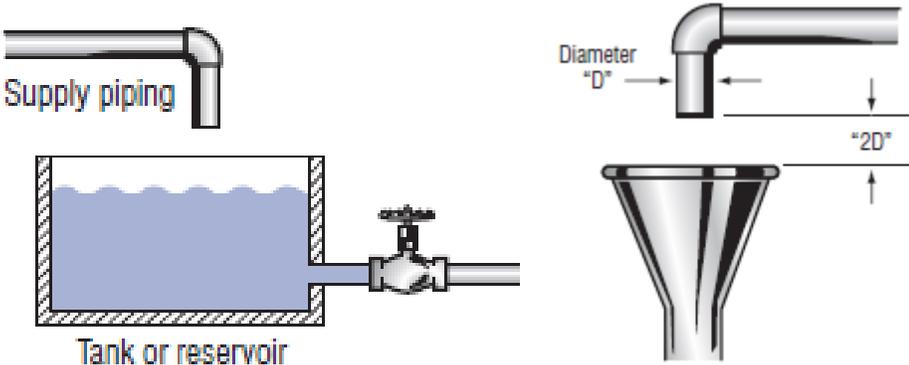


Figure 4: Hose Bibb Vacuum Breaker

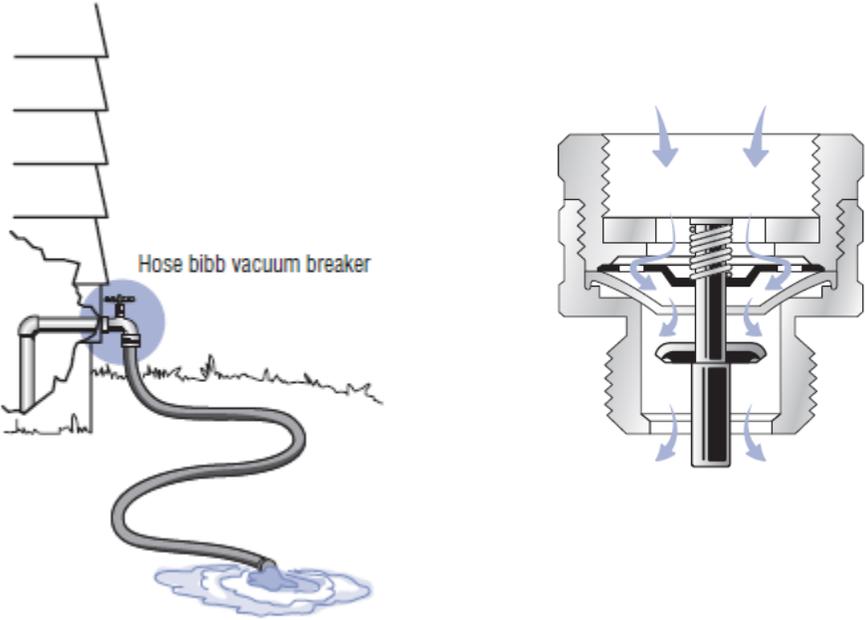
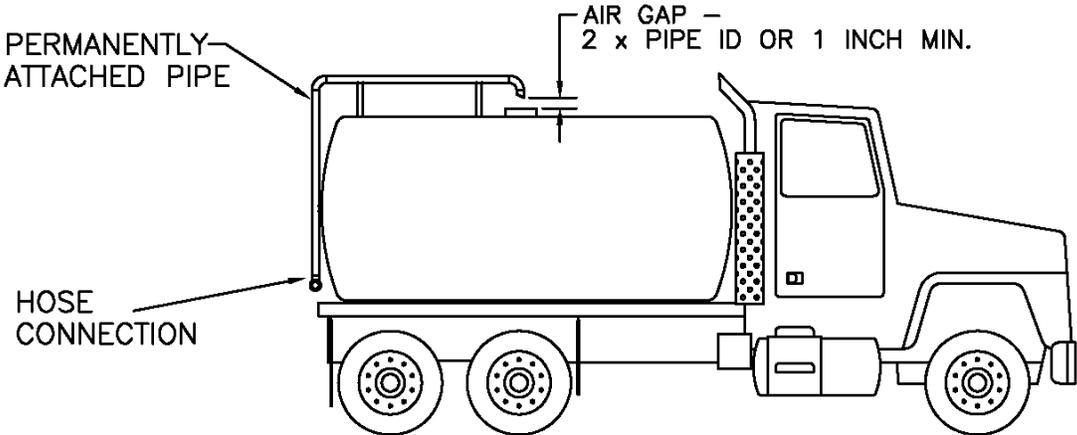
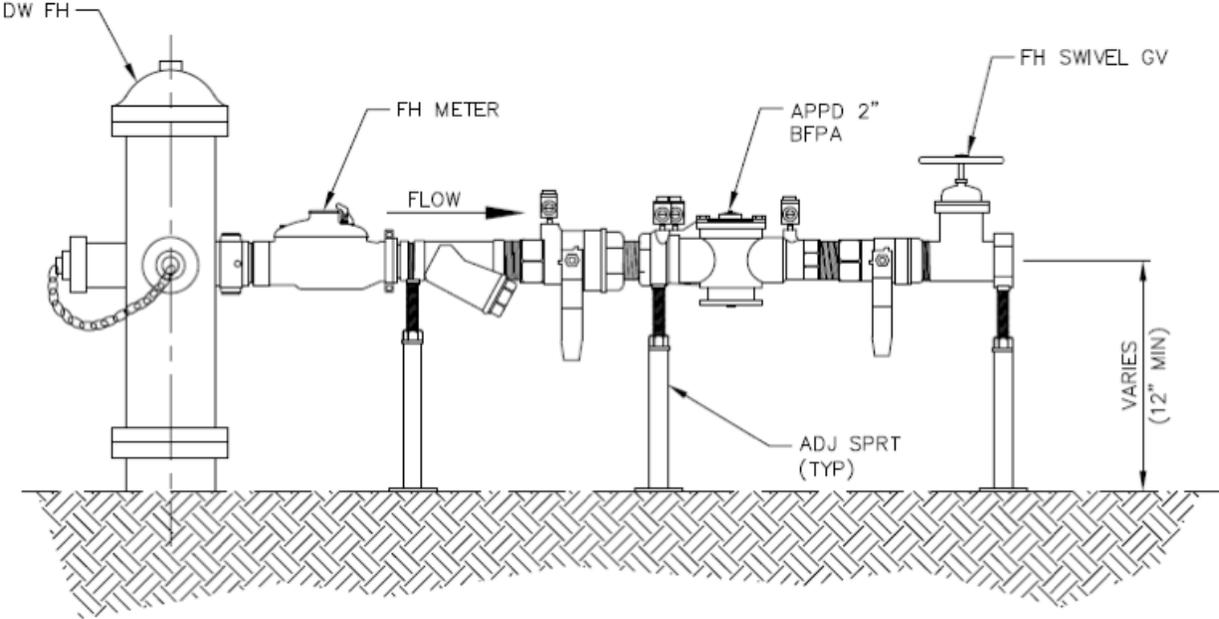


Figure 5: Mobile Vessel and Hydrant Use



WITH AIR GAP



HYDRANT METER WITH BACKFLOW ASSEMBLY



BACKFLOW PREVENTION ASSEMBLY TEST REPORT

CITY OF LACEY Public Works
 420 College St. SE Lacey, WA 98503
 (360) 413-4341 FAX (360) 456-7799 backflow@ci.lacey.wa.us

PWS ID	Water System Name	File #
Facility Name		<input type="checkbox"/> Non-Residential <input type="checkbox"/> Residential
Service Address		City Zip
Contact Person	Phone	Email
Hazard Type (if known)		<input type="checkbox"/> DCVA <input type="checkbox"/> RPBA <input type="checkbox"/> PVBA <input type="checkbox"/> AG <input type="checkbox"/> Other
Preventer Physical Location		
<input type="checkbox"/> New <input type="checkbox"/> Existing <input type="checkbox"/> Replacement: Old Ser. #		Confined Space Yes <input type="checkbox"/> No <input type="checkbox"/>
Assembly Make	Model	Serial # Size "
USC-Approved Yes <input type="checkbox"/> No <input type="checkbox"/>	Proper Install Yes <input type="checkbox"/> No <input type="checkbox"/>	Proper Orientation Yes <input type="checkbox"/> No <input type="checkbox"/>

Initial Test	DCVA	RPBA	PVBA/SVBA
Passed <input type="checkbox"/>	Check Valve 1 Leaked <input type="checkbox"/> ___ psid	Relief Valve Opened ___ psid/ Not Open <input type="checkbox"/>	Air Inlet Valve Opened at ___ psid Did Not Open <input type="checkbox"/>
Failed <input type="checkbox"/>	Check Valve 2 Leaked <input type="checkbox"/> ___ psid	Check Valve 2 Closed Tight <input type="checkbox"/> Leaked <input type="checkbox"/>	Opened Fully Yes <input type="checkbox"/> No <input type="checkbox"/>
		Check Valve 1 ___ psid	Check Valve ___ psid
		Approved Air Gap Yes <input type="checkbox"/> No <input type="checkbox"/>	Leaked <input type="checkbox"/>

Cleaning, Repairs, & Parts	Cleaned <input type="checkbox"/> Repaired <input type="checkbox"/>		Cleaned <input type="checkbox"/> Repaired <input type="checkbox"/>		Cleaned <input type="checkbox"/> Repaired <input type="checkbox"/>	
	<input type="checkbox"/> Disc	<input type="checkbox"/> O-Ring(s)	<input type="checkbox"/> Disc	<input type="checkbox"/> O-Ring(s)	<input type="checkbox"/> Air Inlet Disc	<input type="checkbox"/> Float
	<input type="checkbox"/> Spring	<input type="checkbox"/> Module	<input type="checkbox"/> Spring	<input type="checkbox"/> Module	<input type="checkbox"/> Air Inlet Spring	<input type="checkbox"/> Diaphragm
	<input type="checkbox"/> Guide	<input type="checkbox"/> Rubber Kit	<input type="checkbox"/> Diaphragm	<input type="checkbox"/> Rubber Kit/Guide	<input type="checkbox"/> Check Disc	<input type="checkbox"/> Rubber Kit
	<input type="checkbox"/> Seat	<input type="checkbox"/>	<input type="checkbox"/> Seat	<input type="checkbox"/>	<input type="checkbox"/> Check Spring	<input type="checkbox"/>

Final Test	DCVA	RPBA	PVBA/SVBA
Passed <input type="checkbox"/>	Check Valve 1 Leaked <input type="checkbox"/> ___ psid	Relief Valve Opened at ___ psid	Air Inlet Valve Opened at ___ psid
Failed <input type="checkbox"/>	Check Valve 2 Leaked <input type="checkbox"/> ___ psid	Check Valve 2 Closed Tight <input type="checkbox"/>	Opened Fully Yes <input type="checkbox"/> No <input type="checkbox"/>
		Check Valve 1 ___ psid	Check Valve ___ psid

Air Gap Inspection	Pass <input type="checkbox"/> Fail <input type="checkbox"/>	Supply Pipe Diameter "	Air Gap Separation "
Line Pressure	psi	Detector Meter	Gals <input type="checkbox"/> CuFt <input type="checkbox"/>
			Service Restored Yes <input type="checkbox"/> No <input type="checkbox"/>

Remarks*

Test Kit Make & Model	Serial #	Ver./Cal Date**
-----------------------	----------	-----------------

By this signature, I certify:

- I personally inspected and field-tested the backflow assembly using field test procedures meeting WAC 246-290-490 and test equipment meeting WAC 246-292-034; or I personally inspected the air gap or AVB.
- The information in this report is true, complete, and accurate.

BAT Signature (initial test)	Cert. #	Date/Time
BAT Name (print)	BAT Phone #	
Repaired By		Date/Time
BAT Signature (after repair)	Cert. #	Date/Time
BAT Name (print)	BAT Phone #	
BAT Company Name	Address	

*Note unapproved backflow preventer, missing/defective components, repairs made, or conditions that may adversely affect assembly.

**The date of the most recent field test kit verification of accuracy or calibration whichever is most recent.



420 COLLEGE STREET SE
 LACEY, WA 98503-1238
 (360) 413-4341 Fax (360) 456-7799

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 together*

Preliminary Cross-Connection Control Hazard Assessment Form
Non-Residential Customers

Name of Customer or Business: _____

Address: _____

Phone Number: _____

Description of Business: _____

Is your business or premises of a type included in the table below (check all that apply)?

Agricultural (farm or dairy)		Metal plating industry	
Beverage bottling plant		Mortuary	
Car wash		Petroleum processing or storage plant	
Chemical plant		Pier or dock	
Commercial laundry or dry-cleaners		Radioactive material processing	
Having both reclaimed water and potable water provided		Survey access denied or restricted	
Film processing plant		Wastewater lift station or pumping station	
Hospital, medical center, nursing home, veterinary, medical, or dental clinic, or blood plasma center		Having an unapproved auxiliary water supply interconnected with the potable water supply	
Having separate irrigation system using City water and adding chemicals*		Marijuana growing or processing	
Laboratory		Other	

*e.g., parks, playgrounds, golf courses, cemeteries, estates, etc.

Other potential cross-connection concerns:

- Irrigation system
- Fire sprinkler system, using chemicals or anti-freeze
- Swimming pool
- Other (describe): _____

Note to customer: This form is used for preliminary assessment only. The City may require a more thorough assessment at a later date.

This form was completed by (print name): _____ **Date:** _____



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Water Use Questionnaire

Residential Customers

Customer Account Number (optional)

Customer Name

Address Line 1

Address Line 2

Please indicate whether the special plumbing or activities listed below apply to your premises:

Yes	No	Plumbing or Activity Present on Customer's Premises
		Underground sprinkler system
		Water treatment system (e.g. water softener)
		Solar heating system
		Residential fire sprinkler system
		Sewage pumping facilities or grey water system
		Boat moorage with water supply
		Hobby farm (5-10 acres)
		Animal watering troughs
		Swimming pool or spa
		Greenhouse
		Decorative pond
		Photo lab or dark room
		Other water supply (whether connected to plumbing system or not). This includes but is not limited to private wells, and ability to draw water from lakes, streams or springs.
		Home-based business. If Yes, list type/describe (e.g., beauty salon, machine shop, etc.): _____ _____

Completed by (print name): _____ Date: _____

Resident's Signature: _____



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 LACEY, WA 98503-1238
 (360) 413-4341 Fax (360) 456-7799

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Cross-Connection Control Hazard Survey Report
Non-Residential Customers

Customer Information:

Premises name: _____ Telephone: _____
 Address: _____
 Contact person: _____ Title: _____
 Description of premises: _____
 Description of water use: _____

Water Service and Backflow Prevention Assembly (BPA):

Service Type	Size	Meter #	BPA Size	BPA Type
Domestic				
Irrigation				
Fire				
Other				

Survey Results:

Cross-connection	Location & Description	Backflow Prevention

Attach additional sheets if needed

Surveyor's Comments:

Continued

Surveyor's Recommendations:

I certify that this cross-connection hazard survey accurately reflects the overall risk posed by the customer's plumbing system to the City's distribution system. Based on the above survey, I certify that:

- 1. I found the following type(s) of premises isolation backflow preventer(s):
Air Gap ____ RPBA/RPDA ____ DCVA/DCDA ____ None ____
- 2. The existing backflow preventer(s) is/are properly installed and a currently DOH-approved.
Yes ____ No ____ N/A ____
- 3. The existing backflow preventer(s) is/are commensurate with the degree of hazard:
Yes ____ No ____ N/A ____
- 4. The premises owner should install a premises isolation backflow preventer of the following type:
Air Gap ____ RPBA/RPDA ____ DCVA/DCDA ____ N/A ____
- 5. The premises owner should replace the existing premises isolation backflow preventer(s) with:
Air Gap ____ RPBA/RPDA ____ DCVA/DCDA ____ N/A ____

Cross-Connection Control Specialist (CCS) Information:

Name: Branden Clark DOH CCS Certification #: 014136 Telephone: (360) 413-4341
Company name: City of Lacey Address: 420 College St SE, Lacey, WA 98503

CCS Signature: _____ **Date:** _____

As the Owner of the Premises (or Owner's authorized agent), I certify that I have received a copy of this completed Cross-Connection Control Hazard Survey Report.

Signature: _____ **Date:** _____

Note: Customers and regulatory agencies should be aware that the Purveyor's requirement for this cross-connection hazard survey and/or for the installation of a specific backflow prevention assembly on a service pipe *do not* constitute an approval of the customer's plumbing system, compliance of the customer's plumbing system with the Uniform Plumbing Code or an assurance of the absence of cross connections in the customer's plumbing system.

Survey Results:

